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The Global Financial Cycle and the Gravity of Finance and Trade

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Abstract:
Cross-border finance matters for cross-border trade and, hence, the global financial conditions driven by a global financial cycle, in which the U.S. dollar's nominal effective exchange rate plays a key role. Utilizing empirical gravity models for both trade and finance, we explore the relevance of cross-border loans for bilateral trade. We also detail how a global dollar cycle affects exports both directly and indirectly via a finance-trade channel. In line with the macroeconomic literature, we confirm that also on a bilateral level these effects are particularly strong if one trading partner is an emerging market or developing economy. By developing a finance-augmented trade gravity model, we are also shedding new light on the workings of classical gravity variables, such as physical distance and common borders, but also currency unions and regional trade agreements on the gravity of trade.

Keywords: cross-border loans, trade, global networks, global dollar cycle, global financial cycle, gravity model, currency unions, regional trade agreements

JEL Classification: F1, F3, G15, G21

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1. Introduction

Cross-border finance is an important driver and facilitator of international trade. Yet, if finance follows a global financial cycle, as posited by Rey (2015), then global financial conditions are an important driver of both global and bilateral trade patterns. Hence, the boom of global cross-border lending (relative to GDP) since the 1990s can be seen as facilitating the proliferation of cross-border value chain networks, thus leading to a peak in merchandize trade globalization as measured by the (real) export to GDP relation at the time of the great financial crisis of 2008/9. After 2008 both trade and finance first declined and then stagnated – though cross-border lending at a considerably lower level – a state often dubbed as 'slowbalization'. Figure 1 shows how cross-border lending is mirroring cross-border trade with the notable exception of the global value chain (GVC) disruptions during the Covid 19 pandemic.

[Insert Figure 1 about here]

The literature on the global financial cycle is largely based on analyses of global aggregates, such a global trade, GDP or investment, and time series of financial variables. One of the innovations of our study is that we go beyond this macro view and explore the causal relationship and between the global financial cycle, cross-border finance and trade from the perspective of bilateral finance and trade networks, employing empirical gravity analyses as the most appropriate tool. To do so, we present an estimation of a gravity model of cross-border loans, which is augmented by key global financial cycle co-variates as well as by a time-varying measure of bilateral financial openness. This "gravity-of-finance" estimate is essentially a reduced form prediction of cross-border loans which are not driven by international trade. Hence, we are able to identify the impact of cross-border loans on trade by means of a finance-augmented trade gravity model.

However, when looking deeper into the global financial cycle, the literature is increasingly converging on the view that the global financial cycle is essentially a global U.S. dollar cycle (see, e.g. Obstfeld and Zhou, 2022). This implies that both global finance and global trade are co-moving with the U.S. dollar. In a similar vein, Bruno and Shin (2023) argue that a broad nominal U.S. dollar index closely tracks not only international finance, in particular cross-border bank loans, but also mirrors real global trade (as a proportion of real global GDP) developments as visualized in

Figure 1. In this sense, these authors suggest a causal story from dollar development to trade, based on working capital requirement in global value chains. These co-movement are, however, likely to affect advanced countries less than emerging markets and developing economies (EMDE), as argued and demonstrated by Obstfeld and Zhou (2022). In particular, broad-based nominal dollar appreciations could constrain access to finance more severely for EMDE than for advanced economies (AE) and thus negatively impact EMDE trade.

In our paper we investigate the impact of the global financial cycle on the gravity of finance and trade, hence focusing on the impact of a finance channel on trade. To do so, we highlight here the role of cross-border bank loan and employ data obtained from the BIS' Locational Banking Statistics. This allows us to explore the bilateral network of trade and finance linkages between 23 individual bank/exporter countries and 179 individual borrower/importer countries from 1995 to 2022. Our results, firstly, reveal that cross-border loans are an important causal driver of global exports. Hence, we confirm the existence of a trade-finance channel, which has been documented for specific trade finance products such as letters of credit (see, e.g., Niepmann and Schmidt-Eisenlohr, 2017a) or foreign bank presence (Claessens and van Horen, 2021). However, we are the first to document its existence based on cross-border loans, which as Figure 1 has shown are an important financing source for GVC trade (Kim and Shin, 2023), and according to Claessens and van Horen (2021) partly substitute for foreign bank presence. Secondly, we show that the global dollar cycle negatively impacts trade partly directly and partly indirectly via the finance channel. Hence, we find that the trade finance channel is key for understanding the dollar cycle's impact on trade. Thirdly, we show that this is particularly true for EMDE and to a lesser extent (if any) for AE. Fourthly, and "en passant", our analysis reveals that the positive currency union effect on international trade (Rose, 2000) works predominately via the financial channel, while regional trade agreements do not boost trade by facilitating cross-border finance. Hence, we find that their trade-enhancing effect is indeed a pure trade (policy) effect.

In sum, our study contributes to the literature on the role of finance and the global financial cycle for global trade in three ways: First, by investigating the impact of cross-border loans and the global financial on bilateral trade we extend the trade gravity literature. Second, and in doing so, we are able to investigate and differentiate between the direct effect of the global dollar cycle on trade and the indirect trade-finance channel via cross-border credits. Third, and finally, we show

how these direct and indirect effects are different and potentially more severe for EMDE, as suggested by recent literature.

The plan of the paper is as follows: Section 2 discusses the three related literature areas, namely the analyses of the global dollar cycle, the literature on the links of trade and finance, and gravity literature and outlines our theoretical framework. On the base of this, section 3 introduces our methodology, section 4 describes our data sets. Section 5 presents the results of our empirical analyses, section 6 features robustness checks and section 7 concludes.

2. Literature Review

Our paper draws on three literature strands. First, there is a growing literature on the causal role of finance for trade. This literature often focusses on trade credits, letters of credits and other trade financing instruments. Our analysis extends this literature by scrutinizing the impact of cross-border bank loans. Second, we build on the global financial cycle literature, which posits that the U.S. dollar has a prominent role in driving key financial and real variables, including and of particular importance for our study, cross-border trade. We contribute to this literature by investigating bilateral trade relations to determine both global effects as well as differential effects on country groups by development level. Finally, we extend the trade gravity literature by modeling the financial channels and uncover the mechanisms through which the key variables in gravity models – such as distance, common borders, cultural and political ties, regional trade agreements and currency unions – work.

2.1. The Finance-Trade Channel

Trade requires finance. A seller can ask for pre-payment before shipping the good or allow the buyer to pay later. In both cases credit relationships between sellers and buyers are established. In the simplest case no banks are directly involved, but in the case of cash-in-advance the buyer may require a credit from a bank, while 'open account' financing may force the seller to obtain working capital finance from banks. Alternatively, direct bank intermediation via trade credits is possible. In all cases specific and differing risks are involved. Cross-border trade increases these risks. As explained by Antràs and Foley (2015: p. 854), "(a)lthough similar claims arise for purely domestic transactions, international transactions are unique because longer transportation times often increase working capital requirements and variation in institutional context across countries

introduces additional considerations.“ In a similar vein, Amiti and Weinstein (2011) highlight the higher working capital financing needs in international trade, especially when shipping by sea is involved, as well as the relatively higher need to insure against credit default risk in international trade as exporters often lack expertise or at least willingness to evaluate counterparty default risk. This leads to the involvement of banks, be it to provide payment insurance, guarantees or trade credits and cross-border loans. However, as argued by Foley and Manova (2015: 141), “differences in access to financial capital explain variation in trade participation at the country, industry, and firm levels. Firms need to fund fixed and variable costs of cross-border transactions and these transactions often tie up capital for longer periods of time than domestic transactions and involve distinct risks.”

A key implication of a trade finance channel is that “exports are more sensitive to financial shocks due to the higher default risk and higher working capital requirements associated with international trade” (Amiti and Weinstein, 2011: p. 1842). The retrenchment of global finance during the great financial crisis of 2008/9 is therefore often viewed as an important contributor to the collapse of global trade at that time, given the much higher sensitivity of exports to finance relative to domestic spending (see, e.g. Ahn, Amiti and Weinstein, 2011). Hence, in 2008 real world exports contracted by 17 percent while world GDP fell by “only” 5 percent, leading to a collapse of the world-trade-to-GDP relation, commonly used as an indicator of trade globalization. (Ahn, Amiti and Weinstein, 2011; Chor and Manova, 2012; Bems, Johnson and Yi; 2013).

As a consequence, studies on the finance-trade nexus proliferated.[1] For example, Amiti and Weinstein (2011) study the role of bank health and establish a causal link from domestic bank health to firm-level exports using data from the Japanese financial crisis from 1990 through to 2010. Niepmann and Schmidt-Eisenlohr (2017a) investigate the use of letters of credit and documentary collections by exporters to mitigate risks in foreign trade and find that the great financial crisis pushed firms more towards using letters of credit. In another paper, the same authors estimate that a “one-standard deviation negative shock to a country’s letter-of-credit supply reduces U.S. exports by 1.5 percentage points” (Niepmann and Schmidt-Eisenlohr, 2017b: p. 338). Next to special foreign finance products such as letters of credit, bilateral financial relations have been found of importance for the finance channel. Caballero, Candelaria, and Hale (2018) focus on connections between banks that arise through cross-border interbank lending. The authors find that new

[1] For a survey see Foley and Manova (2015).

connections between banks in a given country pair lead to increase in the trade for this country pair in the following year. They interpret their finding as evidence that these bank connections tend to reduce export risks. Claessens and van Horen (2021) provide evidence that exports increase with foreign bank presence. In particular, exports are larger when banks from the importing country are present, and the entry of a foreign bank can boost exports to the bank's home country. The latter effect is stronger when foreign bank presence is large, bilateral cross-border lending is low and when the host countries are economically and financially less developed. Finally, Kim and Shin (2023) propose a theoretical framework in which the length of supply chains is influenced not only by economic fundamentals or supply chain efficiency but also by financial conditions. Firms have to weigh the benefits of offshoring against the financial costs of lengthening the value chain. In consequence, the authors argue that the trade-to-GDP ratio closely tracks financial conditions and document that in times of proliferation of global cross-border value chains, working capital requirement are particularly sensitive to and increase with the length of the value chain. This suggests that cross-border loans can play an important role in operating global value chains, a claim that we will investigate in this study.

In sum, there is (1) increasing evidence for a finance-trade channel that operates through different financial arrangements such as cash-in-advance, open accounts, letter of credits, foreign bank presence, domestic bank health, and cross-border loans, whereby (2) the choice of the financial arrangement depends on country-specific conditions, and (3) is highly sensitive to global financial conditions, as reviewed next.

2.2.The Importance of the Global Financial Cycle for International Finance and Trade

Global financial conditions are related both directly to cross-border lending and indirectly to a number of real economy developments, including international trade as stressed by recent literature on the existence and importance of a global financial cycle. In particular, Rey (2015) is the first to highlight the strong co-movements between international capital flows, asset prices and credit growth. As the global financial cycle can be linked with global uncertainty as well as with the monetary policy in the center country, notably the U.S., it is not aligned with other affected countries' specific macroeconomic conditions (Rey, 2015). Since then, the idea that the global financial cycle influences international finance has gained traction in the literature but has also received skeptical reviews. E.g., Cerutti, Claessens and Rose (2019) examine the impact of

common shocks and observables in the U.S. as center country on cross-border capital flows and could not find any significant explanatory power of these factors for capital flows.

More recently, the focus has shifted to the special role of the U.S. and the U.S. dollar. Bruno and Shin (2015: p. 536) develop a model "where regional banks borrow in U.S. dollars from global banks to lend to local corporate borrowers. In turn, global banks finance cross-border lending to regional banks by tapping U.S. dollar money market funds in financial centres." Thus, the composition of U.S. banks' liabilities measured by the ratio of financial assets to equity for U.S. broker-dealers can be indicative of the global financial cycle due to 'global leverage'. Miranda-Agrippino and Rey (2020) follow up on the earlier analysis by Rey (2015) and construct a global financial cycle index, based on an extensive factor analysis. Obstfeld and Zhou (2022) show that this index is strongly correlated with the broad nominal dollar index and conclude that the global financial cycle is largely a global dollar cycle. In a similar vein, Jiang, Krishnamurthy and Lustig (2023) argue that the key ingredient of the global financial cycle is the international demand for safe dollar assets. As a consequence, international investors are willing to pay a convenience yield to own dollar denominated bonds. Therefore, these authors also conclude that the global financial cycle is a global dollar cycle.

The interest in the global financial cycle, and in particular the global dollar cycle has been spurred by the observation that especially an appreciation of the broad nominal dollar negatively impacts other countries' macroeconomic conditions and trade, as argued by Obstfeld and Zhou (2022). With respect to the finance-trade nexus, these authors show that world exports relative to GDP are negatively correlated with the U.S. dollar broad nominal exchange rate. Moreover, they posit that this negative effect is especially relevant for EMDE as these are typically countries with substantial amounts of dollar-denominated external liabilities, pegged exchange rates and a low (inflation) credibility of the central bank. Likewise, Bruno and Shin (2023) argue that a stronger dollar is associated with tighter dollar credit conditions, citing a BIS (2016) study that finds that a 1% depreciation of the dollar is associated with a 0.6-percentage-point increase in the quarterly growth rate of dollar-denominated cross-border lending. Given the dollar dominance in cross-border lending (Gopinath, 2024), they also find that following a dollar appreciation, exporters that are more reliant on dollar-funded bank credits face a greater decline in credit and a slowdown in exports. The nexus from the dollar to finance is, however, in contradiction to the standard competitiveness channel where a stronger dollar would lead to more exports by non-U.S. firms.

Bruno and Shin (2023) argue that the financial channel can outweigh this competitiveness channel. The finance channel is particularly important when companies are dependent on and/or exposed to dollar funding conditions, as a stronger dollar leads to tighter credit supply, raising the cost of working capital for exporting firms and thus leads to less exports. Obstfeld and Zhou (2022: pp. 372-373) point out that the negative relation between the dollar and trade can also be the direct result of the importance of commodities in world trade. In particular, they show that a 1% appreciation of the dollar is associated with much larger percentage fall of commodity prices, hence dollar commodity prices fall in real terms when the dollar strengthens. A second negative dollar-trade link comes via the importance of trade in investment goods in the presence of a strongly negative correlation between world investment and the dollar and, thus, between global investment, global growth and, ultimately, trade. Consequently, growth and trade will typically be more negatively affected in EMDE than in high-income countries when financial conditions tighten (Obstfeld and Zhou, 2022). In this respect, it is also important to recall that currency devaluations in EMDE are not effective when export prices are denominated in US dollars and prices are sticky. In fact, Gopinath et al. (2020) find that dollar appreciations lead to trade contraction at least in the short run - when dollar invoicing and sticky prices with dollar invoicing are important.

Overall, we conclude that (1) the global financial cycle is a potentially broader concept then the global dollar cycle but the global dollar cycle plays a key role in influencing global financial conditions and, hence, access to cross-border finance of countries; (2) the positive competitiveness effects of dollar appreciations on trade can be overcompensated by both indirect financial channel effects and direct effects on trade via commodity prices, investments, and dollar invoicing. This implies that (3) the direct effect on trade is theoretically undetermined, but one can hypothesize that it is most likely to be negative for EMDE. Hence, in our setting we do expect a negative direct effect of a dollar appreciation on EMDE next to indirect effect via the financial channel.

2.3. The Gravity Approach to Trade and Finance

The gravity model is the gold standard for analyzing bilateral trade relationships and was pioneered by Tinbergen (1962) and Pöyhönen (1963). The key variables of the Newton-inspired gravity are economic size as indicator for economic masses - typically proxied by the GDPs of the respective bilateral country pairs - and physical distance, with a substantial distance effect, which depends on

the sample size and period, but also on the methodology applied.[2] Later applications added controls for additional bilateral facilitators such as a common border, colonial ties, common language, etc. and – on the political level – in particular regional trade agreements and currency regimes, especially currency unions. The literature is vast and still expanding, refining the measurement of policy variables and advancing the methodology. While most studies find significant effects of these variables on trade, their size is often hotly debated. While it is beyond the scope of this paper to review the literature here, we refer to it when discussing our results in section 5, to put our results into perspective.

More recently, gravity approaches are applied to cross-border finance and international banking. Martin and Rey (2004) provide a theoretical foundation for a gravity model for cross-border financial flows. Aviat and Coeurdacier (2007) extended it to asset holdings, while Portes and Rey (2005) focus on cross-border equity flows. While these early approaches focus on international asset markets, cross-border banking is also increasingly analyzed with gravity models (Buch, 2005; Heuchemer, Kleimeier and Sander, 2009; Kleimeier, Sander and Heuchemer, 2013; Brei and von Peter, 2018; Cerutti, Casanova and Pradhan, 2023). Despite the weightlessness of financial products, gravity models perform well in explaining asset trade (Portes and Rey, 2005) and it has been shown that also in financial and banking markets 'distance matters'. The negative and substantial impact of distance can be attributed to informational and transactional frictions in cross-border finance (Brei and von Peter, 2018) and verifies the existence of gravity in finance.

When looking at the determinants of the gravity of cross-border finance and trade, one can differentiate three categories of factors. First, there are bilateral factors which concern the relationship of each particular country pair, namely the classical gravity variables from physical distance over common borders, common language to common political institutions, such as regional trade agreements and currency unions. Second, there are a number of country-specific factors that impede or nurture bilateral trade and finance. Especially in the case of cross-border finance, the literature points to the state of financial development, the strength of the institutional framework, bank health, or financial crisis in the bank or customer country as important factors.

[2] For recent surveys and re-estimations see Brei and von Peter (2018) and Baier and Standaert (2020). The former also conduct a comparison of estimates over time, using different methodologies and comparing distance effects of trade and banking. While a meta-analysis found an average distance elasticity is close to -1 (Head and Mayer, 2014), classic estimates using traditional least square dummy variable (LSDV) estimates are typically higher. However, regardless of the estimation methods, there is a so-called distance puzzle of an increasing distance effect over time.

Third, there are common global factors, such as a global financial crisis, geopolitical disruptions or a global financial cycle.

In our empirical gravity model we consequently control as much as possible for bilateral determinants, including regional trade agreements and currency unions. As we are not especially interested in the particularities of country-specifics, we follow Anderson and van Wincoop (2003) and control for country-specifics, aka 'multilateral resistance', by means of country dummies. As our model includes time-varying global factors, we are prevented from using time dummies, which is the first-best approach for obtaining reliable estimates for the impact of bilateral determinant. However, we benchmark our results with time and time-by-country controls, but investigate without time controls when focusing on the impact of time-varying global factors.

3. Methodology

Our methodological approach starts from a classic trade gravity model augmented by finance:

$$(1)\ lnEXPORTS_{ijt} = \beta_1 lnGDP_{it} + \beta_2 lnGDP_{jt} + \beta_3\ lnCBLOANS_{ijt} + \sum_{k=4}^{K} \beta_k X_{ij} + \sum_{l=K+1}^{L} \beta_l Z_{ijt} + \lambda_i + \upsilon_j + \gamma_t + \epsilon_{ijt}$$

In the results we present in this paper, we focus on bilateral exports rather than on trade.[3] $EXPORTS_{ijt}$ is measures the exports in year t from country i to country j. GDP_{it} and GDP_{jt} reflect the size of the economy of country i and j in year t, respectively. $CBLOANS_{ijt}$ is our finance proxy measuring the stock of cross-border loans in year t from banks in country i to customers in country j. X_{ij} and Z_{ijt} are time-invariant and time-varying bilateral controls, respectively, both proxying for trade costs. For X_{ij} we rely on typically employed proxies for these frictions including distance, common border, colonial history and common language. Z_{ijt} include trade-cost reducing free-trade agreements and currency unions. λ_i and υ_j are fixed effects for country i and j, respectively, controlling for time-invariant country-specifics, aka multilateral resistance. γ_t are fixed effects for year t. ε_{ijt} is the error term.

[3] In unreported analyses, we replicate our core results for bilateral trade and find that results are robust yet somewhat weaker.

This model, however, ignores the endogeneity of finance for trade. We address this issue by estimating a two-stage least square (2SLS) model where the first stage regression estimates a gravity model of cross-border finance and the second stage regression estimates a gravity model of trade. As instrumental variables (IVs) for our finance proxy $CBLOANS_{ijt}$ we consider a time-variant measure of bilateral financial openness as well as co-variates of the global financial cycle. Among the co-variates of the global financial cycle, the broad nominal U.S. dollar, aka the global dollar cycle, plays a special role. While it is an obvious candidate for a sufficiently strong IV for $CBLOANS_{ijt}$, our literature review has shown that it also directly impacts trade, hence it does not meet the excludability restriction. Nevertheless, we will explicitly test these claims first before estimating our preferred 2SLS model. Our empirical gravity model for cross-border finance and trade then takes the following form:

$$(2)\ lnCBLOANS_{ijt} = \beta_1 lnGDP_{it} + \beta_2 lnGDP_{jt} + \beta_3 lnGDCy_t + \sum_{k=4}^{K} \beta_k IV_{ijt} + \sum_{l=K+1}^{L} \beta_l IV_t + \sum_{m=L+1}^{M} \beta_m X_{ij} + \sum_{n=M+1}^{N} \beta_n Z_{ijt} + \lambda_i + \upsilon_j + \epsilon_{ijt}$$

$$(3)\ lnEXPORTS_{ijt} = \beta_1 lnGDP_{it} + \beta_2 lnGDP_{jt} + \beta_3\ ln\widehat{CBLOANS}_{ijt} + \beta_4 lnGDCy_t + \sum_{k=5}^{K} \beta_k X_{ij} + \sum_{l=K+1}^{L} \beta_l Z_{ijt} + \lambda_i + \upsilon_j + \epsilon_{ijt}$$

Equation (2) presents the first stage of the 2SLS model. $GDCy_t$ represents the strength of the global dollar cycle in year t. IV_{ijt} denotes our bilateral instruments, while IV_t denotes our global instruments, e.g. the co-variates of the global financial cycle. Equation (3) represents the second stage of the 2SLS model where $\widehat{CBLOANS}_{ijt}$ is the instrumented value of cross-border loans between country i and j in year t. When investigating the co-variates of the global financial cycle as potential instruments IV_t, we have to drop the year fixed effects γ_t from our empirical gravity model in order to estimate its relation with finance and trade.

In order to assess the relevance and validity of the IVs, we employ several tests. First, the partial R^2 and F test statistic inform about the explanatory power and significance of the instrumental variables in the first stage, respectively. To determine whether the endogenous

regressors in the model are in fact exogenous, we utilize Wooldridge's (1995) robust score χ^2 test and robust regression-based F test. Regarding overidentification, we use Wooldridge's (1995) robust score χ^2 test of overidentifying restriction.

4. Data

The scope of our sample in terms of year t and countries i and j is determined by the availability of $CBLOANS_{ijt}$. We obtain our proxy for cross-border loans between banks in country i and borrowers in country j from the BIS Locational Banking Statistics which are based on the principle of residence and are consistent with the principles underlying national accounts and balance of payment statistics.[4] Country i indicates the BIS reporting country, e.g. country in which the bank resides while country j indicates the BIS counterparty country, e.g. the country in which the borrower resides. Cross-border loans are measured as stocks, e.g. loan amounts outstanding, and reported in U.S. dollar. Given our focus on the finance-trade channel, we only consider cross-border lending the non-financial sector and exclude interbank lending. In order to match the frequency of cross-border loans to the annual frequency of the trade data, we average across quarterly stocks originally reported by the BIS to obtain annual stocks of cross-border loans.[5] The resulting sample covers a large geographic range, which extends to 23 individual reporting countries i and 179 individual counterparty countries j and spans the years from 1995 to 2022.[6]

We obtain $EXPORTS_{ijt}$ from the DOTS Direction of Trade Statistics. We focus on exports as reported by country i. In order to match trade to cross-border loans, we consider exports in year t from reporting country i to counterparty country j.[7] Exports are measured in U.S. dollar. For our sample, the total outstanding nominal amounts of cross-border loans show spectacular growth from $ 353.5 billion in 1995 to $ 5.1 trillion in 2022. Over the same period, exports increase from $ 1.1 trillion to $ 10.0 trillion.[8]

[4] A cross-border loan is made when a customer living in country A borrows from a bank office located in country B. As the bank's office is located in country B, such a loan is cross-border, independent of whether the headquarter of the bank is located in country A or B. Therefore, we are truly considering those cases where the bank or customer crosses a national border. In contrast, a domestic loan is made when citizens of country A and B who live in country B borrow at a bank office located in country B.

[5] Details regarding definitions, units and sources of all variables are available in Table A1 in the appendix.

[6] Table A2 in the appendix lists all individual reporting and counterparty countries.

[7] Thus, the BIS reporting country i corresponds to the bank country as well as the exporter country while the BIS counterparty country j corresponds to the customer, e.g. borrower country, as well as the importer country.

[8] Figure A1 in the appendix provides a visual impression of these developments of nominal cross-border lending and exports between the country-pairs included in our sample over time.

We proxy the global dollar cycle ($GDCy_t$) with the effective, nominal, trade-weighted exchange rate index of the U.S. dollar against a basket of 64 currencies in year t provided by the BIS. The index set to 100 in 2020 with increasing values indicating an appreciation of the dollar and thus weaker financial conditions. We average the monthly BIS index to obtain an annual index.

Regarding the classical control variables in our gravity model, we proxy the size of the of country i and j by their respective annual GDPs measured in U.S. dollar based on data obtained from the World Bank's World Development Indicators. We obtain proxies for X_{ij} from Andrew Rose's website and include dummy variables indicating whether country i and j share a common land border (common border) or common language (common language) and whether country i ever colonized country j (colony). Missing values are filled from information provided by the CIA World Factbook. We also include the great circle distance in km between capital cities of country i and j (distance) from Eden's Chemical Ecology Net. Z_{ijt} includes regional trade agreements and currency unions. We gather information on regional trade agreements from Mario Larch's Regional Trade Agreements Database (Egger and Larch, 2008). We implement a broad proxy that encompasses all types of regional trade agreements covering customs unions, free trade agreements, partial scope agreements and economic integration agreements. Our proxy takes the form of a dummy variable equal to 1 if country i and j belong to the same regional trade agreement in year t. Information on currency unions comes from Andrew Rose's website and the IMF's Annual Reports on Exchange Arrangements and Exchange Restrictions. Currency unions are defined as hard pegs with no separate legal tender. Our proxy takes the form of a dummy variable equal to 1 if the country i and j belong to the same currency union in year t.

The three potential instruments for cross-border loans we finally settle on and report in this paper are proxied as follows.[9] First, as our proxy for financial openness ($FINOPEN_{ijt}$) we use the product of Chinn-Ito's normalized financial openness index in country i and j in year t (Chinn and Ito, 2006). The Chinn-Ito Index is a de jure measure of financial openness. It is based on dummy variables that codify the tabulation of restrictions on cross-border financial transactions including the presence of multiple exchange rates, restrictions on current and capital account transactions and the requirement of the surrender of export proceeds. Higher values indicate a larger degree of financial openness. Second, as one covariate of the global financial cycle we measure the inverse convenience yield ($ICYLD_t$) as the yield of 3-month AA US commercial paper

[9] We will motivate our choice of IVs in detail in section 5.2 where we discuss the results of our endogeneity tests.

minus the yield of 3-month US T-Bills in year t using data provided by the Federal Reserve Bank of St. Louis. We employ the inverse of the convenience yield rather than the convenience yield itself so that higher values of our proxy indicate better global financial conditions. Third, as another covariate of the global financial cycle we approximate global leverage ($GLEV_t$) with the ratio of financial assets to equity for U.S. broker-dealers in year t using data provided by the Board of Governors of the Federal Reserve System. We average the original quarterly data to obtain annual data. Higher values for global leverage indicate better global financial conditions.[10]

5. Results

5.1. A Naïve Finance-Augmented Baseline Gravity Model for Exports

Our modeling strategy starts with a baseline gravity model for exports as outlined in equation (1) in order to benchmark our results. Table 1 reports our gravity estimates for exports from 23 bank countries to 179 customer countries. It is important to note here that this sample deviates significantly from typical trade gravity samples as we are limited by the data availability for cross-border loans. This means, that we essentially estimate the role of the gravity variables for exports of BIS-reporting bank countries. While some estimated coefficients deviate, most are by and large in line with those reported in the gravity literature. Model (1) is a classic least squared dummy variable (LSDV) estimate for exports, using time-varying bilateral controls, country fixed effects and time fixed effects. With respect to time dummies, a superior empirical strategy is to use time-by-country fixed effects as argued by Baldwin and Taglioni (2006) and as reported in model (2).

[Insert Table 1 about here]

The classical gravity model variables are the economic size, proxied by sum of the logs of the GDPs of exporter and importer countries, and the geographic distance that separates a country pair. Here, instead of using the economic size of the respective country pairs we opt to estimate the impact of their respective GDPs separately for two reasons. First, the role of the bank country's GDP is much lower than the role of the economic size of the customer (importer) country. This is where our results differ from other estimates where typically the estimated trade elasticity with respect to GDP is close to one. We conjecture that our lower elasticities are due partly to the special

[10] Descriptive statistics and correlations for all variables are available in Tables A3 and A4 in the appendix.

character of our sample with bank countries being the only export countries. Second, as we will have to continue to work without time fixed effects when scrutinizing global factors such as the global dollar cycle, national GDPs can help to explain the time variation of the dependent variable. However, the role of GDP is not our focal point and our model (2) which employs time-by-country fixed effects so that country GDPs drop out, shows that all other estimated coefficients are largely in line with the estimates obtained in model (1).

With respect to the bilateral controls, the distance between any country pair is a key proxy for bilateral trade costs. For distance we estimate an elasticity slightly above 1 in both models (1) and (2) which is in line with the empirical literature that uses comparable methodological approaches.[11] Our common border coefficients are 0.306 and 0.301, respectively, indicating that a common border increases exports by about 36% ($100*(e^{0.306}-1) = 35.8\%$). By comparison, Larch and Yotov (2024) find for the period 1980-2016 coefficients between 0.46 and 0.22. However, they control for WTO membership but not for currency union membership. For country pairs with colonial ties, we find roughly doubled exports while a common language promotes exports by about 40%. By comparison, the former authors find a weaker colonial tie and a stronger common language effect. Since both variables are strongly correlated, the differences are most likely due to the different country-pairs in our versus Larch and Yotov's (2024) sample. Finally, and most interestingly, we report positive and significant currency union effects as well regional trade agreements effects. Regional trade agreements increase exports between 30% and 40% while the currency union effect is between 17.5 and 8.8%. Our coefficients for regional trade agreements are slighter higher than the one reported by Larch and Yotov (2024), whose regional trade agreements database we utilize here. However, they are generally in line with the overall evidence that these authors review, which puts the coefficient between 0.1 and 0.4. Our currency union effect is much smaller than the one first documented by Rose (2000). However, the literature inspired by that paper has shrunk the currency union effect considerably. While Rose's results implied a tripling of trade, the meta-analysis by Head and Mayer (2014) reports a mean coefficient of 0.79, implying a doubling of trade, while Baldwin and Taglioni (2007) put the effects on exports at a 35% boost for

[11] See, e.g. Larch and Yotov (2024) and Brei and Von Peter (2018). Typically, when estimated for different single years the distance coefficient tends to increase over time. The obtained distance coefficients are typically somewhat smaller when using a Poisson pseudo-maximum-likelihood (PPML) estimator (Brei and von Peter, 2018). The PPML literature introduced by Santos Silva and Tenreyro (2006) especially seeks to address a bias that overstates the distance effect in the presence of heteroscedasticity.

the euro area. At the lower end are Santos Silva and Tenreyro (2006) who have difficulties establishing any effect at all. We therefore conclude that given our sample and our standard methodological our results are indeed reasonable.

In the next step, we add cross-border loans in a naïve way to these gravity equations. The results of models (3) and (4) show that finance has a significant and positive effect on exports with an elasticity of 0.110 and 0.118, respectively. Compared to models (1) and (2) the distance effect shrinks slightly, possibly indicating that part of the distance effect works via cross-border loans that may be less easily available over longer distances. While the other coefficients are also affected, the differences are too small to interpret, not least because the estimates might well be distorted by the endogeneity of finance which, both theoretically and empirically (as we will show soon) is also influenced by exports.

Finally, we introduce the global dollar cycle. Model (5) reports the results when adding the broad nominal dollar index while model (6) also includes cross-border loans. In these regressions we have to drop the time fixed effects in order to obtain estimates for the global dollar cycle that only varies over the time dimension. The estimated coefficients signal a substantial and significant negative effect of broad nominal dollar appreciations. In line with our theoretical priors, the effect is lower when cross-border loans are included, suggesting that the impact of the global dollar cycle is partly mediated via the finance channel. Finally, it should be noted that the remaining coefficient estimates are relatively robust to the inclusion of the global dollar cycle.

5.2. The Gravity of Finance and Exports: Addressing the Endogeneity of Cross-Border Loans

Causality between cross-border loans and exports is clearly bi-directional. Hence, the naïve regressions including finance shown above can be misleading. To address the potential endogeneity of cross-border loans we conduct a 2SLS estimation. The first stage regression of the 2SLS essentially estimates a *gravity model for cross-border finance*. In this first stage regression, we amend the classical gravity model determinants by drawing on the global financial cycle literature. As such, we explore the role of important covariates and potential drivers of cross-border finance. A key determinant in this literature is the broad nominal dollar index as a proxy for the global dollar cycle, but also indicators which capture financial market participants' insecurity and search for a safe haven. Moreover, we consider the Chinn-Ito index as a time-variant proxy of financial openness for any country pair.

The first stage for our export gravity model should predict the *exogenous* variations of cross-border loans, i.e. the variations which are independent of bilateral exports. Hence, key global financial cycle covariates should also qualify as instrumental variables to predict the exogeneous variations of cross-border loans. Specifically, we expect the covariates of the global financial cycle to be strong instruments for cross-border loans with respect to relevance. The covariates should also meet the exclusion restriction as they affect exports only through cross-border loans but not directly. We experimented with various potential IVs derived from the global financial cycle literature as reviewed in section 2 above, but theoretically and empirically the broad nominal dollar index, the convenience yield on dollar-denominated assets, and global leverage are the most promising ones. In this we follow (1) the important contribution of Obstfeld and Zhou (2022) and Bruno and Shin (2023), who provide evidence for the key role of the U.S. currency for global finance, (2) Jiang, Krishnamurthy and Lustig (2023) who argue that this global dollar cycle has one key ingredient, namely the international demand for safe dollar assets as measured by the convenience yield, and (3) Bruno and Shin (2015) who propose a measure of global leverage – indicating the ratio of financial assets to equity for U.S. broker-dealers – based on a model of the global banking market where global banks raise funds in the U.S. money market in order to lend cross-border to regional banks who in turn lend to local corporate borrowers. Thus, the composition of US banks' liabilities can be indicative of the global financial cycle and instrument cross-border loans. In contrast to the global dollar cycle which affects exports directly via the competitiveness channel as outlined in section 2.2 above, these other covariates of the global financial cycle should affect exports only through cross-border loans but not directly.

Next to these time-variant IVs reflecting the global financial cycle, we also include a variable that is an important driver of cross-border loans at the country pair level. Our choice is financial openness, based on the prominent Chinn and Ito (2006) index which measures the degree of a country's capital account openness. These authors argue that capital account liberalization can improve financial development by allowing the interest rate to rise to its competitive market equilibrium, enabling investors to hold more diversified portfolios and improving the efficiency of the financial system in terms of reduced information asymmetry, adverse selection and moral hazard. Consequently, borrowers' cost and access to capital improves including their access to cross-border loans. We therefore conjecture that financial openness is an important driver of cross-border capital flows but does only affect exports indirectly via the finance-trade channel. Our

financial openness proxy measures the country-pair openness by multiplying the Chinn-Ito index of each country pair. Consequently, the index is time-varying, too.

When testing each of these IVs in the first stage regression in isolation in models (1) to (4) of Table 2, all four proxies are found to be (very) relevant instruments for predicting exogenous cross-border loans, with F test values exceeding the conventional benchmark of 10 by far. Moreover, they all have in common that the effect of the then exogenous variations of cross-border loans on exports is boosted by about 2 to 4-times, as compared to the naïve OLS regressions of Table 1.

In the next step, we test for violations of the exclusion restriction. This requires to estimate an overidentified model with more than one IV. The overidentification tests of models (5) to (11) in Table 3 confirm – as theoretically expected – that the broad nominal dollar index clearly belongs into the export regression, independent with which other IV it is combined to perform the overidentification test. We therefore conclude that we need to extend the export gravity model with the global dollar cycle.[12]

[Insert Table 2 about here]

In consequence, we converge for our preferred model on an export gravity model that is augmented by predicted (instrumented) cross-border loans and the global dollar cycle as described by equation (2) and (3), respectively, and presented in Table 3. For these 2SLS regressions, we again calculate all test statistics for IV relevance and exclusion for multiple IVs.[13] From these exercises we find model (1) the most appealing. The two IVs, namely financial openness and the inverse convenience yield are both individually significant and feature a very high F-test of 91.243. The exclusion restrictions is clearly met, as indicated by the overidentification test. In particular, financial openness is a significant and strong driver of cross-border loans, while an increase in international investors' preference for safe dollar assets as indicated by the convenience yield, significantly reduce cross-border lending. Finally, the endogeneity test confirms the endogeneity of cross-border loans and hence justifies the instrumentation. While model (3) might appear

[12] Table A5 in the appendix shows additional combinations of IVs. Taken together, Tables 3 and A5 show all possible combinations of the four IVs. The results of Table A5 indicate that the 2SLS is overidentified once global leverage is included as one of the IVs.
[13] For completeness, Table A6 in the appendix additionally shows the 2SLS models for single IVs.

appealing at first sight, we are concerned about the high correlation of 0.50 between global leverage and the global financial cycle. In contrast the correlation between the inverse convenience yield and the global financial cycle is only -0.08.[14] Regarding models (2) and (4) note that the correlation of 0.5 between global leverage and the inverse convenience yield seems to be responsible for the insignificant coefficient of the inverse convenience yield. Thus, these two models do not find our preference.

While model (1) is our preferred model, we are aware that the 2SLS estimate is consistent but not necessarily unbiased. As argued by Angrist and Prischke (2009: p. 209) this bias is an increasing function of the number of instruments. We therefore follow these authors' suggestion and also report in model (5) the limited information maximum likelihood (LIML) estimation of our overidentified model to obtain median-unbiased coefficient estimates. The similarity of the 2SLS results of model (2) and LIML results of model (5) indicate that any potential bias in the 2SLS estimation is negligible.

[Insert Table 3 about here]

Our preferred model (1) in Table 3 represents a gravity model for trade and finance which predicts cross-border loans with a full-fledged gravity model plus the two IVs and the global dollar cycle. Looking first in isolation at the gravity of finance, the R^2 of 0.671 points to the high predictive power of the first stage. This result clearly supports the usefulness of a gravity model estimate of international finance. Our estimate has even more explanatory power than a standard gravity estimation for cross-border loans as we account for both the role of a global financial cycle and de-jure financial openness by country pair and over time. Going into the details of the estimation we observe that – not surprisingly – the bank country GDP is not a significant determinant of cross-border lending, while the GDP of the borrower country is, albeit with an elasticity of far less than one. Next, we also confirm the there is a strong gravity in finance with a distance coefficient of -1.390, which is in line with coefficients obtained in the literature, especially when employing an LSDV gravity model (Brei und Von Peter, 2018). More surprisingly, we find a significant negative border effect. This may point to the need of investigating the results more

[14] See Table A4 for correlations. As reported in Table A7 in the appendix, we also find an overidentification problem when replicating Table 4 with financial openness and global leverage as instruments.

deeply – by for example using other measures of the common border variable, such as common border length – which is beyond both the scope and interest of this paper. The negative border effect may, however, also relate to the already discussed result by Claessens and van Horen (2021), namely that foreign bank presence and cross-border lending are inversely related. Hence, if a common border promotes foreign bank presence, cross-border lending could be reduced. However, the presence of such a relationship warrants a different research setting which is again beyond the scope of this paper. Regarding our instruments, we again confirm their high significance for predicting cross-border loans. For the remaining interpretation of the results, it is most enlightening when discussing them in relation to our *finance-augmented export gravity* equation, obtained as the second stage estimate with predicted cross-border loans.

Our key results here are that, first, the global dollar cycle matters for both cross-border finance and exports, as expected theoretically and indicated by the overidentification test. The empirical results confirm that the global dollar cycle impacts finance more strongly than trade. This is not surprisingly as the dollar strength is expected to have ambiguous effects on trade because the traditional (positive) competitiveness channel may work against the identified (negative) channels, especially for EMDE countries as will investigate in the next section.

We plot our predicted cross-border loans together with the measured loans and exports in Figure 2. The figure shows nicely how our predicted loans are better able to track exports especially in times of abrupt changes, e.g., during the financial crisis of 2008/9. In consequence, our preferred estimates show, secondly, that the role of cross-border loans is three-times larger in model (1) of Table 3 than estimated in the naïve OLS model (6) of Table 1. In other words, our novel approach documents that cross-border loans cause exports and that the global dollar cycle impacts exports both directly and indirectly via a cross-border loans trade-finance channel.

[Insert Figure 2 about here]

Thirdly, we find and posit that typical trade gravity estimation results are in fact mediated through the finance channel. This can be interfered from comparing our 2SLS with our benchmark OLS results, e.g. model (6) in Table 1. A first example is distance. While the OLS model reports a coefficient of about -1.1, our 2SLS estimate puts it at -0.652, suggesting that indeed (frictions in) the access to cross-border finance are an important element of the trade frictions obtained in trade

gravity model estimates. The border effect found in the 2SLS estimate for exports is stronger than in the OLS estimate, suggesting a larger than expected impact of borders on the physical part of trading – yet this border effect may be reduced by foreign bank presence. As for colonial ties and common language, we find these variables of higher importance to finance as compared to trade, suggesting that there is a stronger influence of path dependency and cultural factors in the realm of cross-border banking as opposed to physical trade. A related and interesting case is the role of currency unions in promoting trade. Our results show that the currency union effect is largely mediated via facilitating cross-border banking with a much stronger impact on loans than a direct effect on exports. To illustrate this, our LIML estimate in model (5) of Table 3 suggests that currency union membership gives a 21% ($100*(e^{0.193}-1) = 21.3\%$) boost to cross-border loans. With an export elasticity with respect to cross-border loans of 0.327, currency union membership increases exports via the finance channel by about 7%, while the direct effect on exports is 9.19%. Finally, we find no significant impact of regional trade agreements on cross-border loans. Hence regional trade agreements work not via the trade-finance channel but directly via facilitating trade.[15]

To sum up, we find an important and significant role of cross-border loans for exports and thus add to trade and finance literature. Our setting allows us also to shed light on the internal mechanics of trade gravity models by showing that gravity estimates can be seen as a type of reduced form estimates that combine both direct and indirect effects via cross-border finance. In this sense we are also able to show that the global dollar cycle plays a double role for exports, directly and indirectly via the finance channel.

5.3. The Global Dollar Cycle and the Special Impact on EMDEs

Our results have shown that a broad-based dollar appreciation can impact exports negatively, both directly and indirectly via restraining cross-border loans. As discussed in our literature review, these negative effects are predominantly relevant for EMDE, which are typically more dependent on external U.S. dollar funding, dollar invoicing and other global developments beyond their

[15] The database by Larch as used here allow to disentangle the character of regional trade agreements and to analyze different types of regional trade agreements, including those with regulation for services. Larch and Yotov (2024) provide evidence for differential effects of different regional trade agreement types in a trade gravity model setting. We can, therefore not preclude the case that the results for special 'deeper' regional trade agreements may provide evidence for a trade-finance channel. However, such an analysis is beyond the scope of this paper.

control. Hence, the global dollar cycle is expected to have differential effects depending on the country's development level. We therefore use time-variant dummies for countries belonging to different income levels according the Word Bank classification and interact these dummies with the global dollar cycle proxy to obtain the effects by country development level.

[Insert Table 4 about here]

In Table 4 we report the results using high income countries as the benchmark. While our previous results with respect to cross-border loans and all standard gravity variables are generally robust, the global dollar cycle is indeed found to impact high income countries the least. Its impact on cross-border loans is still negative, meaning that a broad dollar appreciation is reducing these loans also for high-income countries, though much less than our previous overall estimate suggested. The obtained coefficient is now only -0.780 as opposed to -1.375 for all countries (see model (1) in Table 3). However, we do not find a significant direct effect on exports. Hence, for high income countries the global dollar cycle works only through the finance channel.

For EMDE we differentiate between upper-middle income countries, lower-middle income countries and low-income countries. As the country-group dummies show, upper-middle countries receive most cross-border loans, lower-middle income countries are following, while low-income countries do not receive significantly more loans that high-income countries. This ranking across income groups reflects the pull factors of international finance identified by López and Stracca (2021) including macroeconomic stability, the soundness of institutions or the development of local financial markets. In contrast, high-income countries may simply be less dependent on cross-border loans as they are able to attract foreign bank presence or can draw on a well-developed domestic banking system. Both, however, is regularly not the case for low-income countries.

With respect to the broad dollar index, our results reveal the differential impact of the global dollar cycle. Upper-middle income countries are the country group which is most negatively impacted by dollar appreciations in terms of access to finance. The negative impact on cross-border loans is -2.096 (= -0.780 - 1.316) and exceeds the baseline impact obtained for high-income countries by far. This suggests an especially high vulnerability of this country group to global financial conditions. However, and possibly thanks to their more diversified economies, we do not find a significant direct negative effect on export. In this respect, this group is more like high-

income countries. The picture is different for lower-middle income countries. They are more negatively affected than the baseline via both the financial channel (-1.577) and the direct channel (-0.608). Low-income countries, typically with very limited access to private cross-border banking finance are therefore not so much affected by access to finance. The interaction term is insignificant; hence the global dollar cycle coefficient stays at -0.780. However, the negative direct effect via export it the strongest across all country groups (-0.672).

In sum, we confirm that the global dollar cycle most strongly affects EMDEs. However, we are able to disentangle the direct and indirect channels and show that the impact of the direct channel increases with a lower income and development level. By contrast, the relation between income level and access to finance is non-linear, effecting upper-middle income and lower-middle income countries the most.

6. Robustness

6.1. The Special Role of China and the U.S. in International Trade

Both China and the U.S. play a special role in international trade. China belongs to the EMDE being a low-income country at the start of our sample period in 1995 before moving to lower-middle income status in 1999 and upper-middle income status in 2010. China's trade patterns are unique as both state-owned enterprises are important importers and a substantial fraction of its imports are intermediate inputs for global value chain manufacturing production, with the latter progressively being replaced by domestic inputs since approximately 2008 (Sander, 2022: pp.69-70). These factors at least partly explain China's specific import dynamics which are relatively unrelated to GDP growth and negatively rather than positively related to RMB appreciation (Cheung, Chinn and Qian, 2012). In our sample, China with 408 of 41,683 country-pair observations accounts for 1% of our sample. However, in dollar terms exports to China are almost as large as the exports to all other EMDE combined and have grown at a faster rate. Specifically, exports to China grow from $ 17 billion in 1995 to 1,137 billion in 2022 compared to exports to all other EMDE which grow from $ 206 billion to $ 1,603 billion over the same time period.[16] Similarly, the U.S. with 403 of 41,683 country-pair observations accounts for only 1% of our sample while in dollar terms, exports from the U.S. amount to 45% in 1995 and 19% in 2022 of

[16] China is included in our sample as a customer country but not at as bank country. Thus, we are considering exports to China.

total annual exports. This declining trend in total exports of goods reflects the shifting focus of US exports towards services.[17] As we investigate to special role of the U.S. dollar's broad nominal exchange rate, the point can be made that the results are contaminated by the direct effect of the dollar's relative strength on bilateral dollar exports.

Our main results of model (1) in Table 3 and Table 4 might thus be distorted by when including China and / or the U.S. and not representative of other im- and exporter countries in our sample. Table 5 shows our gravity model for finance and trade when we exclude China as importer country in models (1) and (2) or exclude the U.S. as exporter country in models (3) and (4). Results are robust.

[Table 5 about here]

6.2. The Endogeneity of the Global Dollar Cycle with Respect to Trade

One concern with our results could be the potential endogeneity of the global dollar cycle with respect to bilateral trade. We are serious about this possibility but also confident that our results are not biased for both, theoretical and empirical reasons. Theoretically, we believe that the current status of the global dollar cycle is predominately driven by financial factors rather than by contemporaneous bilateral trade positions. For example, Jiang, Richmond and Zhang (2022) show that the global dollar cycle is driven by relative interest rates, global saving and investor preference. In fact, the whole literature on the global financial cycle highlights these factors, and it is widely accepted view that trade, via purchasing power parity arbitrage is a long-run rather than a short run phenomenon. While we are confident that our results are not biased by the potential endogeneity of the global dollar cycle with respect to bilateral trade, we nevertheless conduct robustness checks.

Table 6 shows the results of a 2SLS estimation with two potentially endogenous variables: cross-border loans and the global dollar cycle. Thus, the 2SLS model contains two first stages, one for each potentially endogenous variable. Our instruments are the same as in our main specification of model (1) in Table 3: financial openness and the inverse convenience yield. As one of the covariates of the global finance cycle, the latter should be a particularly strong instrument for the global dollar cycle. Our results in Table 6 show that the inverse convenience yield is – as expected

[17] This declining trend is in line with Mandel (2012) who reports a drop of U.S. merchandise exports from 12% of global exports in the 1980s and 1990s to 8.5% in 2010. In our sample, the share of U.S. exports is higher as we can only consider 23 exporter countries for which bilateral cross-border loan data is available.

– negatively related to the global dollar cycle and its relevance is confirmed by its significance as well as the joint F test for both instruments. In contrast to cross-border loans, however, the insignificant χ^2 and F endogeneity test statistics indicate that the global dollar cycle is exogenous, thereby validating our theoretical and empirical prior.

In Table 7 we check for the robustness of our main results of model (1) in Table 3 and Table 4 by using the lagged global dollar cycle instead of the contemporaneous global dollar cycle. By definition, the lagged global dollar cycle in year t-1 should be exogenous with respect to trade in year t. That is, trade in year t will not affect the global dollar cycle in year t-1. Our results are overall robust even if we find a somewhat lower significance of the global dollar cycle and interaction effect with low-middle income countries in the cross-border loan regression of model (2).

[Insert Tables 6 and 7 about here]

7. Conclusions

Finance matters for trade. Hence, our understanding of the gravity of trade can be enhanced by understanding the related gravity of cross-border finance. In this paper we have developed a straight-forward and intuitive 2SLS approach to deal with the endogeneity of finance and the potential direct and indirect impact of global financial (U.S. dollar) cycle.

Our study makes three major contributions to the literature: First, we extend the finance-trade literature by documenting the significant and economically sizeable impact of bilateral cross-border loans on bilateral trade. The implication is that trade globalization, de-globalization or "slowbalization" should be evaluated in the context of global financial market conditions and their relative contribution in the context of global geopolitical fragmentation. Second, as global finance is driven by a global financial cycle, which essentially is a dollar cycle, we demonstrate how a global dollar strength impacts bilateral trade both directly and indirectly via the finance-trade channel. We furthermore show –in line with the global financial cycle literature – that these effects affect countries differently depending on their relative income status, with lower-middle income countries being most negatively affected by a broad U.S. dollar strength. Third, we show that the well-documented trade determinants established in the rich gravity literature, such as the role of distance, borders, colonial ties, common culture, as well as RTA and CU membership, are

essentially a combination of genuine trade (cost) effect and indirect effects via the finance-trade nexus.

While our approach delivers plausible and robust results, it is nevertheless limited by both the availability of data where the major limitation is clearly the number of BIS-reporting banks. Though quantitatively the coverage of "global" cross-border loans is substantial, it restricts the number of investigated country pairs. We are, however, confident that judged by the obtained results relative to other gravity studies as well as by some of our robustness checks, that the potential bias introduced is within acceptable ranges and thus an acceptable price to pay for obtaining new evidence on this part of the finance-trade channel. Moreover, as the BIS data leave out some important players in the cross-border loan market, notably China, but also non-reporting Germany, there is a risk to play Hamlet without the prince. Nevertheless, as our robustness exercises of excluding the U.S. as exporter and bank country and China as importer and borrower country show, the bias introduced may be limited given the still large number of country pairs in our gravity model setting. On the positive side, we have, however, developed a way in which the joint gravity of finance and trade could be investigated if data for missing countries are being made available, e.g., data on China's bilateral lending in the framework of her Belt and Road Initiative.

With respect to the scope of our contribution, it can clearly by extended both with respect to the econometrics of gravity models and the finesse of key gravity variable measures. With respect to the econometrics, recent approaches feature, for example, Poisson pseudo maximum likelihood (PPML) estimates pioneered by Santos Silva and Tenreyro (2006) or the role of incorporating domestic trade flows (Yotov, 2022), which could shed more light on the robustness of some coefficients, though mostly they have been developed to address the 'distance puzzle' of an increasing distance coefficient in recent years, which is not at the heart of our investigation. With respect to the gravity variable measures, we are aware that many different definitions of core gravity variables, especially distance and border measures, are possible. Yet, again, they are not at the core of our study. Moreover, future research could make more use of the Mario Larch's data base on RTAs, which differentiates between different types of RTAs to investigate the (non-) existence of a finance-trade channel of RTA trade effects, thus extending on this study as well as the recent RTA review study by Larch and Yotov (2024).

Finally, we conjecture that a finance-augmented trade gravity model adds considerable value to the analysis of policy effects by acknowledging the finance-trade nexus and potential

complementary effects. Examples range from regional-cum-financial integration policies, over disintegration policies, like Brexit, or the analysis of economic trade-cum-finance sanctions. After all, our study shows that the impact of both global and bilateral financial conditions on trade deserves our full attention.

Acknowledgements

Appendix

[Insert Figure A1 and Tables A1 to A6 here]

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Figure 1: the development of global trade, global finance and the global dollar cycle over time
This figure shows the development of global trade and finance and the global dollar cycle since 1995 measured. Trade is the sum of series NE.EXP.GNFS.KD and NE.IMP.GNFS.KD obtained from the World Bank's World Development Indicators database reflecting total annual exports and imports, respectively, of all countries worldwide in constant 2015 U.S. dollar. Global finance is series Q.S.C.B.TO1.A.5J.A.5A.A.5J.N obtained from the Bank of International Settlements' Locational Banking Statistics reflecting the total cross-border loans to the non-financial sector reported by banks in all BIS reporting countries in nominal U.S. dollar in the 4th quarter of each year. World GDP are series NY.GDP.MKTP.KD (e.g. GDP in constant 2015 U.S. dollar) and NY.GDP.MKTP.CD (e.g. GDP in current U.S. dollar) obtained from the World Bank's World Development Indicators database and used for real trade and global finance, respectively. The global dollar cycle is series BIS series M.N.B.US from the Bank of International Settlements reflecting the effective, nominal, trade-weighted exchange rate index of the US dollar against a basket of 64 currencies. The index set to 100 in 2020 with lower values indicating a nominal U.S. dollar appreciation, Global trade and global finance are reported in percent of GDP on the left-hand-side axis while the global dollar cycle is reported on the right-hand-side axis.

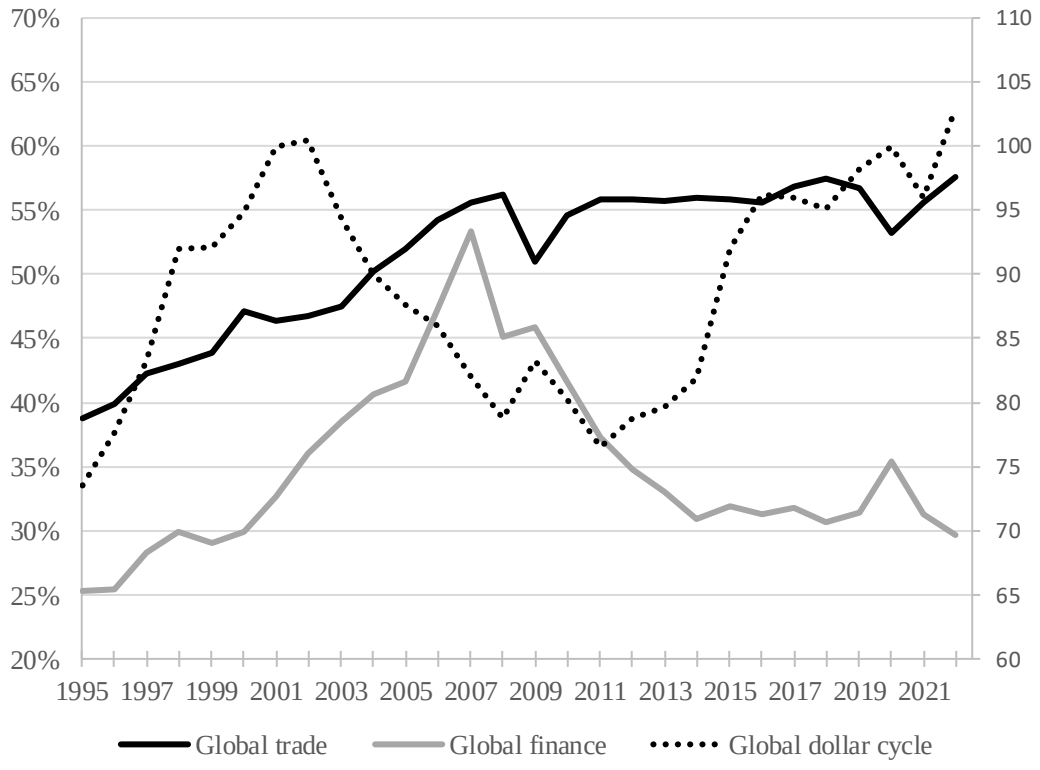

Figure 2: Trade, cross-border loans and predicted cross-border loans over time
This figure shows the annual total exports, cross-border loans and predicted cross-border loans between all country-pairs included in the sample of 41,683 country-pair by year observations. All variables are measured in millions of U.S. dollar and logs. Predicted cross-border loans are obtained from the first stage regression of model (1) in Table 3 which instruments cross-border loans with financial openness and the global dollar cycle.

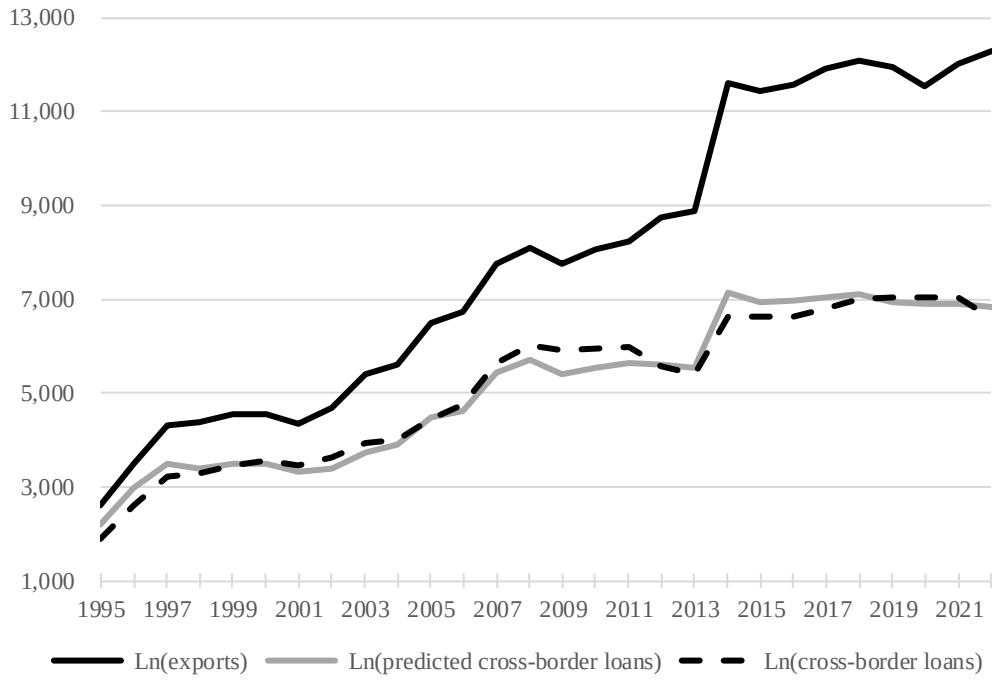

Figure A1: The development of exports and cross-border loans over time

This figure shows total annual exports and cross-border loans between all country-pairs included in our sample of 41,683 country-pair by year observations as well as the global dollar cycle index. Exports and cross-border loans are measured in millions of U.S. dollar.

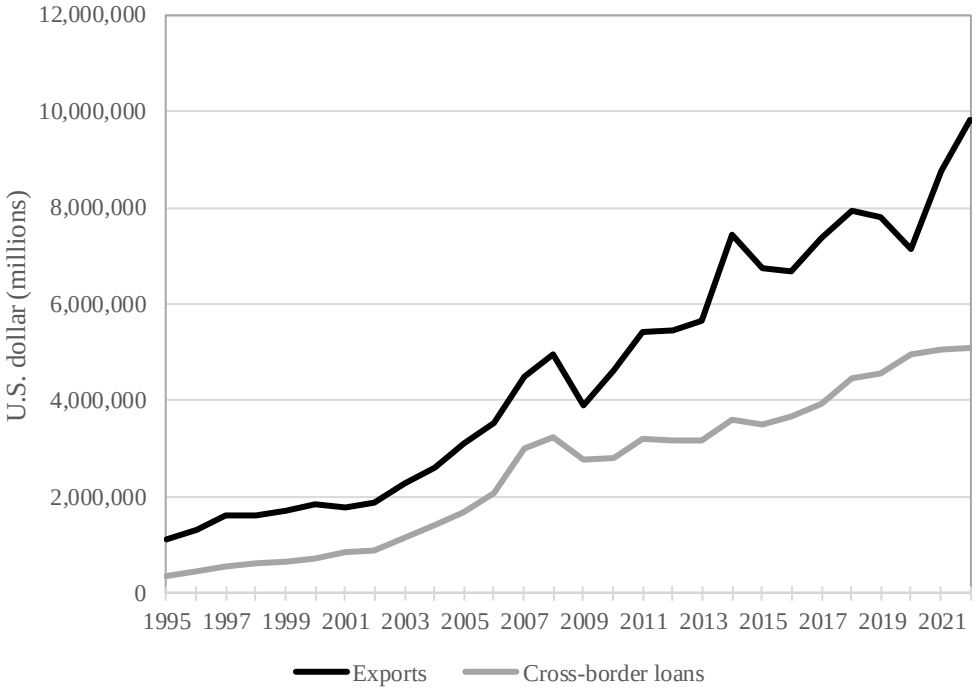

Table 1: Developing the baseline model

This table shows OLS regressions with robust standard errors. For each independent variable, the top row shows the estimated coefficient and the bottom row shows the standard error. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

Dependent variable	Ln(exports)					
	(1)	(2)	(3)	(4)	(5)	(6)
Ln(cross-border loans)			0.110 ***	0.118 ***		0.110 ***
			(0.003)	(0.003)		(0.003)
Ln(GDP_B)	0.167 ***		0.194 ***		0.122 ***	0.122 ***
	(0.039)		(0.038)		(0.023)	(0.023)
Ln(GDP_C)	0.582 ***		0.543 ***		0.545 ***	0.505 ***
	(0.017)		(0.017)		(0.014)	(0.013)
Ln(distance)	-1.105 ***	-1.091 ***	-0.953 ***	-0.923 ***	-1.109 ***	-0.956 ***
	(0.011)	(0.012)	(0.011)	(0.012)	(0.011)	(0.011)
Border	0.306 ***	0.301 ***	0.352 ***	0.357 ***	0.303 ***	0.350 ***
	(0.035)	(0.035)	(0.032)	(0.033)	(0.035)	(0.032)
Colony	1.105 ***	1.084 ***	1.000 ***	0.979 ***	1.106 ***	1.000 ***
	(0.028)	(0.028)	(0.027)	(0.027)	(0.028)	(0.027)
Common language	0.349 ***	0.325 ***	0.299 ***	0.274 ***	0.348 ***	0.299 ***
	(0.016)	(0.016)	(0.015)	(0.016)	(0.016)	(0.015)
Currency union	0.161 ***	0.084 ***	0.140 ***	0.079 ***	0.160 ***	0.136 ***
	(0.021)	(0.024)	(0.020)	(0.022)	(0.021)	(0.020)
Regional trade agreements	0.261 ***	0.339 ***	0.256 ***	0.325 ***	0.247 ***	0.246 ***
	(0.015)	(0.019)	(0.014)	(0.018)	(0.015)	(0.014)
Ln(global dollar cycle)					-0.739 ***	-0.596 ***
					(0.048)	(0.047)
Fixed effects						
Bank country	yes	no	yes	no	yes	yes
Customer country	yes	no	yes	no	yes	yes
Year	yes	no	yes	no	no	no
Bank country * year	no	yes	no	yes	no	no
Customer country * year	no	yes	no	yes	no	no
Adjusted R^2	0.889	0.893	0.895	0.900	0.889	0.895
Observations	41,683	41,683	41,683	41,683	41,683	41,683

Table 2: Instrumeting cross-order loans

This table shows instrumental variables regressions estimated as 2SLS with robust standard errors. For each independent variable, the top row shows the estimated coefficient and the bottom row shows the standard error. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively. The F test statistic informs about the significance of the instrumental variables in the first stage. To determine whether endogenous regressors in the model are in fact exogenous, we report Wooldridge's (1995) robust score χ^2 test and robust regression-based F test. Regarding overidentification, we report Wooldridge's robust score χ^2 test of overidentifying restrictions.

	(1)		(2)		(3)		(4)		(5)		(6)	
Dependent variable	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)
Ln(cross-border loans)		0.257 ***		0.324 ***		0.462 ***		0.568 ***		0.523 ***		0.445 ***
		(0.084)		(0.041)		(0.036)		(0.051)		(0.044)		(0.030)
Ln(GDP_B)	0.048	0.127 ***	-0.053	0.126 ***	0.175 ***	0.124 ***	-0.002	0.123 ***	0.029	0.123 ***	-0.076	0.124 ***
	(0.052)	(0.024)	(0.052)	(0.025)	(0.052)	(0.029)	(0.051)	(0.033)	(0.052)	(0.031)	(0.052)	(0.029)
Ln(GDP_C)	0.363 ***	0.444 ***	0.345 ***	0.421 ***	0.483 ***	0.373 ***	0.368 ***	0.336 ***	0.382 ***	0.352 ***	0.367 ***	0.379 ***
	(0.030)	(0.032)	(0.029)	(0.020)	(0.031)	(0.020)	(0.029)	(0.026)	(0.030)	(0.024)	(0.029)	(0.020)
Ln(distance)	-1.405 ***	-0.754 ***	-1.403 ***	-0.659 ***	-1.387 ***	-0.465 ***	-1.397 ***	-0.316 ***	-1.395 ***	-0.379 ***	-1.392 ***	-0.489 ***
	(0.021)	(0.119)	(0.021)	(0.059)	(0.021)	(0.051)	(0.021)	(0.073)	(0.021)	(0.063)	(0.021)	(0.044)
Border	-0.429 ***	0.413 ***	-0.457 ***	0.442 ***	-0.423 ***	0.501 ***	-0.430 ***	0.547 ***	-0.428 ***	0.528 ***	-0.458 ***	0.494 ***
	(0.065)	(0.048)	(0.065)	(0.038)	(0.066)	(0.039)	(0.065)	(0.045)	(0.065)	(0.042)	(0.065)	(0.038)
Colony	0.972 ***	0.861 ***	0.973 ***	0.795 ***	0.967 ***	0.661 ***	0.966 ***	0.557 ***	0.965 ***	0.601 ***	0.964 ***	0.677 ***
	(0.051)	(0.086)	(0.051)	(0.049)	(0.051)	(0.047)	(0.051)	(0.061)	(0.051)	(0.055)	(0.051)	(0.043)
Common language	0.451 ***	0.232 ***	0.459 ***	0.202 ***	0.453 ***	0.140 ***	0.451 ***	0.092 ***	0.451 ***	0.112 ***	0.460 ***	0.147 ***
	(0.032)	(0.041)	(0.032)	(0.025)	(0.032)	(0.025)	(0.032)	(0.031)	(0.032)	(0.028)	(0.032)	(0.023)
Currency union	0.213 ***	0.100 ***	0.180 ***	0.086 ***	0.225 ***	0.057 **	0.219 ***	0.035	0.223 ***	0.045	0.189 ***	0.061 **
	(0.049)	(0.027)	(0.049)	(0.023)	(0.049)	(0.027)	(0.049)	(0.031)	(0.049)	(0.029)	(0.049)	(0.026)
Regional trade agreements	-0.021	0.232 ***	-0.048	0.234 ***	0.037	0.238 ***	0.011	0.241 ***	0.015	0.239 ***	-0.009	0.237 ***
	(0.032)	(0.015)	(0.032)	(0.016)	(0.032)	(0.018)	(0.032)	(0.020)	(0.032)	(0.019)	(0.032)	(0.017)
Instruments												
Ln(inverse convenience yield)	0.074 ***								0.068 ***			
	(0.013)								(0.014)			
Ln(financial openness)			0.566 ***								0.605 ***	
			(0.048)								(0.048)	
Ln(global leverage)					0.597 ***							
					(0.037)							
Ln(global dollar cycle)							-1.300 ***		-1.281 ***		-1.393 ***	
							(0.105)		(0.105)		(0.105)	
Fixed effects												
Bank country	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Customer country	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Adjusted R^2	0.668	0.884	0.669	0.871	0.670	0.829	0.669	0.783	0.669	0.804	0.671	0.835
Observations	41,683	41,683	41,683	41,683	41,683	41,683	41,683	41,683	41,683	41,683	41,683	41,683
First stage												
F	30.405 ***		138.697 ***		254.811 ***		154.311 ***		97.700 ***		156.777 ***	
Endogeneity												
$\chi 2$	3.278 *		28.994 ***		152.620 ***		163.325 ***		163.211 ***		179.244 ***	
F	3.270 *		30.140 ***		153.504 ***		163.673 ***		163.870 ***		186.073 ***	
Overidentifcation												
$\chi 2$									6.523 ***		13.278 ***	

Table 2 continued: Instrumeting cross-order loans

This table shows instrumental variables regressions estimated as 2SLS with robust standard errors. For each independent variable, the top row shows the estimated coefficient and the bottom row shows the standard error. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively. The F test statistic informs about the significance of the instrumental variables in the first stage. To determine whether endogenous regressors in the model are in fact exogenous, we report Wooldridge's (1995) robust score χ^2 test and robust regression-based F test. Regarding overidentification, we report Wooldridge's robust score χ^2 test of overidentifying restrictions.

	(7)		(8)		(9)		(10)		(11)	
Dependent variable	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)
Ln(cross-border loans)		0.494 ***		0.431 ***		0.492 ***		0.430 ***		0.429 ***
		(0.036)		(0.028)		(0.036)		(0.026)		(0.026)
Ln(GDP_B)	0.132 **	0.124 ***	-0.045	0.125 ***	0.132 **	0.124 ***	0.056	0.125 ***	0.057	0.125 ***
	(0.052)	(0.030)	(0.052)	(0.028)	(0.052)	(0.030)	(0.053)	(0.028)	(0.053)	(0.028)
Ln(GDP_C)	0.463 ***	0.362 ***	0.381 ***	0.384 ***	0.462 ***	0.362 ***	0.461 ***	0.384 ***	0.460 ***	0.384 ***
	(0.031)	(0.021)	(0.030)	(0.019)	(0.031)	(0.021)	(0.031)	(0.018)	(0.031)	(0.018)
Ln(distance)	-1.387 ***	-0.420 ***	-1.390 ***	-0.509 ***	-1.387 ***	-0.423 ***	-1.382 ***	-0.510 ***	-1.382 ***	-0.512 ***
	(0.021)	(0.052)	(0.021)	(0.041)	(0.021)	(0.052)	(0.021)	(0.038)	(0.021)	(0.038)
Border	-0.424 ***	0.515 ***	-0.456 ***	0.488 ***	-0.424 ***	0.514 ***	-0.451 ***	0.488 ***	-0.451 ***	0.487 ***
	(0.065)	(0.040)	(0.065)	(0.037)	(0.065)	(0.040)	(0.066)	(0.037)	(0.0665)	(0.037)
Colony	0.965 ***	0.629 ***	0.963 ***	0.691 ***	0.965 ***	0.631 ***	0.963 ***	0.692 ***	0.963 ***	0.693 ***
	(0.051)	(0.048)	(0.051)	(0.042)	(0.051)	(0.048)	(0.051)	(0.040)	(0.051)	(0.040)
Common language	0.452 ***	0.125 ***	0.460 ***	0.154 ***	0.452 ***	0.126 ***	0.461 ***	0.154 ***	0.461 ***	0.155 ***
	(0.032)	(0.025)	(0.032)	(0.022)	(0.032)	(0.025)	(0.032)	(0.022)	(0.032)	(0.022)
Currency union	0.226 ***	0.051 *	0.193 ***	0.064 **	0.226 ***	0.051 *	0.196 ***	0.064 **	0.196 ***	0.064 **
	(0.049)	(0.028)	(0.049)	(0.025)	(0.049)	(0.028)	(0.049)	(0.025)	(0.049)	(0.025)
Regional trade agreements	0.041	0.239 ***	-0.005	0.237 ***	0.041	0.239 ***	0.021	0.237 ***	0.021	0.237 ***
	(0.032)	(0.018)	(0.032)	(0.017)	(0.032)	(0.018)	(0.032)	(0.017)	(0.032)	(0.017)
Instruments										
Ln(inverse convenience yield)			0.068 ***		0.010				0.010	
			(0.013)		(0.015)				(0.015)	
Ln(financial openness)			0.605 ***				0.601 ***		0.601 ***	
			(0.048)				(0.048)		(0.048)	
Ln(global leverage)	0.464 ***				0.450 ***		0.459 ***		0.444 ***	
	(0.044)				(0.048)		(0.043)		(0.048)	
Ln(global dollar cycle)	-0.640 ***		-1.375 ***		-0.658 ***		-0.741 ***		-0.759 ***	
	(0.122)		(0.105)		(0.122)		(0.122)		(0.122)	
Fixed effects										
Bank country	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Customer country	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Adjusted R^2	0.670	0.816	0.671	0.840	0.670	0.817	0.671	0.840	0.671	0.841
Observations	41,683	41,683	41,683	41,683	41,683	41,683	41,683	41,683	41,683	41,683
First stage										
F	135.846 ***		117.298 ***		91.673 ***		141.846 ***		107.104 ***	
Endogeneity										
$\chi 2$	194.787 ***		182.065 ***		193.815 ***		222.385 ***		221.351 ***	
F	196.008 ***		189.188 ***		195.059 ***		230.201 ***		229.158 ***	
Overidentifcation										
$\chi 2$	7.130 ***		16.479 ***		8.891 **		15.240 ***		16.745 ***	

Table 3: The endogeneity of cross-border loans in the gravity of trade and finance

This table shows instrumental variables regressions estimated as 2SLS or LIML with robust standard errors. For each independent variable, the top row shows the estimated coefficient and the bottom row shows the standard error. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively. The F test statistic informs about the significance of the instrumental variables in the first stage. To determine whether endogenous regressors in the model are in fact exogenous, we report Wooldridge's (1995) robust score χ^2 test and robust regression-based F test. Regarding overidentification, we report Wooldridge's robust score χ^2 test of overidentifying restrictions.

	2SLS								LIML	
	(1)		(2)		(3)		(4)		(5)	
Dependent variable	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)
Ln(cross-border loans)		0.326 ***		0.370 ***		0.352 ***		0.350 ***		0.327 ***
		(0.036)		(0.048)		(0.030)		(0.030)		(0.035)
Ln(GDP_B)	-0.045	0.122 ***	0.132 **	0.122 ***	0.056	0.122 ***	0.057	0.122 ***	-0.045	0.122 ***
	(0.052)	(0.025)	(0.052)	(0.027)	(0.053)	(0.026)	(0.053)	(0.026)	(0.052)	(0.025)
Ln(GDP_C)	0.381 ***	0.425 ***	0.462 ***	0.409 ***	0.461 ***	0.416 ***	0.460 ***	0.416 ***	0.381 ***	0.424 ***
	(0.030)	(0.020)	(0.031)	(0.022)	(0.031)	(0.018)	(0.031)	(0.018)	(0.030)	(0.019)
Ln(distance)	-1.390 ***	-0.654 ***	-1.387 ***	-0.592 ***	-1.382 ***	-0.618 ***	-1.382 ***	-0.621 ***	-1.390 ***	-0.652 ***
	(0.021)	(0.051)	(0.021)	(0.068)	(0.021)	(0.043)	(0.021)	(0.043)	(0.021)	(0.050)
Border	-0.456 ***	0.443 ***	-0.424 ***	0.462 ***	-0.451 ***	0.454 ***	-0.451 ***	0.453 ***	-0.456 ***	0.444 ***
	(0.065)	(0.037)	(0.065)	(0.039)	(0.066)	(0.036)	(0.066)	(0.036)	(0.065)	(0.039)
Colony	0.963 ***	0.791 ***	0.965 ***	0.749 ***	0.963 ***	0.767 ***	0.963 ***	0.768 ***	0.963 ***	0.790 ***
	(0.051)	(0.045)	(0.051)	(0.055)	(0.051)	(0.041)	(0.051)	(0.041)	(0.051)	(0.047)
Common language	0.460 ***	0.201 ***	0.452 ***	0.181 ***	0.461 ***	0.190 ***	0.461 ***	0.190 ***	0.460 ***	0.200 ***
	(0.032)	(0.023)	(0.032)	(0.028)	(0.032)	(0.022)	(0.032)	(0.022)	(0.032)	(0.022)
Currency union	0.193 ***	0.088 ***	0.226 ***	0.079 ***	0.196 ***	0.083 ***	0.196 ***	0.083 ***	0.193 ***	0.088 ***
	(0.049)	(0.023)	(0.049)	(0.025)	(0.049)	(0.023)	(0.049)	(0.023)	(0.049)	(0.028)
Regional trade agreements	-0.005	0.243 ***	0.041	0.243 ***	0.021	0.243 ***	0.021	0.243 ***	-0.005	0.243 ***
	(0.032)	(0.016)	(0.032)	(0.016)	(0.032)	(0.016)	(0.032)	(0.016)	(0.032)	(0.015)
Ln(global dollar cycle)	-1.375 ***	-0.315 ***	-0.658 ***	-0.258 ***	-0.741 ***	-0.282 ***	-0.759 ***	-0.284 ***	-1.375 ***	-0.313 ***
	(0.105)	(0.072)	(0.122)	(0.083)	(0.122)	(0.067)	(0.122)	(0.067)	(0.105)	(0.069)
Instruments										
Ln(inverse convenience yield)	0.068 ***		0.010				0.010		0.068 ***	
	(0.013)		(0.015)				(0.015)		(0.013)	
Ln(financial openness)	0.605 ***				0.601 ***		0.601 ***		0.605 ***	
	(0.048)				(0.048)		(0.048)		(0.048)	
Ln(global leverage)			0.450 ***		0.459 ***		0.444 ***			
			(0.048)		(0.043)		(0.048)			
Fixed effects										
Bank country	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Customer country	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Adjusted R^2	0.671	0.870	0.670	0.859	0.671	0.864	0.671	0.864	0.671	0.870
Observations	41,683	41,683	41,683	41,683	41,683	41,683	41,683	41,683	41,683	41,683
First stage										
F	91.243 ***		57.048 ***		133.755 ***		89.184 ***			
Endogeneity										
$\chi 2$	40.367 ***		38.000 ***		75.782 ***		74.658 ***			
F	41.991 ***		37.889 ***		78.543 ***		77.357 ***			
Overidentifcation										
$\chi 2$	1.132		2.612		0.340		2.981			

Table 4: The gravity of trade and finance for countries of different income levels

This table shows instrumental variables regressions estimated as 2SLS with robust standard errors. For each independent variable, the top row shows the estimated coefficient and the bottom row shows the standard error. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

	(1)	
Dependent variable	Ln(cross-border loans)	Ln(exports)
Ln(cross-border loans)		0.309 ***
		(0.037)
Ln(GDP_B)	-0.075	0.122 ***
	(0.053)	(0.026)
Ln(GDP_C)	0.408 ***	0.392 ***
	(0.034)	(0.022)
Ln(distance)	-1.394 ***	-0.680 ***
	(0.021)	(0.052)
Border	-0.461 ***	0.433 ***
	(0.065)	(0.037)
Colony	0.963 ***	0.806 ***
	(0.051)	(0.045)
Common language	0.461 ***	0.205 ***
	(0.032)	(0.023)
Currency union	0.165 ***	0.085 ***
	(0.049)	(0.023)
Regional trade agreements	0.002	0.238 ***
	(0.032)	(0.016)
Ln(global dollar cycle)	-0.780 ***	-0.081
	(0.157)	(0.074)
Upper middle-income customer country	5.734 ***	0.410
	(1.160)	(0.586)
Ln(global dollar cycle) * upper middle-income customer country	-1.316 ***	-0.112
	(0.258)	(0.131)
Lower middle-income customer country	3.458 ***	2.525 ***
	(1.237)	(0.623)
Ln(global dollar cycle) * lower middle-income customer country	-0.797 ***	-0.608 ***
	(0.275)	(0.139)
Low-income customer country	2.231	2.720 ***
	(1.441)	(0.804)
Ln(global dollar cycle) * low-income customer country	-0.499	-0.672 ***
	(0.321)	(0.179)
Instruments		
Ln(inverse convenience yield)	0.070 ***	
	(0.014)	
Ln(financial openness)	0.586 ***	
	(0.048)	
Fixed effects		
Bank country	yes	yes
Customer country	yes	yes
Adjusted R^2	0.671	0.874
Observations	41,683	41,683

Table 5: The gravity of trade and finance when considering the special role of China and the US in global trade

This table shows instrumental variables regressions estimated as 2SLS with robust standard errors. For each independent variable, the top row shows the estimated coefficient and the bottom row shows the standard error. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

Sample	All importer countries except China				All exporter countries except US			
	(1)		(2)		(3)		(4)	
Dependent variable	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)
Ln(cross-border loans)		0.321 ***		0.303 ***		0.323 ***		0.308 ***
		(0.035)		(0.036)		(0.036)		(0.036)
$Ln(GDP_B)$	-0.030	0.124 ***	-0.057	0.122 ***	-0.104 *	0.117 ***	-0.131 **	0.117 ***
	(0.053)	(0.026)	(0.054)	(0.026)	(0.054)	(0.026)	(0.055)	(0.027)
$Ln(GDP_C)$	0.370 ***	0.420 ***	0.398 ***	0.389 ***	0.396 ***	0.420 ***	0.424 ***	0.389 ***
	(0.030)	(0.020)	(0.035)	(0.022)	(0.030)	(0.020)	(0.035)	(0.023)
Ln(distance)	-1.391 ***	-0.669 ***	-1.395 ***	-0.696 ***	-1.357 ***	-0.649 ***	-1.362 ***	-0.672 ***
	(0.021)	(0.050)	(0.021)	(0.051)	(0.023)	(0.050)	(0.023)	(0.051)
Border	-0.488 ***	0.440 ***	-0.492 ***	0.429 ***	-0.400 ***	0.471 ***	-0.405 ***	0.463 ***
	(0.066)	(0.037)	(0.065)	(0.037)	(0.068)	(0.037)	(0.068)	(0.037)
Colony	0.966 ***	0.794 ***	0.966 ***	0.808 ***	0.941 ***	0.800 ***	0.941 ***	0.812 ***
	(0.051)	(0.044)	(0.051)	(0.045)	(0.052)	(0.044)	(0.052)	(0.044)
Common language	0.466 ***	0.204 ***	0.467 ***	0.208 ***	0.488 ***	0.199 ***	0.489 ***	0.203 ***
	(0.032)	(0.023)	(0.032)	(0.023)	(0.033)	(0.024)	(0.033)	(0.025)
Currency union	0.184 ***	0.084 ***	0.156 ***	0.079 ***	0.288 ***	0.057 **	0.257 ***	0.054 **
	(0.049)	(0.023)	(0.049)	(0.022)	(0.053)	(0.026)	(0.053)	(0.025)
Regional trade agreements	-0.029	0.241 ***	-0.022	0.235 ***	0.001	0.231 ***	0.010	0.226 ***
	(0.032)	(0.016)	(0.032)	(0.016)	(0.034)	(0.017)	(0.034)	(0.017)
Ln(global dollar cycle)	-1.363 ***	-0.324 ***	-0.774 ***	-0.089	-1.509 ***	-0.302 ***	-0.927 ***	-0.078
	(0.106)	(0.071)	(0.157)	(0.073)	(0.110)	(0.077)	(0.164)	(0.078)
Upper middle-income customer country			5.726 ***	0.483			5.767 ***	0.242
			(1.171)	(0.588)			(1.208)	(0.605)
Ln(global dollar cycle) * upper middle-income customer country			-1.316 ***	-0.130			-1.324 ***	-0.072
			(0.210)	(0.132)			(0.269)	(0.135)
Lower middle-income customer country			3.476 ***	2.393 ***			3.351 ***	2.451 ***
			(1.244)	(0.623)			(1.2832)	(0.645)
Ln(global dollar cycle) * lower middle-income customer country			-0.797 ***	-0.580 ***			-0.771 ***	-0.588 ***
			(0.276)	(0.139)			(0.2854)	(0.143)
Low-income customer country			2.271	2.849 ***			1.935	2.732 ***
			(1.4487)	(0.804)			(1.4654)	(0.815)
Ln(global dollar cycle) * low-income customer country			-0.505	-0.701 ***			-0.431	-0.670 ***
			(0.322)	(0.179)			(0.327)	(0.182)
Instruments								
Ln(inverse convenience yield)	0.069 ***		0.071 ***		0.071 ***		0.074 ***	
	(0.014)		(0.014)		(0.014)		(0.014)	
Ln(financial openness)	0.615 ***		0.596 ***		0.625 ***		0.607 ***	
	(0.048)		(0.048)		(0.049)		(0.049)	
Fixed effects								
Bank country	yes	yes	yes	yes	yes	yes	yes	yes
Customer country	yes	yes	yes	yes	yes	yes	yes	yes
Adjusted R^2	0.670	0.869	0.671	0.873	0.658	0.862	0.658	0.865
Observations	41,275	41,275	41,275	41,275	39,852	39,852	39,852	39,852

Table 6: Testing for the endogeneity of the global dollar cycle with respect to trade
This table shows instrumental variables regressions estimated as 2SLS. For each independent variable, the top row shows the estimated coefficient and the bottom row shows the standard error. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively. The F test statistic informs about the significance of the instrumental variables in the first stage. To determine whether endogenous regressors in the model are in fact exogenous, we report Wooldridge's (1995) robust score χ^2 test and robust regression-based F test.

	(1)		
Dependent variable	Ln(cross-border loans)	Ln(global dollar cycle)	Ln(exports)
Ln(cross-border loans)			0.294 ***
			(0.045)
Ln(GDP_B)	-0.020	-0.018 ***	0.134 ***
	(0.052)	(0.003)	(0.027)
Ln(GDP_C)	0.361 ***	0.015 ***	0.422 ***
	(0.030)	(0.001)	(0.019)
Ln(distance)	-1.401 ***	0.008 ***	-0.706 ***
	(0.021)	(0.001)	(0.069)
Border	-0.455 ***	-0.000	0.429 ***
	(0.065)	(0.004)	(0.040)
Colony	0.972 ***	-0.006 *	0.828 ***
	(0.051)	(0.003)	(0.057)
Common language	0.459 ***	0.000	0.215 ***
	(0.032)	(0.001)	(0.025)
Currency union	0.185 ***	0.006 **	0.088 ***
	(0.049)	(0.003)	(0.027)
Regional trade agreements	-0.042	0.027 ***	0.217 ***
	(0.032)	(0.001)	(0.029)
Ln(global dollar cycle)			0.588
			(0.859)
Instruments			
Ln(inverse convenience yield)	0.074 ***	-0.005 ***	
	(0.013)	(0.001)	
Ln(financial openness)	0.565 ***	0.029 ***	
	(0.048)	(0.002)	
Fixed effects			
Bank country	yes	yes	yes
Customer country	yes	yes	yes
Adjusted R^2	0.670	0.081	0.876
Observations	41,683	41,683	41,683
First stage			
F	162.820 ***	98.470 ***	
Endogeneity			
$\chi 2$	15.695 ***	1.060	
F	15.621 ***	1.055	

Table 7: Controlling for the endogeneity of the global dollar cycle with respect to trade

This table shows instrumental variables regressions estimated as 2SLS with robust standard errors. For each independent variable, the top row shows the estimated coefficient and the bottom row shows the standard error. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

	(1)		(2)	
Dependent variable	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)
Ln(cross-border loans)		0.324 ***		0.305 ***
		(0.037)		(0.037)
Ln(GDP_B)	-0.008	0.135 ***	-0.031	0.137 ***
	(0.052)	(0.025)	(0.053)	(0.026)
Ln(GDP_C)	0.360 ***	0.421 ***	0.388 ***	0.389 ***
	(0.030)	(0.019)	(0.034)	(0.022)
Ln(distance)	-1.398 ***	-0.658 ***	-1.401 ***	-0.687 ***
	(0.021)	(0.053)	(0.021)	(0.053)
Border	-0.457 ***	0.441 ***	-0.461 ***	0.431 ***
	(0.065)	(0.037)	(0.065)	(0.037)
Colony	0.968 ***	0.794 ***	0.969 ***	0.810 ***
	(0.051)	(0.046)	(0.051)	(0.046)
Common language	0.460 ***	0.202 ***	0.461 ***	0.207 ***
	(0.032)	(0.024)	(0.032)	(0.024)
Currency union	0.188 ***	0.089 ***	0.165 ***	0.085 ***
	(0.049)	(0.023)	(0.049)	(0.022)
Regional trade agreements	-0.030	0.241 ***	-0.023	0.234 ***
	(0.032)	(0.016)	(0.032)	(0.015)
Ln(lagged global dollar cycle)	-0.655 ***	-0.316 ***	-0.261 *	-0.053
	(0.103)	(0.056)	(0.155)	(0.069)
Upper middle-income customer country			5.047 ***	0.281
			(1.170)	(0.578)
Ln(lagged global dollar cycle) * upper middle-income customer country			-1.164 ***	-0.083
			(0.261)	(0.130)
Lower middle-income customer country			1.988	2.295 ***
			(1.217)	(0.580)
Ln(lagged global dollar cycle) * lower middle-income customer country			-0.466 *	-0.558 ***
			(0.271)	(0.129)
Low-income customer country			-0.378	3.256 ***
			(1.390)	(0.745)
Ln(lagged global dollar cycle) * low-income customer country			0.092	-0.791 ***
			(0.310)	(0.166)
Instruments				
Ln(financial openness)	0.069 ***		0.072 ***	
	(0.014)		(0.014)	
Ln(global leverage)	0.584 ***		0.573 ***	
	(0.048)		(0.048)	
Fixed effects				
Bank country	yes	yes	yes	yes
Customer country	yes	yes	yes	yes
Adjusted R^2	0.670	0.871	0.670	0.875
Observations	41,683	41,683	41,683	41,683

Table A1: Variable definitions and sources

variable	definition	units	source	website
Cross-border loans	Stocks of cross-border loan to non-bank sector from banks in BIS reporting country to borrowers in BIS counterparty country in year t, i.e. measure = S: Amounts outstanding / Stocks; frequency= Q: Quarterly; balance sheet position= C: Total claims; type of instruments = G: Loans and deposits; Currency denomination = TO!: All currencies; currency type of reporting country = A: All currencies (=D+F+U); type of reporting institutions = A: All reporting banks/institutions (domestic, foreign, consortium and unclassified); counter party sector = N: Non-banks, total; Position type = N: Cross-border. Quarterly data are averaged to obtain annual data.	U.S. dollar millions	BIS Locational Banking Statistics	https://data.bis.org/topics/LBS
Exports	Exports from reporting country to counterparty country as reported by BIS reporting country in year t.	U.S. dollar millions	DOTS Direction of Trade Statistics	https://data.imf.org/?sk=9d6028d4-f14a-464c-a2f2-59b2cd424b85
GDP_B	GDP in bank country (aka BIS reporting country and exporter country) in year t. GDP Series NY.GDP.MKTP.CD.	U.S. dollar millions (at current prices)	World Bank's World Development Indicators	https://databank.worldbank.org/source/world-development-indicators
GDP_C	GDP in customer country (aka BIS counterparty country and importer country) in year t. GDP Series NY.GDP.MKTP.CD.			
Distance	Great circle distance in km between capital cities of reporting and counterparty country.	km	L. Eden, Texas A&M University, Chemical Ecology Net	http://www.chemical-ecology.net/java/capitals.htm
Border	Dummy equal to 1 if reporting and counterparty country share a common land border, 0 otherwise. Missing values in Rose filled in from CIA World Factbook.	0/1	Andrew Rose's website; CIA World Factbook	https://www.andrewkrose.net/
Colony	Dummy equal to 1 if reporting country ever colonized counterparty country or vice versa, 0 otherwise. Missing values in Rose filled in from CIA World Factbook.	0/1		https://www.cia.gov/the-world-factbook/
Common language	Dummy equal to 1 if reporting and counterparty country share a common language, 0 otherwise. Missing values in Rose filled in from CIA World Factbook.	0/1		
Currency union	Dummy equal to 1 if reporting and counterparty country belongs to the same currency union in year t, 0 otherwise. Rose's data end in 2017 and the IMF's annual reports on Exchange Arrangements and Exchange Restrictions are used to update the data to 2022 and to fill in data for country-pairs missing in Rose alltogether.	0/1	Andrew Rose's website; IMF's Annual Reports on Exchange Arrangements and Exchange Restrictions	https://www.andrewkrose.net/ https://www.imf.org/en/Publications

Table A1 continued: Variable definitions and sources

variable	definition	units	source	website
Regional trade agreeents	Dummy equal to 1 if reporting and counterparty country belong to the same regional trade agreement or agreements in year t.	0/1	Mario Larch's Regional Trade Agreements Database (Egger and Larch, 2008)	https://www.ewf.uni-bayreuth.de/en/research/RTA-data/index.html
Global dollar cycle	Index of global financial conditions based on the effective, nominal, trade-weighted exchange rate of the US dollar against a basket of 64 currencies. BIS series M.N.B.US. Monthly data are averaged to obtain annual data. Index set to 100 in 2020. Increasing values indicate an appreciation of the U.S. dollar, e.g.weaker credit conditions.	continuous index	Bank for International Settlements (2024), Effective exchange rates, BIS WS_EER 1.0 (data set)	https://data.bis.org/topics/EER/data
Inverse convenience yield	Yield of 3-month AA commercial paper minus 3 months US T-Bill minus yield. Series RIFSGFSM03NA is used for T-Bill yield. Series RIFSPPFAAD90NA is used for AA commercial paper yield; for 1995 and 1996 series H0RIFSPPCM03NA is used.	continuous	Federal Reserve Economic Data, Economic Research Division, Federal Reserve Bank of St. Louis	https://fred.stlouisfed.org/
Financial openness	Product of Chinn-Ito's normalized financial openness index in reporting and counterparty country in year t. Missing values for 2022 filled with data for 2021. A higher value indicates a larger degree of capital account openness.	continuous index	Chinn and Ito (2006)	https://web.pdx.edu/~ito/Chinn-Ito_website.htm
Global leverage	Ratio of financial assets to equity for U.S. broker-dealers in year t. Quarterly data are averaged to obtain annual data.	continous	Board of Governors of the Federal Reserve System (2023), Figure 3.7	https://www.federalreserve.gov/publications/2023-october-financial-stability-report-accessibility-tables.htm#xfig3-7

Table A2: Country coverage

This table lists the countries included in our sample of 41,683 country-pair by year observations.

Panel A: Bank countries (e.g. exporter countries)					
Australia	Canada	France	Italy	Philippines	Switzerland
Austria	Chile	Greece	Korea	South Africa	United Kingdom
Belgium	Denmark	Hong Kong SAR	Mexico	Spain	United States
Brazil	Finland	Ireland	Netherlands	Sweden	
Panel B: Customer countries (e.g. importer countries)					
Albania	Chad	Greece	Lesotho	Pakistan	Suriname
Algeria	Chile	Grenada	Liberia	Panama	Sweden
Angola	China	Guatemala	Libya	Papua New Guinea	Switzerland
Antigua and Barbuda	Colombia	Guinea	Lithuania	Paraguay	Syria
Argentina	Comoros	Guinea-Bissau	Madagascar	Peru	Sao Tome and Principe
Armenia	Costa Rica	Guyana	Malawi	Philippines	Tajikistan
Aruba	Croatia	Haiti	Malaysia	Poland	Tanzania
Australia	Cyprus	Honduras	Maldives	Portugal	Thailand
Austria	Czechia	Hong Kong SAR	Mali	Qatar	The Bahamas
Azerbaijan	Cote d'Ivoire	Hungary	Malta	Republic of Congo	The Gambia
Bahrain	Democratic Republic of the Congo	Iceland	Marshall Islands	Romania	Togo
Bangladesh	Denmark	India	Mauritania	Russia	Tonga
Barbados	Djibouti	Indonesia	Mauritius	Rwanda	Trinidad and Tobago
Belarus	Dominica	Iran	Mexico	Samoa	Tunisia
Belgium	Dominican Republic	Iraq	Micronesia	San Marino	Turkmenistan
Belize	Ecuador	Ireland	Moldova	Saudi Arabia	Turkiye
Benin	Egypt	Israel	Mongolia	Senegal	Uganda
Bhutan	El Salvador	Italy	Morocco	Seychelles	Ukraine
Bolivia	Equatorial Guinea	Jamaica	Mozambique	Sierra Leone	United Arab Emirates
Bosnia and Herzegovina	Eritrea	Japan	Myanmar	Singapore	United Kingdom
Botswana	Estonia	Jordan	Namibia	Slovakia	United States
Brazil	Eswatini	Kazakhstan	Nepal	Slovenia	Uruguay
Bulgaria	Ethiopia	Kenya	Netherlands	Solomon Islands	Uzbekistan
Burkina Faso	Fiji	Kiribati	New Zealand	South Africa	Vanuatu
Burundi	Finland	Korea	Nicaragua	Spain	Venezuela
Cabo Verde	France	Kuwait	Niger	Sri Lanka	Vietnam
Cambodia	Gabon	Kyrgyz Republic	Nigeria	St Kitts and Nevis	Yemen
Cameroon	Georgia	Laos	North Macedonia	St Lucia	Zambia
Canada	Germany	Latvia	Norway	St Vincent and the Grenadines	Zimbabwe
Central African Republic	Ghana	Lebanon	Oman	Sudan	

Table A3: Descriptive statistics

This table shows the descriptive statistics for our sample of 41,683 country-pair by year observations.

Panel A: Continuous variables				
	Mean	Std. dev.	Min	Max
Exports ($m)	3,086.06	15,359.98	0.00007	472,583.60
Cross-border loans ($m)	1,715.63	16,267.95	0.00067	803,429.50
GDP_B ($m)	1,684,854.00	3,245,167.00	69,139.83	25,400,000.00
GDP_C ($m)	605,299.50	2,033,675.00	63.10	25,400,000.00
Distance (km)	6,605.41	4,287.32	56.65	19,838.50
Global dollar cycle	90.09	8.29	73.47	102.95
Inverse convenience yield	0.29	0.27	0.06	1.46
Financial openness	1.25	0.88	-0.97	2.30
Global leverage	25.18	8.91	16.21	46.13
Panel B: Continuous variables in logs as used in regressions				
	Mean	Std. dev.	Min	Max
Ln(exports)	5.30	2.63	-9.54	13.07
Ln(cross-border loans)	3.46	3.34	-7.31	13.60
$Ln(GDP_B)$	13.62	1.07	11.14	17.05
$Ln(GDP_C)$	11.21	2.20	4.14	17.05
Ln(distance)	8.49	0.90	4.04	9.90
Ln(global dollar cycle)	4.50	0.09	4.30	4.63
Ln(inverse convenience yield)	-1.53	0.72	-2.81	0.38
Ln(financial openness)	0.72	0.45	-3.36	1.19
Ln(global leverage)	3.17	0.33	2.79	3.83
Panel C: Categorical variables				
	% of sample with value=1		Min	Max
Border	2.5		0	1
Colony	2.9		0	1
Common language	23.2		0	1
Currency union	5.6		0	1
Regional trade agreements	40.8		0	1

Table A4: Correlations

This table shows the correlations between the continuous independent variables in our sample of 41,683 country-pair by year observations.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Ln(exports)	1.00								
(2) Ln(cross-border loans)	0.66	1.00							
(3) Ln(GDP_B)	0.23	0.26	1.00						
(4) Ln(GDP_C)	0.78	0.45	-0.04	1.00					
(5) Ln(distance)	-0.35	-0.28	0.14	-0.12	1.00				
(6) Ln(global dollar cycle)	-0.04	-0.08	0.01	0.00	0.01	1.00			
(7) Ln(inverse convenience yield)	0.00	0.05	-0.06	-0.05	-0.02	-0.08	1.00		
(8) Ln(financial openness)	0.27	0.28	0.01	0.21	-0.20	0.03	0.01	1.00	
(9) Ln(global leverage)	0.00	0.10	-0.12	-0.10	-0.04	-0.50	0.50	-0.01	1.00

Table A5: Additional combinations of IVs to assess the endogeneity of the global dollar cycle

This table shows instrumental variables regressions estimated as 2SLS with robust standard errors. For each independent variable, the top row shows the estimated coefficient and the bottom row shows the standard error. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively. The F test statistic informs about the significance of the instrumental variables in the first stage. To determine whether endogenous regressors in the model are in fact exogenous, we report Wooldridge's (1995) robust score χ^2 test and robust regression-based F test. Regarding overidentification, we report Wooldridge's robust score χ^2 test of overidentifying restrictions.

	(1)		(2)		(3)		(4)	
Dependent variable	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)
Ln(cross-border loans)		0.314 ***		0.465 ***		0.405 ***		0.407 ***
		(0.037)		(0.036)		(0.026)		(0.026)
$Ln(GDP_B)$	-0.020	0.126 ***	0.174 ***	0.124 ***	0.109 **	0.125 ***	0.107 **	0.125 ***
	(0.052)	(0.025)	(0.052)	(0.029)	(0.052)	(0.027)	(0.052)	(0.028)
$Ln(GDP_C)$	0.361 ***	0.424 ***	0.483 ***	0.372 ***	0.484 ***	0.393 ***	0.484 ***	0.392 ***
	(0.030)	(0.019)	(0.031)	(0.021)	(0.031)	(0.018)	(0.031)	(0.018)
Ln(distance)	-1.401 ***	-0.674 ***	-1.387 ***	-0.461 ***	-1.383 ***	-0.546 ***	-1.382 ***	-0.543 ***
	(0.021)	(0.053)	(0.021)	(0.052)	(0.021)	(0.038)	(0.021)	(0.038)
Border	-0.455 ***	0.437 ***	-0.423 ***	0.503 ***	-0.449 ***	0.477 ***	-0.449 ***	0.478 ***
	(0.065)	(0.037)	(0.0665)	(0.039)	(0.066)	(0.036)	(0.066)	(0.036)
Colony	0.972 ***	0.805 ***	0.967 ***	0.658 ***	0.966 ***	0.717 ***	0.966 ***	0.714 ***
	(0.051)	(0.046)	(0.051)	(0.047)	(0.051)	(0.040)	(0.051)	(0.040)
Common language	0.459 ***	0.207 ***	0.453 ***	0.138 ***	0.461 ***	0.166 ***	0.461 ***	0.165 ***
	(0.032)	(0.024)	(0.032)	(0.025)	(0.032)	(0.021)	(0.032)	(0.021)
Currency union	0.185 ***	0.088 ***	0.224 ***	0.057 **	0.195 ***	0.069 ***	0.195 ***	0.069 ***
	(0.049)	(0.023)	(0.049)	(0.027)	(0.049)	(0.024)	(0.049)	(0.024)
Regional trade agreements	-0.042	0.234 ***	0.038	0.238 ***	0.017	0.236 ***	0.017	0.236 ***
	(0.032)	(0.015)	(0.032)	(0.018)	(0.032)	(0.017)	(0.032)	(0.017)
Instruments								
Ln(inverse convenience yield)	0.074 ***		-0.009				-0.011	
	(0.013)		(0.015)				(0.015)	
Ln(financial openness)	0.565 ***				0.585 ***		0.586 ***	
	(0.048)				(0.048)		(0.048)	
Ln(global leverage)			0.606 ***		0.611 ***		0.624 ***	
			(0.042)		(0.037)		(0.042)	
Fixed effects								
Bank country	yes	yes	yes	yes	yes	yes	yes	yes
Customer country	yes	yes	yes	yes	yes	yes	yes	yes
Adjusted R^2	0.670	0.873	0.670	0.828	0.671	0.849	0.671	0.848
Observations	41,683	41,683	41,683	41,683	41,683	41,683	41,683	41,683
First stage								
F	83.206 ***		127.410 ***		200.484 ***		133.625 ***	
Endogeneity								
$\chi 2$	32.284 ***		154.922 ***		175.189 ***		177.947 ***	
F	33.416 ***		155.778 ***		181.176 ***		184.020 ***	
Overidentifcation								
$\chi 2$	0.487		4.522 **		5.854 **		10.489 ***	

Table A6: Additional instrumental variable specifications regarding the endogeneity of cross-border loans in the gravity of trade and finance

This table shows instrumental variables regressions estimated as 2SLS with robust standard errors. For each independent variable, the top row shows the estimated coefficient and the bottom row shows the standard error. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively. The F test statistic informs about the significance of the instrumental variables in the first stage. To determine whether endogenous regressors in the model are in fact exogenous, we report Wooldridge's (1995) robust score χ^2 test and robust regression-based F test.

	(1)		(2)		(3)	
Dependent variable	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)	Ln(cross-border loans)	Ln(exports)
Ln(cross-border loans)		0.228 **		0.339 ***		0.375 ***
		(0.090)		(0.039)		(0.048)
Ln(GDP_B)	0.029	0.122 ***	-0.076	0.122 ***	0.132 **	0.122 ***
	(0.052)	(0.024)	(0.052)	(0.026)	(0.052)	(0.027)
Ln(GDP_C)	0.382 ***	0.461 ***	0.367 ***	0.420 ***	0.463 ***	0.407 ***
	(0.030)	(0.036)	(0.029)	(0.021)	(0.031)	(0.022)
Ln(distance)	-1.395 ***	-0.791 ***	-1.392 ***	-0.636 ***	-1.387 ***	-0.585 ***
	(0.021)	(0.127)	(0.021)	(0.055)	(0.021)	(0.068)
Border	-0.428 ***	0.401 ***	-0.458 ***	0.449 ***	-0.424 ***	0.464 ***
	(0.065)	(0.050)	(0.065)	(0.037)	(0.065)	(0.039)
Colony	0.965 ***	0.886 ***	0.964 ***	0.779 ***	0.965 ***	0.744 ***
	(0.051)	(0.091)	(0.051)	(0.048)	(0.051)	(0.055)
Common language	0.451 ***	0.245 ***	0.460 ***	0.195 ***	0.452 ***	0.179 ***
	(0.032)	(0.044)	(0.032)	(0.024)	(0.032)	(0.028)
Currency union	0.223 ***	0.110 ***	0.189 ***	0.085 ***	0.226 ***	0.078 ***
	(0.049)	(0.028)	(0.049)	(0.024)	(0.049)	(0.026)
Regional trade agreements	0.015	0.244 ***	-0.009	0.243 ***	0.041	0.243 ***
	(0.032)	(0.015)	(0.032)	(0.016)	(0.032)	(0.016)
Ln(global dollar cycle)	-1.281 ***	-0.442 ***	-1.393 ***	-0.298 ***	-0.640 ***	-0.251 ***
	(0.105)	(0.131)	(0.105)	(0.075)	(0.122)	(0.083)
Instruments						
Ln(inverse convenience yield)	0.068 ***					
	(0.014)					
Ln(financial openness)			0.605 ***			
			(0.048)			
Ln(global leverage)					0.464 ***	
					(0.044)	
Fixed effects						
Bank country	yes	yes	yes	yes	yes	yes
Customer country	yes	yes	yes	yes	yes	yes
Adjusted R^2	0.669	0.888	0.671	0.867	0.670	0.858
Observations	41,683	41,683	41,683	41,683	41,683	41,683
First stage						
F	25.595 ***		159.06 ***		113.976 ***	
Endogeneity						
$\chi 2$	1.843		38.789 ***		39.459 ***	
F	1.834		40.5091 ***		39.3401 ***	

Table A7: The gravity of trade and finance for countries of different income levels with alternative instruments
This table shows instrumental variables regressions estimated as 2SLS with robust standard errors. For each independent variable, the top row shows the estimated coefficient and the bottom row shows the standard error. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively. The F test statistic informs about the significance of the instrumental variables in the first stage. To determine whether endogenous regressors in the model are in fact exogenous, we report Wooldridge's (1995) robust score χ^2 test and robust regression-based F test. Regarding overidentification, we report Wooldridge's robust score χ^2 test of overidentifying restrictions.

	(1)	
Dependent variable	Ln(cross-border loans)	Ln(exports)
Ln(cross-border loans)		0.384 ***
		(0.027)
Ln(GDP_B)	0.084	0.137 ***
	(0.053)	(0.028)
Ln(GDP_C)	0.494 ***	0.360 ***
	(0.035)	(0.020)
Ln(distance)	-1.387 ***	-0.576 ***
	(0.021)	(0.038)
Border	-0.455 ***	0.466 ***
	(0.065)	(0.036)
Colony	0.966 ***	0.733 ***
	(0.051)	(0.039)
Common language	0.461 ***	0.172 ***
	(0.032)	(0.021)
Currency union	0.169 ***	0.070 ***
	(0.049)	(0.024)
Regional trade agreements	0.023	0.235 ***
	(0.032)	(0.017)
Ln(global dollar cycle)	0.248	-0.042
	(0.158)	(0.074)
Upper middle-income customer country	4.928 ***	-0.148
	(1.167)	(0.601)
Ln(global dollar cycle) * upper middle-income customer country	-1.148 ***	0.016
	(0.260)	(0.134)
Lower middle-income customer country	2.540 **	2.116 ***
	(1.213)	(0.622)
Ln(global dollar cycle) * lower middle-income customer country	-0.607 **	-0.515 ***
	(0.270)	(0.138)
Low-income customer country	0.580	3.229 ***
	(1.382)	(0.788)
Ln(global dollar cycle) * low-income customer country	-0.146	-0.784 ***
	(0.3098)	(0.176)
Instruments		
Ln(financial openness)	0.575 ***	
	(0.048)	
Ln(global leverage)	0.592 ***	
	(0.039)	
Fixed effects		
Bank country		
Customer country	0.671	0.855
	41,683	41,683
Adjusted R^2	0.670	0.875
Observations	41,683	41,683
First stage		
F-test	184.970 ***	
Endogeneity		
$\chi 2$	138.241 ***	
F	142.569 ***	
Overidentifcation		
$\chi 2$	4.219 **	