IMF Economic Review (2022) 70:185–211
https://doi.org/10.1057/s41308-021-00155-3

RESEARCH ARTICLE

International Trade and Letters of Credit: A Double-Edged Sword in Times of Crises

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Published online: 5 January 2022

Abstract

This study argues that the ability to mitigate risks associated with international trade is particularly important at times of heightened uncertainty, such as the economic crisis caused by the Covid-19 pandemic. Risk mitigation can be achieved through letters of credit (LCs), trade finance instruments providing guarantees to trading partners. As their use varies across products, exports of some products are more resilient than others during times of increased uncertainty. This situation reverses in times of financial crises when distressed banks may limit the supply of LCs. Our analysis using data on US and EU-15 exports during the Covid crisis and the Global Financial Crisis provides empirical support for these hypotheses.

Keywords International trade · Trade finance · Letter of credit · Risk · Global financial crisis · Covid-19

JEL Classification G01 · F14 · F23

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1 Introduction

Trading goods across international borders is more risky than trading within national borders. The trading partners are located in different countries that may be separated by a large distance which results in long shipping times, are subject to different laws and may speak different languages. Deciding on whether the risk should be borne by one of the trading partners or shifted onto a bank by paying a fee to purchase a so-called letter of credit (LC) is one of the key decisions that needs to be made.

This paper argues that the ability of the trading partners to mitigate risks associated with international trade transactions is particularly important at times of heightened uncertainty, such as the crisis caused by the Covid-19 pandemic. And because the use of LCs varies across products, exports of some products are more resilient than exports of other products during times of heightened uncertainty. This situation reverses in times of a financial crisis when purchasing LCs becomes difficult, if not impossible, due to the financial system being in distress. Then the goods that require guarantees and protection provided by LCs experience a more severe decline in exports than other products.

The first contribution of this paper lies in providing empirical evidence documenting the differential impact of the Covid crisis and the Global Financial Crisis (GFC) on products relying to a different extent on LCs. This is a novel finding, not documented in the exiting literature so far. The ability to distinguish between different causes of crisis-related drops in international trade may be important for forecasting future recoveries.

The second contribution of the paper lies in creating a new index of product-specific intensity of LC use, which is made possible by the availability of unique data detailing financial terms of international trade transactions.

There exist four primary ways of structuring financing in international trade. Under *open account* (OA), the importer pays after the arrival of the goods in the destination and the exporter is exposed to the risk of non-payment. Alternatively, under *cash in advance* (CIA) the importer pays before the exporter ships the goods to the destination, and thus the importer faces the risk of not receiving the pre-paid goods. The trading partners may shift the risk onto their banks by purchasing an LC. In an LC-financed transaction, the importer's bank promises to pay for the goods on behalf of the importer provided the exporter meets all requirements specified in the contract. In this way, the risk of non-payment or non-delivery of pre-paid goods is eliminated. A substantial fee is typically charged by a bank issuing an LC. The exporter may further eliminate the risk of the importer's bank defaulting by using services of a domestic bank to confirm an LC. Finally, under *documentary collection* (DC), the transaction is facilitated by the exporter's bank and the importer's bank. While this financing term works similarly to LC, it does not involve a payment guarantee by the importer's (or the exporter's) bank, and thus it is much cheaper than LC. However, in some cases a properly structured DC can provide partial protection.

The paper proceeds in several steps. First, we demonstrate differences across products in their reliance on LCs. We do so using international trade data from

Turkey disaggregated by firm, 8-digit HS product code, country, year and payment method. We construct an LC-intensity index (*LC-Int* hereafter) removing variation due to different partner countries in particular years. *LC-Int* is available for 1,196 4-digit HS products.

The index reveals considerable variation across products, including within the same industry. For instance, "Silk-worm cocoons suitable for reeling" (HS5001) are among the products with the highest value of *LC-Int*, while another product belonging to the same 2-digit HS heading "Silk waste (including cocoons unsuitable for reeling, yarn waste and gametted stock)" (HS5003), is among products with the lowest *LC-int* value. Similarly, the index value for "Live bovine animals" (HS0102) is in the top decile, while the one for "Meat of bovine animals; fresh or chilled" (HS0201) is only in the 3rd decile.

The *LC-Int* measure exhibits intuitive correlations with several product characteristics, such as, the value per weight, durability, average shipping time, transaction size, etc. Since LCs are expensive and incur a non-negligible fixed cost, if a given product tends to be shipped in bulk, due to its inherent characteristics, the large transaction value gives the trading partners a greater impetus to eliminate the risk. Durable products, which are more easily collateralized, are easier to insure. A longer delay due to the shipping time increases the risk of an adverse exchange rate or price movement, and thus may prompt one of the trading partners to try to renegotiate the contract.[1]

Second, we focus on the trade collapse which took place in the first half of 2020 as a result of the economic crisis induced by Covid-19. The economic downturn caused by widespread lockdowns and uncertainty about the trajectory and duration of the pandemic created a period of heightened uncertainty for business. Exporters faced an increased risk of non-payment, while importers worried about not receiving prepaid goods as a result of their trading partners facing financial difficulties or going bankrupt. Global trade flows fell by 16 percent and 18 percent year-on-year in April and May, respectively. And the US exports saw a decline of 30 and 35 percent during the same period.

Using monthly US and EU-15 export data for the 2017-2020 period, we show that products that are typically traded on LC terms proved to be more resilient during the pandemic. More specifically, comparing year-on-year growth rates, we find that products at the 90th percentile of *LC-Int* experienced a 2.5 log points smaller decline in exports during the pandemic crisis, relative to products at the 10th percentile of *LC-Int*. These findings are robust to allowing for a differential impact of the pandemic on consumer goods, consumer durables, differentiated products, as well as products with other characteristics such as contract intensity, share of ocean shipping, average shipment size, relationship stickiness and income elasticity.

The third part of the paper considers the Great Trade Collapse of 2008-09. Between the third quarter of 2008 and the second quarter of 2009, the world witnessed the steepest fall of world trade in recorded history and the deepest fall since the Great Depression

[1] Hummels and Schaur (2010) show theoretically and empirically that transit lags act as significant trade barriers.

(Baldwin 2009). The Great Trade Collapse was caused by the GFC, a shock very different in nature to the Covid-induced economic downturn when it comes to its impact on the composition of trade flows. As the GFC made it difficult, if not impossible, to purchase LCs, it had a particularly strong impact on products heavily reliant on protection offered by LCs. Using data on US and EU-15 exports for 2003-2009, we demonstrate that products relying more heavily on LCs experienced a more severe decline in exports to countries affected by the GFC.

In the final part of the paper, we conduct a validation exercise using Turkish data where we can *observe the actual use of LCs in financing a given trade flow.* We show that the share of LC-backed exports increased during the Covid crisis and decreased for exports destined to countries afflicted by the GFC. By showing patterns consistent with those found in the main analysis, the validation exercise provides yet another piece of evidence in favor of our hypotheses and boosts our confidence in the *LC-int* measure.

Our paper is related to three strands of the economic literature. First, it is related to the literature on economic impacts of uncertainty. A large body of research shows that uncertainty affects investment, growth, employment and trade (see e.g. Bernanke (1983), Hassler (1996), Bloom (2009), Handley and Limão (2015, 2017)). Our contribution to this literature lies in pointing out that different types of exports products are differentially affected by uncertainty caused by economic crises.

The second strand of related literature encompasses studies aiming to explain the Great Trade Collapse. The existing literature has investigated several factors which contributed to this phenomenon, namely the shift away from demand for durable goods (Levchenko et al. 2009, Eaton et al. 2016), increased protectionism (Evenett 2009), the lack of access to financing (Amiti and Weinstein 2011, Paravisini et al. 2015, Chor and Manova 2012) and the interplay of uncertainty and higher ordering costs for foreign (relative to domestic) inputs (Novy and Taylor 2020). We contribute to this literature by providing systematic evidence that confirms the importance and clarifies the nature of the role of insurance offered by the financial system in international trade.

Finally, our paper is related to the new but growing literature on financing terms in international trade transactions (Schmidt-Eisenlohr (2013), Antràs and Foley (2015), Hoefele et al. (2016), Ahn (2014), Niepmann and Schmidt-Eisenlohr (2017), Demir et al. (2017), Demir and Javorcik (2018), Ahn and Sarmiento (2019), Demir and Javorcik (2020)). We contribute to this literature by drawing attention to the interplay between the type of financing terms used and performance of exports during economic and financial crises. Our other contribution lies in compiling a new index of product reliance on LCs.

2 Letter-of-Credit Intensity Measure: *LC-Int*

The purpose of this section is to introduce the *LC-Int* index, which will serve as the key variable in our analysis. We start with background information on the standard ways of structuring financing terms in international trade transactions. We then explain why it makes sense to create a product-specific measure of reliance on LCs.

We introduce the data source and the methodology. And finally we discuss the properties of the index.

2.1 Financing Terms in International Trade Transactions

There exist four main methods of structuring financing terms in an international trade transaction: *open account, cash in advance*, *documentary collection*, and *letter of credit*.

Under *open account* terms, goods are delivered before a payment is made by the importer. This is the safest method for the importer and the riskiest one for the exporter. Under *cash-in-advance* terms, the exporter receives the payment before ownership of the goods is transferred. This method eliminates the payment risk on the part of the exporter, and all the risk is borne by the importer.

A *letter of credit* eliminates the risk to both parties. An LC is a guarantee issued by the importer's local bank (issuing bank) that a payment will be made to the exporter, provided that the conditions stated in the LC have been fulfilled. The importer's bank charges (often a substantial) fee for issuing an LC. The exporter can also request its local bank to confirm the LC. If confirmed, the exporter's bank (the confirming bank) takes on the responsibility for making payments if the importer's bank fails to transfer the payment by the due date. The LC is the most secure instrument available to international traders. Another widely-used payment method is *documentary collection*, in which transactions are settled by banks through an exchange of documents. While this method does not involve a payment guarantee, it may partially eliminate the transaction risks as the importer does not pay prior to shipment and the exporter retains ownership of the goods until the importer pays for the goods or accepts to pay at a later date.

LCs protect the seller against the buyer (i) refusing to accept the shipment and the associated payment obligations; (ii) refusing to pay for the goods received (fraud); (iii) intentionally delaying the payment; (iv) disputing the terms of the contract (e.g. whether the goods are of specified quality) in order to reduce the payment obligation.

The fundamental principle of an LC is that it deals with documents and not with goods. The payment obligation is independent from the underlying contract of sale or any other contract in the transaction. The bank's obligation is defined by the terms of the LC alone, and the contract of sale is not considered. Thus the bank is obliged to pay, regardless of whether the contract between the buyer and the seller is subject to contractual issues. The LC does not permit of any dispute with the buyer as to the performance of the contract of sale being used as a ground for non-payment or reduction or deferment of payment.[2] Whilst the bank is under an obligation to identify that the correct documents exist, the bank is not responsible for investigating

[2] The only exception to this may be fraud. For example, a dishonest seller may present documents which seem to comply with the LC and receive payment, only for it to be later discovered that the documents are fraudulent. This would place the risk on the buyer, but it also means that the issuing bank must be stringent in assessing whether the presented documents are legitimate.

the underlying facts of each transaction, whether the goods are of the sufficient — and specified—quality or quantity. Because the transaction operates on a negotiable instrument, it is the document itself which holds the value—not the goods to which it refers. This means that the bank need only be concerned with whether the document fulfils the requirements stipulated in the letter of credit.

2.2 Why a Product-Specific Measure is Informative

The nature of the product traded matters for how desirable it is to use an LC.

For instance, under the Basel framework, a lower credit conversion factor applies when the traded good can serve as a collateral (Demir et al. 2017). Therefore, firms trading products which can be collateralized more easily, because they are more durable or less differentiated, would rely on LCs.

In the same vein, sellers of heavy products, which tend to be shipped by sea and have longer transport times, face a higher risk of the buyer changing her mind and attempting to cancel the order. They are more likely to accept a trade deal only if they can guarantee the transaction with a letter of credit.

The risk of default also depends on specific features of the market on which the products are traded. Exporters primarily need LCs to protect themselves against importers intentionally delaying payment or attempting to pay less by questioning product quality or specifications. This is more likely to occur in markets where purchasing firms have relatively thin margins, more difficult access to credit or a high bargaining power vis-a-vis the exporter. Exporters of perishable goods are particularly vulnerable as perishability means that there is little time to call off the transaction and find an alternative buyer.[3]

In summary, there is not one particular product characteristic that makes LCs more desirable. Rather it is an array of factors that determine product-specific demand for trade insurance. We will come back to this issue later in this section when we examine the link between *LC-Int* and product characteristics.

2.3 Why Constructing *LC-Int* Using Turkish Data is Appropriate

While constructing our *LC-int* indicator on observations based solely on Turkish trade might reflect some specificities of the country's productive and financial systems, we believe that this does not detract from the fact that the index contains general and useful information on patterns pertaining to products traded around the world.

There are several considerations in choosing the data to be used for constructing the *LC-int* measure. First, one would like to use information from a country with a large trading portfolio in order to maximize the product coverage of the index. Second, one would like to focus on a country with a reasonably well

[3] Obviously, factors specific to the partner country and the trading firms matter, but these will be purged from our index, as explained later.

developed banking sector that is capable of both issuing and confirming LCs. At the same time, it is useful to choose an emerging market rather than a G7 country, as less than perfect contract enforcement increases the need for using LCs on the import side, thus increasing prevalence of LCs and amplifying variation across products. Finally, one needs to choose a country where data on trade financing terms are available.

Turkey fulfills all of the criteria listed above. With its population of over 80 million, Turkey is one of the most important emerging markets. It is a large open economy trading more than 1000 4-digit HS products with more than 200 countries. Although its institutions have been improving, they are still at the level representative of an emerging market.

During the sample period that we use to construct *LC-Int* (2003-2006), Turkish banking system was healthy, with strong balance sheets, low levels of nonperforming loans, and capital levels above regulatory minima. This was possible thanks to a comprehensive reform program in the financial sector backed by the International Monetary Fund in the aftermath of the 2001 crisis and strong commitment by the Turkish authorities to harmonization with the EU acquis. The period is also characterized by high growth rates and rising incomes, with real per capita income growth averaging at about 6% per annum. Such strong economic performance and successful economic reforms, accompanied by ample global liquidity, led to a significant surge in foreign direct investment into Turkey. The banking sector benefited from such inflows, and as a result, the share of total banking sector assets held by foreigners reached 25%.

During the sample period, about 20% of the total value of Turkish imports and 15% of exports used LCs. These figures are very close to the use of LCs by importers located in middle income countries – which include Turkey—as reported by Niepmann and Schmidt-Eisenlohr (2017) based on SWIFT data.

Most importantly for our purposes, Turkey is unique among emerging markets and developed countries in mandating reporting of financing terms in all international trade transactions. To the best of our knowledge no other country collects such information for both imports and exports. Moreover, reporting of financing terms in Turkey has to be backed by documentation, which mean that the data collected are highly reliable.

Our index will be constructed using data on both import and export flows, which means it will capture demand for LCs from exporters in a large number of countries around the world selling to Turkey and as well as Turkish exporters supplying a variety of countries. Thus we would expect it to be fairly representative of the global demand for LCs. Focusing on Turkish exports to a variety of markets (where LCs are issued) will also mean that we should not be concerned about specificity of the Turkish financial sector affecting the index.

Finally, the econometric results presented in the following sections show that our indicator has strong explanatory power for the patterns and trends in international trade flows that do not involve Turkey.

2.4 Constructing the *LC-Int* Index

We construct our *LC-Int* measure using confidential micro-level international trade data from Turkey. The data set is provided by the Turkish Statistical Institute and covers the universe of Turkey's imports and exports. It includes information on the monthly value of imports (including freight and insurance costs) and exports (reported on f.o.b. basis) as well as the breakdown of financing disaggregated by the importing/exporting firm, 8-digit HS product code, country of origin/destination. Most importantly for our purposes the dataset distinguishes between the four main financing terms: open account, cash in advance, documentary collection, and letter of credit.

Our *LC-Int* index is constructed based on the intensity of the LC use in both import and export transactions. To avoid the period of the recent financial crisis, we construct our measure based on figures for 2003–2006. We pool exports and imports transactions together to eliminate the possibility that particularities of the Turkish financial sector affect availability of LCs across products.

During the period under consideration, transactions relying on LCs were found in 92% of the 4-digit HS products, with the average share of LC-backed trade across all 4-digit HS product categories reaching 9%. There exists, however, considerable heterogeneity in the use of LCs across products/industries, which we exploit to construct our *LC-Int* measure (see Table A1 and Fig. A1 in the Appendix).

To construct *LC-Int*, we first estimate the following regression using monthly data for the 2003-2006 period:

$$\mathbb{1}\{p = LC\}_{\text{fikcm}} = \alpha_{ct} + \sum_{y=1}^{12} \mathbb{1}\{\text{month} = y\} + \alpha_{k4} + \epsilon_{\text{fikcm}}, \tag{1}$$

where the dependent variable is a binary variable that takes on the value one when the payment method (p) is LC, and zero otherwise for trade flow $f = \{\text{import}, \text{export}\}$ by Turkish firm i, 8-digit HS product k with a trade partner located in country c in month-year m. We add country-year fixed effects (α_{ct}), 4-digit HS product fixed effects (α_{k4}) and dummies for calendar months to capture seasonal effects. The estimated product fixed effects capture trade insurance intensity of each 4-digit HS product.[4] By construction, $\hat{\alpha}_{k4}$ is orthogonal to country-level factors.

2.5 *LC-Int* Versus Other Product Characteristics

Our *LC-Int* index is available for 1,196 goods, of which 188 are agricultural and agri-food products.[5] In Fig. 1, we graph *LC-Int* against six other product characteristics, and in Appendix Table A2 we test more formally how *LC-Int* correlates with various other product characteristics.

[4] We drop cases where the number observations per 4-digit HS product code is less than 10.

[5] The data is available at https://www.dropbox.com/s/bnqjlsdnchpo939/LCInt.txt?dl=0.

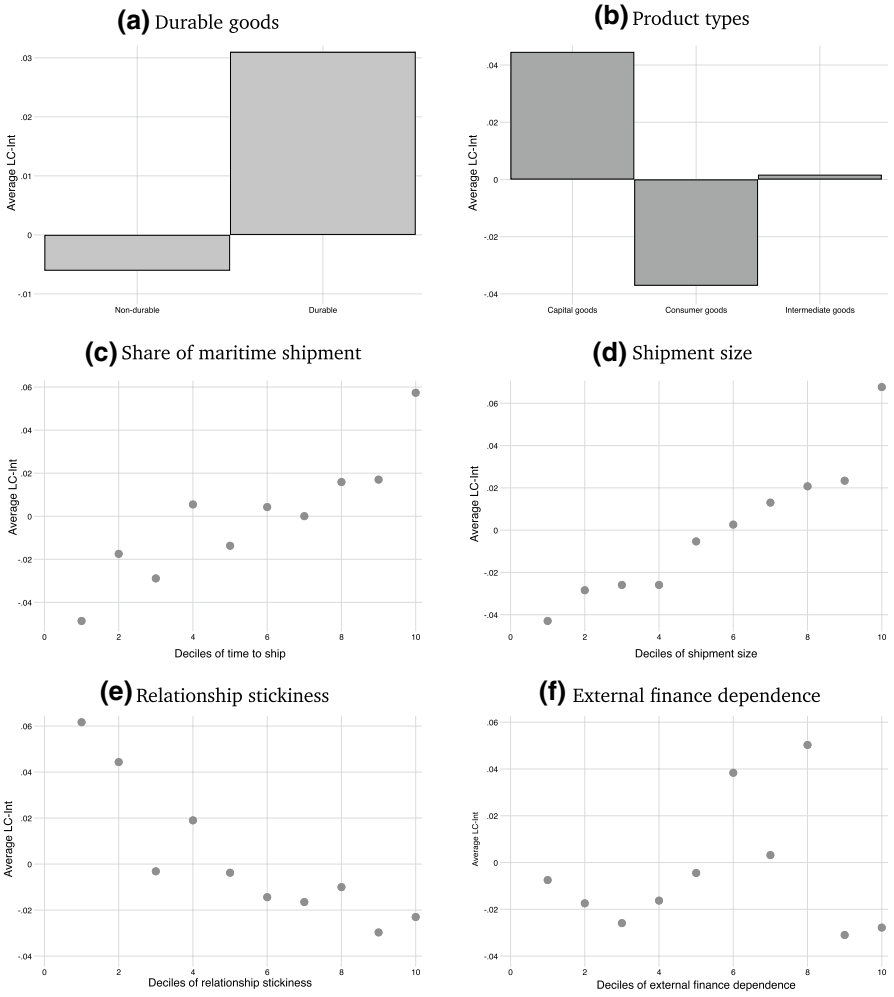

Fig. 1 Average *LC-Int* and other product characteristics *Notes:* The figure shows the average value of *LC-Int* for each category or decile as stated on the x-axis. *LC-Int* is demeaned in the full sample to have a zero mean

As mentioned earlier, capital goods and durable consumer goods tend to rely more on LCs.[6] Products that tend to be shipped by sea also use LCs more intensively.[7] This could be explained by the fact that maritime transport is slow and the probability of default increases with shipping time (Berman et al. 2013). A longer

[6] Durability and product types are given by the classification by broad economic categories (BEC) provided by the United Nations Statistics Division.

[7] We use the 4-digit HS product-specific share of ocean transport in total exports from the EU-27 to the US in 2005 based on Comext (Eurostat) data.

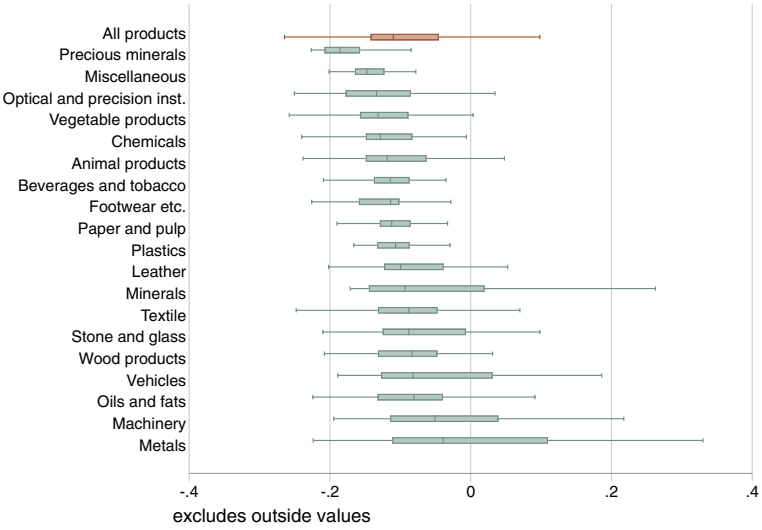

Fig. 2 Median, 25th and 75th percentiles of *LC-Int*, by industry *Notes:* The figure shows the median value of *LC-Int* for each industry. The box sizes show the range from the 25th to the 75th percentile. Whiskers show the higher (lower) adjacent value, i.e. upper (lower) quartile +(-) 1.5 × interquartile range

shipping time also increases the risk of an adverse exchange rate or price movement and thus may prompt one of the trading partners to try to renegotiate the contract.

Products that tend to be shipped in larger volumes use LCs more intensively.[8] This pattern is consistent with the findings of Niepmann and Schmidt-Eisenlohr (2017) based on SWIFT data. Trading partners may have a greater incentive to insure larger shipments. Moreover, as bank LC fees include a fixed component when issuing or confirming LCs, purchasing an LC is relatively cheaper for products that tend to be traded in larger volumes.

In contrast, relationship stickiness, defined as the average duration of a trading relationship observed in a given product (a measure developed by Martin et al. (2020)) is negatively correlated with the LC use. This is intuitive, as long-term trading relationships are associated with greater trust between the trading parties.

Finally, *LC-Int* exhibits no correlation with the widely used industry-level measure of dependence on external financing constructed by Rajan and Zingales (1998). This is not surprising, as *LC-Int* is designed to capture something very different. The external finance dependence measure captures the amount of desired investment that cannot be financed through internal cash flows generated by the same business, while *LC-Int* captures the need to insure sales against non-payment and is not directly related to the firm's or industry's financing needs.

[8] The indicator of shipment size by 4-digit HS product is based on French monthly custom declarations for 2008. It is defined as the logarithm of the median value of monthly French firm-level export values, after controlling for destination and firm fixed effects.

Figure 2 shows the median value of *LC-Int* for all products as well as by broad product category. The products with the highest values of *LC-Int* include metals and minerals (such as ferrous products, tar, crude petroleum oils, pitch coke, etc.), as well as machinery and transport vehicles (such as, rail locomotives). The former group of products often involves bulk shipments going by sea. The latter products tend to be customized. As visible in the figure, values of LC-Int varies widely from one HS4 product to another, even within the same broad product category.

3 The Covid-19 Pandemic and Trade

The economic downturn induced by the COVID-19 pandemic has led to a large decline in global trade in April and May of 2020, followed by a steady recovery during June-August 2020. The pandemic was a time of heightened uncertainty increasing the risk of non-payment for shipped exports and non-delivery of pre-paid imports. However, there were no reported shortages of the supply of bank financing. Therefore, we expect that products traditionally rely more on LCs exhibited greater resilience relative other products during that time.

Before we test this hypothesis formally, we illustrate in Fig. 3 the trajectory of US exports, where the April/May drop is clearly visible. It is also evident from the figure that exports of products that traditionally rely more on LCs exhibited greater resilience relative other products during that time: the dip in US exports of such products was milder and the rebound faster.

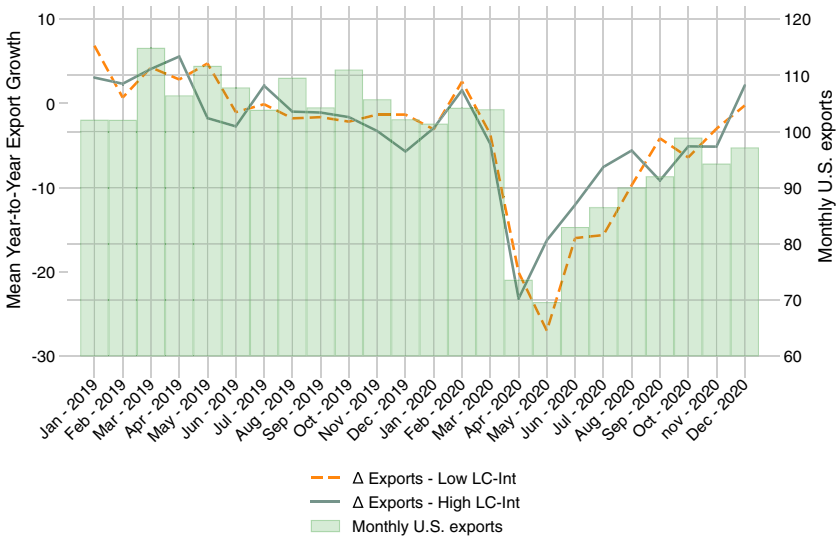

Fig. 3 The collapse of U.S. exports during the Covid-19 pandemic *Notes:* The green bars (*right axis*) show the monthly U.S. exports during 2019 and 2020. The green and orange lines (*left axis*) show the year-to-year growth rates of U.S. monthly exports of products with higher than median *LC-Int* and lower than median *LC-Int* respectively

3.1 Data and Empirical Specification

To test our hypothesis, We use monthly data on US and EU-15 exports for the period April 2017 to December 2020. The data for the US and the EU are provided by the International Trade Centre and EUROSTAT, respectively, and report the value of monthly export flows to their respective top 100 destination countries at the 4-digit HS product level.[9]

We estimate the following specification:[10]

$$\Delta \ln(\text{Exports}_{\text{odpym}}) = \beta \text{LC-Int}_p \times \text{CovidCrisis}_{\text{ym}} + B\text{ProductChar}_p \times \text{CovidCrisis}_{\text{ym}} + \theta_{\text{odym}} + \theta_{\text{odp}} + \theta_{\text{opy}} + \theta_{\text{pm}} + \epsilon_{\text{odpym}} \quad (2)$$

where the dependent variable is the change, with respect to the same month of the previous year, in the logarithm of exports of product p from country o to country d, in month m of year y. ProductChar_p is a vector of the product characteristics presented in the section above, and B is the corresponding vector of coefficients.[11]

We are interested in testing whether exports of products that typically trade using LCs were more resilient than exports of other products during the Covid crisis. Our estimate of interest is β, the coefficient on the interaction between the *LCint* measure and the pandemic period. This poses the question of how to define the indicator for the Covid crisis period, CovidCrisis_{ym}.

Figure 3 reveals that the collapse of U.S. exports in 2020 was severe but limited in time. The US and world trade recovered and reached a new steady trend before the end of the 3rd quarter of 2020 (WTO 2021). Therefore, CovidCrisis_{ym} takes the value of 1 for February through August 2020. The event study, presented later, will reveal that this time window is a very conservative choice.

The specification includes an extensive set of fixed effects. First, we allow θ_{odym} to absorb any variation in the year-on-year growth of exports for a given country pair in a given time period (year-month), such as slowdown in the national economy and lockdowns. Second, we control for the average LC-intensity of each product for each country pair with θ_{odp}. We include θ_{opy} to capture the change in export supply of a given product from a given origin country in a given year and θ_{pm} to control for product-specific seasonality.

Our estimation is performed separately for the US and EU-15 exports. When focusing on the US sample, origin country is fixed, i.e. $o = USA$, so the origin-specific dimension of fixed effects is dropped.

[9] EU-15 exports exclude EU-27 destinations, and both samples exclude Turkey.

[10] We write the empirical specification in its general form to save space. Note that the US sample has a single source country, i.e. $o = US$.

[11] The vector of product characteristics includes: indicator variables for consumer goods, non-differentiated goods, and consumer durables, as well as contract intensity, share of ocean shipping, average shipment size, relationship stickiness and income elasticity. In some specification, it also includes the external finance dependence measure.

Table 1 Trade in *LC-Int* Products during the Covid-19 pandemic-benchmark results

Dep. Var.: $\Delta \ln(Exports_{odpym})$				
	(1)	(2)	(3)	(4)
US exports				
LC-Int$_p$ ×	0.144b	0.155b	0.154b	
CovidCrisis$_{ym}$	(0.059)	(0.066)	(0.067)	
LC-Int$_p$ ×				0.171b
High CovidCrisis$_{dym}$				(0.068)
LC-Int$_p$ ×				0.030
Low CovidCrisis$_{dym}$				(0.128)
No. Obs	663575	663575	663575	663575
R^2	0.099	0.100	0.100	0.100
Fixed effects	dp, dym, py, pm			
EU-15 exports				
LC-Int$_p$ ×	0.193a	0.116a	0.134a	
CovidCrisis$_{ym}$	(0.033)	(0.036)	(0.036)	
LC-Int$_p$ ×				0.139a
High CovidCrisis$_{dym}$				(0.038)
LC-Int$_p$ ×				0.106c
Low CovidCrisis$_{dym}$				(0.059)
No. Obs	5709077	5709077	5709077	5709077
R^2	0.094	0.094	0.094	0.094
Fixed effects	odp, odym, opy, pm			
Interactions w/ product charact	No	Yes	Yes	Yes
Interactions w/ external finance dep	No	No	Yes	Yes

CovidCrisis$_{ym}$ is a dummy indicating the Covid crisis period (March 2020–August 2020). Other product characteristics are dummy variables for consumer goods, non-differentiated goods, and consumer durables, as well as contract intensity, share of ocean shipping, average shipment size, relationship stickiness, and income elasticity. High CovidCrisis (Low CovidCrisis) denotes countries with Covid-19 cases above (below) the monthly median during the March 2020 - August 2020 period. Significance levels: c: $p< 0.1$, b: $p < 0.05$, a : $p < 0.01$. Standard errors, clustered by destination × 4-digit HS codes, are shown inparentheses

While including a long pre-Covid period in the estimation does not directly contribute to the estimating the effect of interest, it allows us to capture seasonality in product exports by including product-month fixed effects. Given the extensive set of fixed effects, the variable of interest is identified from variations across products within the year 2020, i.e. between the March-August period and the rest.[12]

We cluster standard errors by product and destination to allow for possible correlation between disturbances of trade flows within particular products and destination markets.

[12] Note that the results are robust to restricting the sample period to just year 2020.

3.2 Estimation Results

The estimation results for the US sample are reported in the upper panel of Table 1. In the first column, we estimate a specification including just our variable of interest and fixed effects. The coefficient estimate on the interaction between the Covid crisis and our *LC-Int* measure is positive and statistically significant at the 5% level. This result is in line with our prior that exports of products that traditionally rely more on LCs were more resilient to heightened uncertainty relative to other products during the pandemic.

Column 2 reports the results from estimating equation (2) that allows for a differential impact of the Covid crisis on products with different characteristics. More specifically, we include interaction terms of the Covid crisis dummy with indicator variables for consumer goods, non-differentiated goods, and consumer durables, as well as with continuous variables capturing contract intensity, share of ocean shipping, average shipment size, relationship stickiness and income elasticity.[13] We do so to ensure that the effect we capture is really related to product reliance on LCs rather than other product characteristics that may influence differential demand for a given product or a differential ability of producers to ship a given product during the pandemic. The estimate of interest remains positive and statistically significant at the 5% level and its magnitude increases slightly. The estimates suggest that a 1-standard deviation increase in *LC-Int* was associated with a 1.3 log-points larger increase in exports during the pandemic crisis. This is economically significant as the average annual change in monthly trade flows in our data is a 6 log point decline.

In column 3, we additionally include interactions between the Covid crisis and the external finance dependence measure. The coefficient estimates on the variables of interest are almost identical to those found in the previous column in terms of sign, magnitude and significance level.

Finally, the last column exploits the intensity of the pandemic at the level of a destination country. We split countries into *Low CovidCrisis* and *High CovidCrisis* groups according to whether the number of new reported Covid cases in a given month during the February-August period was below or above the sample median. The results imply that our results are driven by exports to countries with a large number of reported Covid cases, which increases our confidence that the findings are driven by the pandemic rather than some other factors.

In the lower panel of Table 1, we report the estimation results for EU-15 exports. The coefficient on the interaction term between the Covid pandemic and *LC-Int* is positive and statistically significant at the 1% level in all three specifications. The magnitudes are comparable to those found in the US sample. They imply that a 1-standard deviation increase in *LC-Int* was associated with a 0.9 log-point increase in LC-backed exports during the pandemic. This is substantial, given that the average change in monthly export flows in the data is equal to 3 log points. As in the US

[13] Contract intensity index, built by Nunn (2007), measures proportion of differentiated products among an industry inputs. We use income elasticities as estimated by Caron et al. (2012).

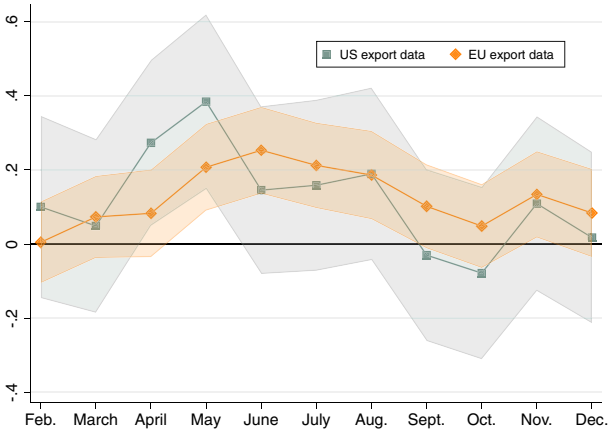

Fig. 4 Equation 2—β coefficients, by months of 2020

sample, we find that the results are more pronounced for exports to countries with the high number of Covid-19 cases.

Next, we estimate a specification corresponding to column 1 of Table 1 but allow for a different coefficient in each month of 2020 and graph the β estimates in Fig. 4. Each coefficient captures the estimated year-on-year export growth observed in a given month relative to the omitted category, i.e. January 2020. We obtain positive and statistically significant estimates for April and May 2020 in the US sample and from May to August 2020 in the EU-15 sample. These estimates suggest that exports of LC-backed products were more resilient than exports of other products at the height of the pandemic.[14]

3.3 Robustness Checks and Extensions

This subsection describes robustness checks and extensions that are presented in Table 2. In column 1, we replace our *LC-Int* with the average share of Turkish LC-financed exports for each 4-digit HS product over the 2003-2006 period, while in column 2, we use an alternative version of our *LC-Int* measure that is based on just Turkish imports (as opposed to both imports and exports). In both cases, our hypothesis finds support in the data.

Next, we focus our attention on other types of trade finance and construct measures analogous to *LC-Int* for OA, CIA and DC financing terms.[15] We then repeat our estimation focusing on interaction terms of the Covid crisis indicator with these

[14] It should be noted that the pandemic and the administrative measures it entailed may have constituted *force majeure*. Thus in LC contracts that included *force majeure* clauses, the guarantees offered by the LCs may have been suspended. But this actually reinforces our argument. Even if some LC contracts were suspended due to *force majeure*, our results indicate that they - on average - offered an effective protection and limited the collapse of international trade.

[15] We thank an anonymous reviewer for suggesting this extension.

Table 2 Trade in *LC-Int* products during the Covid-19 pandemic—alternative indicators

Dep. Var.: $\Delta \ln(Exports_{odpym})$					
TF-indicator$_p$ →	(1)	(2)	(3)	(4)	(5)
	LC Share	LC Import	OA-Int	CIA-Int	DC-Int
US exports					
TF-indicator$_p$ ×	0.154b	0.197a	−0.003	−0.040	−0.001
CovidCrisis$_{ym}$	(0.068)	(0.062)	(0.029)	(0.028)	(0.048)
No. Obs	663575	663575	663173	663575	663575
R^2	0.100	0.100	0.100	0.100	0.100
Fixed effects	dp, dym, py, pm				
EU-15 exports					
TF-indicator$_p$ ×	0.137a	0.097a	−0.105a	0.065a	0.042c
CovidCrisis$_{ym}$	(0.037)	(0.033)	(0.015)	(0.014)	(0.025)
No. Obs	5709077	5709077	5709077	5709077	5709077
R^2	0.094	0.094	0.094	0.094	0.094
Fixed effects	odp, odym, opy, pm				
Interactions w/ product charact	Yes	Yes	Yes	Yes	Yes

CovidCrisis$_{ym}$ is a dummy indicating the Covid crisis period (March 2020–August 2020). Other product characteristics are dummy variables for consumer goods, non-differentiated goods, and consumer durables, as well as contract intensity, share of ocean shipping, average shipment size, relationship stickiness and income elasticity. See main text for the definition of each TF-indicator. Significance levels: c: $p < 0.1$, b: $p < 0.05$, a : $p < 0.01$. Standard errors, clustered by destination × 4-digit HS codes, are shown in parentheses

newly developed measures. As visible in the upper panel of the table, the estimated coefficients are very small in magnitude and not statistically significant. The picture is quite different when we consider European exports in the lower panel. There, all three estimates are statistically significant and consistent with our priors. First, they suggest that the risk of non-payment was substantial during the pandemic and hence EU exporters reduced exports of goods typically relying on OA terms relative to other types of goods.[16] Second, the estimates imply that shipments of goods typically traded on CIA terms were more resilient than other trade flows. Again this is intuitive, as exporting pre-paid goods carried no risk for EU-15 exporters. And importers may have been less concerned about possible non-delivery, given high quality of institutions in the EU-15 countries. Finally, the results suggest that documentary collection (i.e. bank intermediation) provided some protection against increased uncertainty as reflected in the greater resilience of exports typically traded using DC terms.

[16] Recall that under OA terms the importer makes a payment only after the goods are delivered and there is no bank guarantee that a payment will be made.

4 The Great Trade Collapse

Next we consider the behaviour of LC-intensive trade during the Great Trade Collapse, which took place during the Global Financial Crisis of 2008-09. While examining this question is interesting in its own right, it has the additional advantage of allowing us to validate whether our *LC-Int* index really captures product reliance on LCs. This setting is particularly suitable as a validation exercise because the financial crisis caused severe disruption to the supply of LCs in many countries, and thus we expect LC-intensive products to register a greater decline in trade to the affected destinations relative to other products.

The reasons for the severe crunch in the supply of LCs are summarized well by the industry report (ICC Banking Commission (2009), page 20, emphasis added):

> *As the financial crisis unfolded*, ***the availability of trade finance declined*** *and* ***its cost increased*** *because of* ***growing liquidity pressure*** *in mature markets, the* ***general scarcity of capital***, *unprecedented* ***increases in the cost of funding*** *and a perception of* ***heightened country and counterparty risks***. *The contraction in trade finance was also fueled by the* ***loss of critical market participants, such as Lehman Brothers***, it a ***drying up of the secondary market*** *for short-term exposure (as banks and other financial institutions deleveraged) and the volatility of commodity prices. Banks in developed countries are also required to* ***hold more capital at home*** *and are* ***providing less liquidity to banks in emerging economies***. *In addition,* ***the implementation of the Basel II Accord*** *on banking laws and regulations, with its increased risk sensitivity of capital requirements in an environment of global recession, has added pressure on banks to hold back on trade finance.*

Not surprisingly, where trade insurance remained available, its costs increased. Over half of respondents surveyed by ICC Banking Commission (2009) indicated an increase in issuance fees for LCs. 58% reported an increase in confirmation fees.

4.1 Data and Empirical Specification

Our analysis is based on US and EU-15 annual exports data for the 2003-2009 period available from BACI (see Gaulier and Zignago (2010) for more details). The dataset covers about 100 importers and more than a thousand 4-digit HS product codes. As before, we exclude Turkey and within-EU trade from the analysis. We merge the bilateral trade data with data on bank crises obtained from Laeven and Valencia (2013).

Our econometric specification is close to that of the previous section. It examines whether exports of products that rely more heavily on LCs reacted differentially to bank crises in importing countries. We estimate the following equation:

$$\begin{aligned}\Delta \ln(\text{Exports}_{\text{odpy}}) = {} & \gamma \text{LC-Int}_p \times \text{Fin Crisis}_{\text{dy}} + \lambda \text{LC-Int}_p \times \Delta \ln \text{GDP}_{\text{dy}} \\ & + \Gamma \text{ProductChar}_p \times \text{Fin Crisis}_{\text{dy}} + \Lambda \text{ProductChar}_p \times \Delta \text{GDP}_{\text{dy}} + FE + \varepsilon_{\text{odp}}.\end{aligned} \tag{3}$$

where $\Delta \ln \text{Exports}_{odpy}$ is the annual change in the logarithm of exports of 4-digit HS product p from country o to the destination country d in year y. Fin Crisis_{dy} is an indicator variable equal to 1 if the destination country experienced a bank crisis in year y, and 0 otherwise. The data on bank crises comes from Laeven and Valencia (2013). In order to distinguish the specific impact of financial crises from that of an economic slowdown, our specification includes the interaction between *LC-Int* and the annual change in the log of GDP. As before, we introduce a vector of other product characteristics interacted with both the financial crisis dummy and the change in real GDP. We also add an extensive set of fixed effects (FE), which include origin-destination-product and origin-destination-year fixed effects for both the US and EU-15 specifications. We further include product-year fixed effects for the US specification and origin-product-year fixed effects for the EU-15. We cluster standard errors by destination-product.

We expect to obtain a negative coefficient on the interaction term between *LC-Int* and the indicator for a banking crisis in the destination country, which in line with the view that bank crises make it difficult, if not impossible, to purchase LCs and thus adversely affect exports of products that typically rely heavily on LCs. As we do not know precisely when the 2007–2008 financial crisis ended in each country, we drop all years after 2009.[17]

4.2 Estimation Results

The estimation results from the US sample, presented in the upper panel of Table 3, provide support for our hypothesis. The estimated coefficient of interest in Column 1 is in line with the view that banking crises make it difficult for importers to purchase an LC and suggests that exports of products relying heavily on LCs decline relative to other exports when destined for countries experiencing a banking crisis. In column 2, we show that this result is robust to allowing for a differential impact of GDP changes on *LC-Int* products. In column 3, we additionally allow for a differential impact of banking crises on products of different characteristics, while column 4 also ads interactions with external finance dependence. The estimates of interest remain robust to inclusion of this extensive set of controls. They remain significant at the 5% level, while only slightly declining in magnitude. The estimated effects are meaningful: a one-standard-deviation increase in the *LC-Int* measure (i.e. 0.11) is associated with a 1.7 log-points larger decline in trade when a financial crisis hits the importing country.

In the last column, we separate the banking crises into severe and less severe ones based on whether the amount of liquidity support provided by the government is above or below the median. We then allow for separate interactions with *LC-Int* of these two types of crises. Reassuringly, the magnitude of the estimated effect is larger in the cases of severe crises and only this estimate is statistically significant.

[17] We eliminate Nigeria from the sample as a bank crisis started there in 2009.

Table 3 Trade in *LC-Int* Products during the 2007–2009 financial crisis

Dep. Var.: $\Delta \ln(Exports_{odpy})$					
	(1)	(2)	(3)	(4)	(5)
US exports					
LC-Int$_p$ ×	−0.179a	−0.167b	−0.156b	−0.151b	
Fin. Crisis$_{dy}$	(0.067)	(0.067)	(0.075)	(0.075)	
LC-Int$_p$ ×					−0.287b
Large Fin. Crisis$_{dy}$					(0.116)
LC-Int$_p$ ×					−0.065
Small Fin. Crisis$_{dy}$					(0.089)
No. Obs	268892	268800	268800	268800	268800
R^2	0.216	0.216	0.216	0.216	0.216
Fixed effects	dp, dy, py				
EU exports					
LC-Int$_p$ ×	−0.131a	−0.134a	−0.120b	−0.118b	
Fin. Crisis$_{dy}$	(0.044)	(0.045)	(0.050)	(0.050)	
LC-Int$_p$ ×					−0.146c
Large Fin. Crisis$_{dy}$					(0.084)
LC-Int$_p$ ×					−0.105c
Small Fin. Crisis$_{dy}$					(0.057)
No. Obs	1400260	1395723	1395723	1395723	1395723
R^2	0.237	0.237	0.237	0.237	0.237
Fixed effects	odp, ody, opy				
Interactions w/ product charact	No	No	Yes	Yes	Yes
Interactions w/ external finance dep	No	No	No	Yes	Yes
Interactions w/ GDPgrowth	No	Yes	yes	Yes	Yes

Fin. Crisis$_{dy}$ is a dummy indicating when country *d* is affected by a financial crisis during year *y*. Other product characteristics are dummy variables for consumer goods, non-differentiated goods, and consumer durables, as well as contract intensity, share of ocean shipping, average shipment size, relationship stickiness and income elasticity. Large Fin. Crisis (Small Fin. Crisis) denotes countries which experienced a financial crisis in 2007–2009 and liquidity support to the banking sector was larger (smaller) than the median. Significance levels: c: $p < 0.1$, b: $p < 0.05$, a: $p < 0.01$. Standard errors, clustered by destination × 4-digit HS codes, are shown in parentheses

In the lower panel of the table, we present the results for the EU-15 sample. The estimates in the first four columns are all negative and statistically significant at the 1% or 5% level. Their magnitudes are somewhat smaller than those found for the US sample but they are still economically relevant. A one-standard-deviation increase in the *LC-Int* measure is associated with a 1.2 log-points larger decline in EU-15 exports to countries afflicted by a financial crisis. When we allow for different effects of severe and less severe crises, we find that both have a negative and statistically significant effect on LC-intensive exports, but the effect of a severe crisis is larger.

Table 4 Trade in *LC-Int* Products during the 2007–2009 financial crisis—alternative indicators

Dep. Var.: $\Delta \ln(Exports_{odpy})$					
TF-indicator$_p$ →	(1)	(2)	(3)	(4)	(5)
	LC Share	LC Import	OA-Int	CIA-Int	DC-Int
US exports					
TF-indicator$_p$ ×	−0.168b	−0.135c	0.033	0.025	0.008
Fin. Crisis$_{dy}$	(0.076)	(0.075)	(0.035)	(0.034)	(0.060)
No. Obs	268800	268800	268800	268800	268800
R^2	0.216	0.216	0.216	0.216	0.216
Fixed effects	dp, dy, py				
EU-15 exports					
TF-indicator$_p$ ×	−0.129b	−0.107b	−0.006	0.015	0.068
CovidCrisis$_{ym}$	(0.050)	(0.049)	(0.025)	(0.024)	(0.042)
No. Obs	1400021	1399346	1400509	1400509	1400509
R^2	0.200	0.199	0.200	0.200	0.200
Fixed effects	odp, ody, opy				
Interactions w/ product charact	Yes	Yes	Yes	Yes	Yes

Fin. Crisis$_{dy}$ is a dummy indicating when country *d* is affected by a financial crisis during year *y*. Other product characteristics are dummy variables for consumer goods, non-differentiated goods, and consumer durables, as well as contract intensity, share of ocean shipping, average shipment size, relationship stickiness and income elasticity. Large Fin. Crisis (Small Fin. Crisis) denotes countries which experienced a financial crisis in 2007–2009 which estimated impact on national output was larger than the median. Significance levels: c: $p < 0.1$, b: $p < 0.05$, a: $p < 0.01$. Standard errors, clustered by destination × 4-digit HS codes, are shown in parentheses

All specifications in Table 3 include an interactions term between the *LC-Int* measure and the annual change in the importing country's GDP. However, these estimates never reach conventional significance levels and hence are not reported.

4.3 Robustness Checks and Extensions

We subject the financial crisis results to the same robustness checks and extensions, as those we used for the Covid crisis. As evident from Table 4, our findings are robust to using alternative proxies for LC-intensity - either the actual share of LC-backed trade or an alternative *LC-int* measure. In all four specifications, the coefficients of interest remain negative and statistically significant. The estimated magnitudes are very similar to those found in Table 3.

The extensions, in which we investigate whether products typically traded on OA, CIA and DC terms were affected differently by financial crises, do not produce any statistically significant results.

Table 5 Share of Turkey's LC-financed exports during the Covid-19 pandemic

Dep. Var.: $\Delta(LCShare_{\text{dpym}})$		
	(1)	(2)
$\text{CovidCrisis}_{\text{ym}}$	0.0022a	
	(0.0008)	
$\text{High CovidCrisis}_{\text{ym}}$		0.0024a
		(0.0008)
$\text{Low CovidCrisis}_{\text{ym}}$		0.0013
		(0.0015)
No. Obs	722032	722032
R^2	0.062	0.062
Fixed effects	dp, y, m	

$\text{CovidCrisis}_{\text{ym}}$ is a dummy indicating the Covid crisis period (March 2020 - August 2020). High CovidCrisis (Low CovidCrisis) denotes countries with Covid-19 cases above (below) the monthly median during the March 2020 - August 2020 period. Significance levels: c: $p < 0.1$, b: $p < 0.05$, a: $p < 0.01$. Standard errors, clustered by destination × 4-digit HS codes, are shown in parentheses

5 Validation Exercise Using Turkey's Trade Data

In this section, we use data on Turkey's exports, *disaggregated by actual financing terms used*, to show that export flows secured by LCs exhibited greater resilience relative to other export flows during the Covid-19 pandemic but witnessed a larger decline during the Global Financial Crisis. Observing the same pattern (as those found earlier) when we can observe actual financing terms serves as validation of our baseline regression and boosts our confidence in the *LC-Int* measure.

Starting with the Covid crisis, we construct monthly share of Turkish exports backed by LCs for each destination-product pair for the 2017-2020 period. Focusing on the share allows us to implicitly control for any factors affect Turkish exports of a particular product to a particular marker in a particular monthly period. We estimate the following equation:

$$\Delta(LCShare_{\text{dpym}}) = \eta \text{CovidCrisis}_{\text{ym}} + \delta_{\text{dp}} + \delta_y + \delta_m + e_{\text{dpym}} \tag{4}$$

A positive estimate of η would be consistent with our earlier results for the US and EU-15.

To investigate the evolution of LC-financed exports during the Global Financial Crisis we use annual data on Turkey's exports. For the reasons explained earlier, we focus on the share of LC-financed exports in total exports of given product destined for a given country in a given year. We estimate the following equation:

$$\Delta(LCShare_{\text{dpy}}) = \zeta \text{Fin Crisis}_{\text{dy}} + \delta_{\text{dp}} + \delta_y + v_{\text{dpy}} \tag{5}$$

We expect the share of LC-financed exports to decrease destined for crisis-affected countries, i.e. $\zeta < 0$.

Table 6 Share of Turkey's LC-financed exports during the 2007–2009 financial crisis

Dep. Var.: $\Delta(LCShare_{dpy})$			
	(1)	(2)	(3)
Fin. $Crisis_{dy}$	−0.0069a	−0.0069b	
	(0.0027)	(0.0027)	
Large Fin. $Crisis_{dy}$			−0.0083b
			(0.0034)
Small Fin. $Crisis_{dy}$			−0.0057c
			(0.0030)
No. Obs	79889	78433	78433
R^2	0.215	0.215	0.215
Fixed effects	dp, y		
GDP growth control	No	Yes	Yes

Fin. $Crisis_{dy}$ is a dummy indicating when country d is affected by a financial crisis during year y. Large Fin. Crisis (Small Fin. Crisis) denotes countries which experienced a financial crisis in 2007–2009 and liquidity support to the banking sector was larger (smaller) than the median. Significance levels: c: $p < 0.1$, b: $p < 0.05$, a: $p < 0.01$. Standard errors, clustered by destination × 4-digit HS codes, are shown in parentheses

Starting with the Covid crisis, the results presented in Table 5 are consistent with those found for the US and EU-15 exports. The positive and statistically significant coefficient obtained in column 1 suggests that the share of LC-backed exports increased during the Covid crisis by about 0.2% points. This is meaningful, as the average monthly share of LC-backed exports during 2018-2020 was 3% and thus the estimated effect translates into a 7% increase. Moreover, as visible in column 2, this finding was driven by the destination countries with the above median monthly number of cases.

Moving on to the Global Financial Crisis, the results produced by the validation exercise are consistent with those found for the US and EU-15 exports. Namely, the estimates reported in Table 6 indicate that the share of LC-backed trade was lower when destined for destinations affected by a financial crisis. The estimates are statistically significant at the 1% level in column 2 and the 5% level when we control the decline in GDP in the destination country. As visible in column 3, the decline in the share of LC-backed exports was larger in the case of more severe financial crises,

though even mild crises appear to have had an effect. On average, a severe financial crisis resulted in an 0.8% point decline in the share of LC-backed exports.

6 Conclusions

Times of crises, be it economic or financial, are often associated with a collapse in international trade flows. This paper draws attention to the fact that product reliance on LCs has a direct impact on resilience of trade flows. In particular, during periods of increased uncertainty, exports of products insured through LCs are more resilient. In contrast, financial crises, which negatively affect supply of LCs, are associated with a greater decline in trade of LC-intensive goods. These patterns are demonstrated using detailed data on US exports around the time of the Covid-19 pandemic and the Global Financial Crisis.

At the core of our analysis is a newly created measure of product-level reliance on LCs in international trade. This index, available for 1,196 HS4 products, is correlated in intuitive ways with some product characteristics, such as, shipment size, time to ship, relationship stickiness, and others. But the reliance on LCs is due to an array of factors rather than a single product characteristic. This index can be useful in research going beyond international trade, for instance in applications related to finance and economic growth.

Appendix: Additional Tables and Figures

See Tables A1, A2 and Fig. A1.

Table A1 Summary statistics for Turkey's trade

	2006	2010	2017
Share of LC-financed trade			
Mean	0.077	0.062	0.037
10th pctile	0	0	0
25th pctile	0	0	0
Median	0	0	0
75th pctile	0.007	0.001	0
90th pctile	0.262	0.186	0.065
Stdev	0.207	0.182	0.138
Share of CIA-financed trade			
Mean	0.252	0.299	0.307
10th pctile	0	0	0
25th pctile	0	0	0.012
Median	0.029	0.090	0.156
75th pctile	0.479	0.598	0.537
90th pctile	0.904	0.949	0.940
Stdev	0.348	0.363	0.343
Share of OA-financed trade			
Mean	0.498	0.503	0.551
10th pctile	0	0	0.001
25th pctile	0.063	0.073	0.177
Median	0.489	0.515	0.615
75th pctile	0.923	0.929	0.915
90th pctile	1	1	0.999
Stdev	0.400	0.395	0.369
Share of DC-financed trade			
Mean	0.124	0.094	0.066
10th pctile	0	0	0
25th pctile	0	0	0
Median	0	0	0
75th pctile	0.101	0.048	0.015
90th pctile	0.496	0.351	0.216
Stdev	0.251	0.218	0.180

This table presents the descriptive statistics for the share of Turkey's international trade (pooled exports and imports) backed by main financing terms at the country and 4-digit HS product level for the years 2006, 2010, and 2017

Table A2 *LC-Int* and other product characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Durable	0.037a								0.022c	0.016
	(0.010)								(0.013)	(0.014)
Consumer goods		−0.052a							−0.039a	−0.020c
		(0.006)							(0.007)	(0.010)
Non differentiated			0.013c						−0.007	0.002
			(0.008)						(0.012)	(0.012)
Contract intensity				0.002					−0.014	−0.044
				(0.021)					(0.037)	(0.054)
Share of ocean ship					0.068a				0.068a	0.035b
					(0.011)				(0.014)	(0.016)
Mean shipment size (log)						0.033a			0.019a	0.016c
						(0.006)			(0.007)	(0.008)
Relationship stickiness							−0.069a		−0.054a	−0.040a
							(0.012)		(0.013)	(0.015)
External finance dep. (RZ)								−0.005	−0.006	0.002
								(0.011)	(0.015)	(0.021)
Nb. obs	1192	1196	1196	1039	1173	1187	1113	1043	998	996
R^2	0.012	0.028	0.002	0.000	0.032	0.053	0.045	0.000	0.124	0.352

Dependent variable is *LC−Int*. Last column includes 2-digit HS fixed effects. Significance levels: c: $p < 0.1$, b: $p < 0.05$, a: $p < 0.01$. Robust standard errors are shown in parentheses

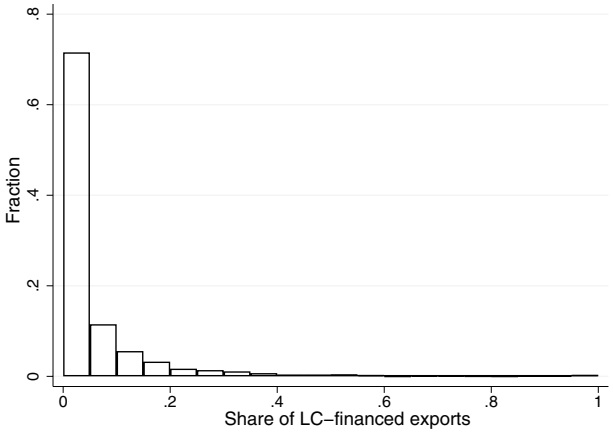

Fig. A1 Distribution of Turkey's LC-financed exports (2006, 2010, and 2017). The figure shows the distribution of the share of Turkey's exports backed by LCs at the country and 6-digit HS product level for the years 2006, 2010, and 2017

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