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Impacts on Emerging Economies

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Abstract[*]

Theory suggests both resilience and fragility in banking networks. This paper finds both, exploiting a new database of cross-border syndicated lending to developing countries from 1993 to 2017. Shocks propagate via co-lenders driven by central players, but shocks impacting fringe banks have little impact. The global financial crisis and the appearance of South-South lenders prompted a decline in network centrality, suggesting greater resilience to normal shocks. Multilateral Development Banks may play a catalytic role, but their small size limits their ability to mitigate shock propagation. The ongoing Covid-19 crisis is not a normal shock, is hitting central players and will likely provoke significant contagion.

JEL classifications: F34, G21, L14
Keywords: Syndicate loans, Shock propagation, Systemic banking crises, Banks

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1. Introduction

Banking flows to emerging economies remain important as a source of financing to banks and directly to the non-financial private sector. Fragilities in global banking were highlighted in the global financial crisis and may also come to the fore during the ongoing Covid-19 crisis. While financial reforms aimed to strengthen capital and liquidity buffers, bank balance sheets are under severe pressure once again as the demand for liquidity has grown and credit risk has soared. The unprecedented falls in economic activity and steep rise in unemployment will likely prompt significant rises in non-performing loans. The financial markets of emerging and developing economies are particularly exposed. Due to the global liquidity crunch and greater risk aversion, emerging and developing countries have suffered significant capital outflows. Maintaining financial stability will be critical to avoid an amplification of the costs of the crisis.

The financial sector may be particularly vulnerable to shocks given the close interaction between banks, so shocks to some institutions may propagate through the banking network (see, for example, Allen and Gale, 2000). In the literature to date, most papers have been concerned with actual credit or derivatives signed between banks. In this paper, we explore contagion between banks that agree to co-lend through syndicated lending operations. The idea is that co-lending relationships may be sticky, they are not formed immediately or without cost. If a bank has a set of co-lenders that disappear from the market, then this will impact the possibility of that bank lending through the syndicated market. Given the perceived higher risks and higher capital requirements, the syndicated lending market is particularly important for borrowers in developing and emerging economies. Moreover, syndicate lending co-moves with overall gross flows of loans form private banks and financial institutions (Figure 1),[1] and in 2007, international syndicated loans represented 40 percent of total cross-border flows to emerging markets (De Haas and Van Horen, 2012).

Syndicates are useful as they diversify risk as banks can lend smaller amounts to multiple borrowers through many syndicated loans rather than extending a few large loans to a limited number of clients; they also allow knowledge to be shared and are a useful tool for banks to manage levels of required regulatory capital (Chowdhry and Nanda, 1996; Pichler and Wilhelm, 2001;

[1] As can be seen in Figure 1, syndicate lending co-moves with the overall gross flows of non-guaranteed (PNG) long-term commercial bank lending and public and publicly guaranteed (PPG) commercial bank loans from private banks and other financial institutions. The correlation between the two series is 0.9 in the sample period.

Tykvová, 2007; Hale, 2012). But as we explore below, relying on loan syndication may impact the ability of banks to lend in this market.

In this paper, we abstract from how loan syndicates form, and we take the structure of the syndicated market as a given. We are agnostic on what drives the choice of a financial institution to partner with another financial institution. Irrespective of how they originate, once syndicate relationships are formed, they tend to be sticky, highlighting the importance of investigating what happens to banks when they form syndicates with a partner affected by a negative shock.[2]

We find that the syndicated lending network is not highly centralized or dense, there are some central players with many co-lenders (typically the large global banks) but then there are many financial institutions on the periphery with relatively few co-lender connections. The network is highly incomplete in the sense that there are few actual connections compared to the many potential connection that could exist. In addition, the global financial crisis (GFC) had a significant impact on the network. Several large global banks became less central with less co-lender connections after the crisis. In addition, some emerging economy banks became more important players (South-South lenders), including official Chinese banks (see Figure 2). We treat these changes, which reduced the density of the network, as exogenous.

There has been considerable empirical work on bank inter-dependence due to borrowing and lending relations (Hale et al., 2019; Cingano, Manaresi and Sette, 2016; Iyer and Peydró, 2011).[3] Theoretical work has tended to focus on shock propagation in a network of financial institutions linked to one another via unsecured debt contracts. While some authors suggested that more interbank connections enhance financial stability (Kiyotaki and Moore, 1997; Allen and Gale, 2000; Freixas, Parigi and Rochet, 2000), others see more dense connections as destabilizing, potentially leading to systemic collapse (Vivier-Lirimont, 2006; Gai, Haldane and Kapadia, 2011; Blume et al., 2011, 2013). Acemoglu et al. (2015) reconcile these seemingly conflicting views in a model where both forces are at play. If negative shocks impacting financial institutions are

[2] Edges (relations between a pair of banks) are positive and significantly associated at least up to the 10th lag.

[3] For example, Hale et al. (2019), analyze how financial shocks in foreign markets are transmitted through the web of bank connections by considering at cross-border lending to other banks (exposure to banks in countries that are experiencing systemic banking crises). The authors find that crisis exposures are associated with lower bank profitability and smaller corporate loan volumes (to foreign, small and non-core borrowers). Cingano, Manaresi and Sette (2016) document that the crunch in the Italian interbank market during the 2007-9 financial crisis led banks with larger exposures to this market to curtail credit, with negative effects on firm investment. Iyer and Peydró (2011) study contagion effects in the Indian interbank market, showing that after the failure of a large bank, banks exposed to it experience large deposit withdrawals, suffer a loss of profitability and cut back loans, propagating the shock to the real sector.

sufficiently small, densely connected financial networks may enhance the resilience of the financial system, whereas dense interconnections among central players may become a mechanism for the propagation of larger shocks, rendering the network more fragile.

Direct borrowing and lending may be one source of contagion, but there may be others. We focus on co-lending relations and the impact that co-lenders may have on banks' lending to developing economies. The only other paper we are aware of that focusses on co-lenders is Nirei, Caballero and Sushko (2015). In their model, through simulation exercises they find that the withdrawal of a bank from a syndicate can cause ripple effects through the market as syndicate arrangements dissolve if co-lenders cannot commit more funds.

To the best of our knowledge, this paper is the first empirical study of shock propagation through co-lending relationships in the international syndicated lending network. We consider various ways in which shocks may originate and propagate through such networks. We differentiate between shocks that impact central lenders versus those on the periphery and allow for heterogeneous impacts. We analyze the impacts of banks that suffer from a crisis in their home country, banks that have exposures to countries that suffer a banking crisis and banks that have co-lenders that suffer a crisis in their home countries.

We find that cross-border bank lending to developing countries is significantly reduced when the home country of a bank is hit by a systemic banking crisis and when the bank's portfolio is exposed to countries experiencing a crisis. We also show how such shocks propagate through the network. For example, we find that a bank reduces lending when its co-lenders are hit by a systemic banking crisis in their home country. The impact of shocks to banks that are central in the network is the main mechanism of this co-lender effect.

A further contribution of the paper is that we investigate different time periods, namely before and after the GFC. As the network became less dense, banks are less impacted by co-lenders in line with the theory. When assessing if shock propagation varied across time, we find that contagion through co-lenders affected bank lending more strongly before and during the crisis, and significantly less after the crisis. But this result reflects the impacts of what might be described as normal shocks so that while the network may have become more resilient, this does not mean it will be resilient to the impacts of the Covid-19 pandemic, which does not appear to be a normal shock.

Finally, we study the role of private sector arms of Multilateral Development Banks (MDBs) that participate in syndicated lending and explore whether they may be catalytic and, whether through partnerships with MDBs, shock propagation may be mitigated. We find evidence for the former, in that MDBs may "introduce" financial institutions to new developing countries, but not for the latter, likely due to their small size.

The remainder of the paper is organized as follows. In Section 2, we describe the data. In Section 3 we present the empirical strategy. In Section 4 we discuss the results and in Section 5 we introduce a set of robustness checks. Section 6 concludes.

2. Data

We gather data on cross-border syndicate lending to developing countries over the period 1993-2017 through Thomson ONE (from Refinitiv). Information on systemic banking crises is obtained from the dataset of Laeven and Valencia (2018).

2.1 Cross-Border Syndicate Lending

Our main source of data is Thomson ONE, which contains detailed data on syndicate loans at the tranche level for private and some public sector borrowers. The vast majority of loans are to private sector entities. The database provides information on the tranche, the borrower and the lender dimensions, such as: signing date, proceeds amount in USD, years to maturity, spreads, use of proceeds, type of loan, description of the yield, borrower nationality, sector and public status, and finally, lender name, nationality and role. Since Thomson ONE does not provide the exact amount lent by each bank, we assign equal shares to each bank participating in each tranche of each deal.

We focus on cross-border syndicated loans between 1993 and 2017. In total, there are 16,628 loans provided by 2,543 banks in 147 developing countries for 8,398 borrowers. Summary statistics for the loans and the data collapsed at the bank-year level can be found in Table 1. The average number of lenders per loan is 7.5, and the average amount in real terms is 293 million dollars (Panel A). Almost 90 percent of lenders are from advanced economies, and developing countries benefitting from cross-border syndicate lending cover most regions across the world (see Figure 3).

We restrict our attention to 285 banks that lend 95 percent of the total amount lent to developing countries in 1993-2017. The average number of lenders per loan is 6.8, and the average

loan amount is 279 million dollars (Panel B). We configure a panel dataset to observe each bank throughout the sample.

When exploring the overall role of MDBs, we are not only interested in the major players in the syndicate network, but also in each bank participating. Hence, to conduct this analysis we go back to the initial sample of 2,543 banks.

Syndicated loans where MDBs participate are slightly smaller in size (Table 1, panel C). On average 6.8 co-lenders participate in loans where MDBs are present. MDB partners are more central compared to the average bank, and almost half of them (46 percent) partner with MDBs for only one year in the sample. Still, some large players (1 percent of banks) partner with MDBs every year in 1993-2017, including Citi, Credit-Agri-Cib, IGN, Mitsubishi-UFJ, Raiffeisen-BI, SOC-GEN, and Unicredit. Finally, while most MDB partners are from advanced economies, it is interesting to note that those banks from lower-income countries that participate in the syndicated lending market are more likely to partner with an MDB.

2.2 Systemic Banking Crisis

We exploit the updated dataset of systemic banking crises by Laeven and Valencia (2018) to assess how shocks propagate through the network of banks participating in the syndicate loan market. A banking crisis is defined as systemic if there are significant signs of financial distress in the banking system (e.g., bank runs, losses in the banking systems, bank liquidations) or if there are significant banking policy intervention measures in response to significant losses in the banking system. We restrict our focus to systemic banking crises between 1993 and 2017. With this information, we are able to account for banking crises in the home country of the lending bank, for the exposure of the lending bank to borrower countries that are facing a systemic banking crisis, and for the proportion of each bank's co-lenders affected by a systemic banking crisis in their home country. We will also be able to distinguish the proportion of central co-lenders affected by a crisis among all co-lenders and the proportion of periphery (or fringe) co-lenders affects by a crisis, where we define central co-lenders as the banks that appear at the 75^{th} percentile of the distribution of betweenness centrality, a measure of connectedness of each bank in the network. In the literature on networks, the betweenness of a given node (or bank) states how often it appears on the shortest path between nodes in the network, that is, how many pairs of other banks are not directly

connected but are related exclusively through the given bank (Caballero, Candelaria and Hale, 2009).

Once we collapse the dataset at the bank-year level, we are left with 7,125 observations (Table 1, panel D). The information on banking crises is not available for all countries, hence, once we merge this dataset with the reduced syndicate lending sample data, we are left with 232 banks that have 88 percent of the market share in our baseline regression.

Once we look instead at the full sample of banks, we have 2,543 banks, of which 22 are MDBs. Summary statistics for this borrower country-bank year level dataset can be found in Table 1, panel E.

2.3 Network

Figure 4 provides one illustration of the co-lender network employing Gephi. Each bubble (or node, in network terminology) represents a bank lending in the international network of syndicate lending. The size of each bubble represents the total amount lent by that bank to other countries in the last year of the sample (2017), while the color of each bubble represents the country of origin of the bank. Table 2 provides selected network statistics. Banks have on average 45 co-lenders per year, but the distribution of centrality is skewed such that there are a few players with many co-lenders and then a long tail of banks with few co-lenders.

The network of the banks or nodes that lend to developing economies through syndicate loans has changed throughout our sample period. Characteristics of the banks in the network such as "Degree," which is the number of connections or edges[4] the node has to other nodes, and "Closeness Centrality," defined as the reciprocal of the average distance from a given starting node to all other nodes in the network, have decreased since the global financial crisis (Figure 5). Moreover, the general density of the network has fallen, that is, the network is less complete than before in terms of possible edges: each bank has fewer connections and is more distant from other nodes in the network (less centralized).

From a Kolmogorov-Smirnov test on the equality of the pre- and post- crisis distributions of centrality and degree values of banks, it is apparent that pre-crisis values are significantly larger than the values post GFC. That is, the network became less dense, and banks became less central

[4] Edges are defined as the number of links or relations between banks.

over time. This is reflected in the cumulative distribution of bank centrality and degree values over time, which shifted towards less centrality and smaller degree (Figures 6-7).

3. Empirical Strategy

To analyze how shocks propagate in the international network of syndicated lending, we adopt a lagged dependent variable model with bank fixed effects:

$$y_{it} = \alpha_0 + \theta y_{it-1} + \alpha_1 home\ shock_{it-1} + \alpha_2 exposure\ shock_{it-1} + \alpha_3 prop\ of\ colenders\ in\ crisis_{it-1} + \delta_i + \delta_t + \varepsilon_{it} \quad (1)$$

where y_{it} is the total amount lent to developing countries by bank *i* (natural logarithm of real million USD). *Home shock*$_{it}$ is a dummy representing a year of systemic banking crisis in the home country of lending bank *i*. *Exposure shock*$_{it}$ represents the percentage of bank *i*'s portfolio exposed to borrower countries *k* in a systemic banking crisis. *Syndicate shock*$_{it}$ is the proportion of co-lenders of bank *i* affected by systemic banking shocks in their countries. δ_i and δ_t are bank *i* and year fixed effects, respectively. ε_{it} are standard errors clustered at the country level.

To assess whether the propagation of shocks through co-lenders changes in time, we add to equation (1) the interaction between the proportion of co-lenders in crisis with *GFC,* a dummy equal to 1 during the global financial crisis (2008 and 2009), and the interaction between the proportion of co-lenders in crisis and *post2010,* a dummy equal to 1 since 2010.

$$y_{it} = \alpha_0 + \theta y_{it-1} + \alpha_1 home\ shock_{it-1} + \alpha_2 exposure\ shock_{it-1} + \alpha_3 prop\ of\ colenders\ in\ crisis_{it-1} + \alpha_4 prop\ of\ colenders\ in\ crisis_{it-1} * GFC + \alpha_5 prop\ of\ colenders\ in\ crisis_{it-1} * post2010 + \delta_i + \delta_t + \varepsilon_{it} \quad (2)$$

α_3 captures the effect on bank lending of the proportion of co-lenders in crisis before 2007, $\alpha_3 + \alpha_4$ measures the effect during the global financial crisis (GFC), and $\alpha_3 + \alpha_5$ the effect after the GFC.

To measure whether participating in a syndicate loan with an MDB can mitigate the effect of shocks, we interact each of the shock variables with *MDB*$_{ict-1}$, a dummy equal to 1 since bank *i* was in its first syndicate with an MDB for a loan to country *c*:

$$y_{ict} = \alpha_0 + \theta y_{ict-1} + \alpha_1 MDB_{ict-1} + \beta_1 home\ shock_{ict-1} + \gamma_1 exposure\ shock_{ict-1} + \delta_1 prop\ of\ colenders\ in\ crisis_{ict-1} + \beta_2 home\ shock_{ict-1} * MDB_{ict-1} + \gamma_2 exposure\ shock_{ict-1} * MDB_{ict-1} + \delta_2 prop\ of\ colenders\ in\ crisis_{ict-1} * MDB_{ict-1} + \delta_{ic} + \delta_t + \varepsilon_{ict} \quad (3)$$

Since in our sample we do not observe the full history of syndicate lending, but only what happens since 1993, it is hard for us to say when banks truly partner with MDBs for the first time. To limit problems related to the precise measurement of the first year, we estimate equation (3) in a sample of banks from 2000 onwards. In that sample, the first year of syndicate lending together with MDBs is more likely to be accurate.

From this analysis, for the dependent variable we exclude banks that are MDBs, and we exclude observations for which the amount lent by bank *i* to country *c* is equal to zero. That is, we observe whether shocks and participating with MDBs in syndicated loans can have any effect on the intensive margin: whether banks decrease or increase their lending after they participate with an MDB and after being hit by a shock. Furthermore, we exclude from the dependent variable in equation (3) the amount lent in the joint loan with MDBs. That is, y_{ict} is the natural logarithm of total amount lent to developing country *c* by bank *i* at time *t,* excluding the amount lent jointly with MDBs. δ_{ic} and δ_t are country-bank and year fixed effects, respectively. ε_{ict} are standard errors clustered at the country level.

4. Results

4.1 Response to Crises: Direct and through Co-Lenders

We start the analysis by exploring which shocks affect bank lending. The results of estimating equation (1) are reported in Table 3. We add fixed effects progressively across the columns: in column (1) we do not control for any fixed effect, in column (2) we add bank fixed effects, in column (3) we add year fixed effects, and in our preferred specification, column (4), we add both bank and year fixed effects. The estimated coefficient of the lagged dependent variable is positive and significantly different from zero across specifications,[5] but it does not give any cause for concern that there might be a unit root. The estimated coefficient of $degree_{t-1}$, i.e., the number of unique co-lenders, is also positive and significant, indicating that any additional co-lender that a

[5] Having both a lagged dependent variable and bank fixed effects will produce a bias in the estimates known as Nickell bias, which should be small given the long time series we exploit (25 years). When adopting a system GMM, results are robust (see Section 5).

bank had at time *t-1* predicts an increase in the bank's lending at time *t*. Once we control for year fixed effects (columns 3-4), we observe that when a bank experiences a shock in its home country, its cross-border lending to developing countries decreases. Specifically, if a country experiences a systemic banking crisis, its banks decrease their cross-border lending through syndicated loans to developing countries by 29 percent. Exposure to countries that experience a crisis is also detrimental for a bank's cross-border lending: an additional 10 percent of a bank's portfolio exposed to countries suffering from a systemic banking crisis decreases the bank's lending by 5 percent.

Co-lenders also impact bank lending, indicating that shocks propagate through the network. As the literature suggests some co-lenders are more important than others, we distinguish between central and peripheral co-lenders to examine whether the centrality of co-lenders can affect the propagation of shocks. In Table 4 we report the baseline results (column 1) and what happens when we separate the proportion of periphery co-lenders in crisis from the proportion of central co-lenders in crisis (column 2). As can be seen, we find evidence that the shock from co-lenders propagates only through central co-lenders. The effect is quantitatively meaningful. If an additional 10 percent of a bank's central co-lenders are hit by a crisis at home, then that is associated with a fall in that bank's lending by 7 percent. To put actual dollar values on this, on average (across banks and years), each bank has 49 co-lenders and on average, 3 central co-lenders with a crisis in their home country. Given that the average amount lent by a bank is 773 million in real (2012) US dollars per year, 1 more central co-lender in a crisis implies a fall in lending of 204 million 2012 US dollars due to the "co-lender effect."

In column (3) we assess whether banks that are central in the international syndicate loan network are more resilient or vulnerable to shocks to co-lenders: the coefficient of the interaction between the dummy indicating whether the bank is central and the co-lenders shock is not significantly different from zero, indicating that fringe banks and central banks are impacted by shocks to co-lenders with the same strength. Last, we evaluate whether shocks to central or fringe co-lenders have different impacts on central or fringe banks. The results in column (4) indicate that it is always shocks to central co-lenders that negatively affect banks, independently of whether the bank being impacted is located in the periphery or it is a central player.

4.2 The Global Financial Crisis

In Table 5 we explore whether the network has become more resilient as centrality has fallen after the global financial crisis. Specifically, we assess whether the co-lender shock hit differently pre-GFC, during the GFC and post-GFC. We assess if co-lender shocks affect banks differently in the three periods by interacting the shock with a dummy equal to 1 in 2008-9, and a dummy equal to 1 for all the years after 2010. Having time fixed effects in this specification would not be appropriate, so we control for real GDP growth instead. In column (1) we report our baseline estimates to facilitate comparison. In column (2), we show what happens to our baseline results when we control for real GDP growth of the bank country at time *t-1* rather than controlling for year fixed effects. Compared to our preferred specification in column (1), the results change slightly. While in column (1), a systemic banking crisis in the home country has a negative and significant effect on bank lending, it seems that real GDP growth captures the effect of that shock, and the estimated coefficient for the variable $home\ shock_{it-1}$ is no longer significant in column (2). In column (3), we report the results from estimating equation (2), that is, we re-estimate the model in column (2) adding the interaction between the proportion of co-lenders in crisis with a dummy equal to 1 in 2008 and 2009, and the interaction between the proportion of co-lenders in crisis with a dummy equal to 1 since 2010. It is interesting to observe that the proportion of co-lenders that have a banking crisis in their home country has a negative and significant effect on bank lending before and during the global financial crisis (GFC), but the relevant coefficient is not significant after the GFC. Many factors could lie behind this result, but a possible explanation is that the network became less dense post GFC. Both the density of the international syndicate network and the average centrality of banks declined after the GFC; see Figure 4.

4.3 MDBs: Role for Shock Mitigation?

An interesting question and an ongoing debate within MDBs is whether they are catalytic and whether they may help stabilize financial markets. To address these questions, we deploy the full network of financial institutions, since we are interested in all the players.

First, it is useful to note that MDBs have an important role in introducing lenders to a new country (around 6 percent of financial institutions start syndicating in a country for the first time[6] with MDBs; of these, approximately 50 percent lend at least once again in the country after being introduced by MDBs[7]). Hence, we also shift our focus to country-bank level data. Results from estimating equation (3) are reported in Table 6. After having participated in a syndicate with an MDB in a loan to a client in a specific country, financial institutions increase their lending to that country (column 1), especially if it was the first time that they participated in a syndicated loan to a client in that country (column 2). While column (2) shows the effect of participating in the syndicated loan market with an MDB, if bank *i* is introduced to the syndicate market of country *c* by an MDB, column (3) shows the effect of participating with an MDB if bank *i* was already present in the syndicated loan market of country *c*. The estimated coefficient of $postMDB_{ct-1}$ is much larger in magnitude in column (2), but the precision of the estimate is not accurate and the confidence intervals overlap with those of the estimated coefficient in column (3), i.e., they are not significantly different from each other. In line with Broccolini et al. (2020), MDBs seem to play a catalytic role. However, from Table 6 we can also see that MDBs do not help to mitigate the shocks that banks receive, that is, having participated in a loan with an MDB does not counterbalance the negative effects of a crisis.

5. Robustness Checks

We found in our empirical results that shocks propagate through central co-lenders, where central co-lenders are defined as the top quartile in the distribution of betweenness centrality. But this result might depend on the particular cut off or the definition of centrality adopted. Hence, we redo the analysis changing the definition of central lenders in two ways. First, we redefine central co-lenders as banks in the top 10^{th} percentile of the distribution of betweenness centrality. As can be seen in column (1) of Table 7, the main results do not change: banks are hit when there is a shock to their central co-lenders with this tighter definition.

[6] We exclude 1993 and 1994 as possible first years of participation in the syndicated loan market, since we only observe financial institutions starting since 1993. That said, this finding is robust to choosing as possible first year any year between 1995 and 2000.

[7] How many banks continue lending after entering a country with MDBs depend on the choice of possible first year and varies between 45 percent and 55 percent.

Second, we adopt a different measure of connectedness in the network literature, namely closeness centrality. Closeness of bank *i* is the inverse of the number of banks that bank *i* has to go through on average to reach other banks in the network. The lower the closeness centrality of bank *i,* the more distant bank *i* is from all the other banks in the network. The results are in column (2) of Table 7, and again the main result (that it is the central lenders that propagate shocks) are unchanged.

As a further robustness check we take out outliers from the database. Specifically, we Winsorize the variable of yearly cross-border amounts lent by banks at the 1 percent level, then take its logarithm, and then re-estimate our baseline model. As can be seen in columns (3)-(4), again the results do not vary.

Our database was created considering banks that are active in the international syndicated loan market. Still, we have some years in which some banks do not lend. As a further robustness check, we restrict the sample to only those banks that lend every year. In this restricted sample, 83 percent of banks are central (vs. 36 percent in the original sample[8]) and on average banks have a much higher number of co-lenders per year (115 on average vs. 49 in the original sample). The fringe players in this restricted sample are on average less on the outside of the periphery compared to the previous sample. As can be seen in column (5), a shock to co-lenders negatively affects the amount lent by banks, even in this reduced sample. Moreover, while shocks to central co-lenders affect bank lending, in addition we find that shocks to fringe co-lenders are also relevant in this setting. We suggest this result is due to the fact that the fringe banks in this reduced sample are more like intermediate players, as we have eliminated the banks that are on the outside of the periphery of the network.

Estimating a fixed effects model in the framework of a dynamic panel data model may generate biased estimates, if the time dimension is short, and the number of banks (in this case) is large. In fact, our panel is relatively long and so we do not think this is a significant problem for the baseline model presented above. To see if we are correct, we re-estimate equation (1) through a system-GMM approach as suggested by Blundell and Bond (1998). This also has the potential advantage of addressing endogeneity by using lagged variables as instruments. Specifically, we

[8] We define banks as being central if their betweenness centrality is above the 75th percentile in the wider dataset. As discussed, we narrow the sample to 232 banks, and we end up with 36 percent of banks in that smaller sample being defined as central.

use a set of moment conditions where lagged levels are used as instruments for the lagged dependent variable in the difference equations and lag differences in the level equation. We employ Windmeijer's (2005) finite sample correction to report standard errors. To avoid instrument proliferation, we first instrument with 3 to 6 lags of the lagged dependent variable (Table 8, column 1) and we instrument with 3-15 lags (column 2). The results are very reassuring, as all the main results are unchanged in both cases. The proportion of co-lenders in crisis has a negative and significant effect on the amount lent by the bank. When we disentangle the effect of central and fringe co-lenders, we continue to find that the shock is transmitted through central co-lenders (columns 3-4) and not through fringe players.

Both the validity of the instruments and the presence of serial correlation in the residuals can be tested. The Hansen test, reported at the bottom of the table, suggests that overidentifying restrictions are valid for all specifications. The Arellano-Bond test for autocorrelation of residuals in differences confirms that differenced residuals do not exhibit significant AR(3) behavior, that is, third lags of endogenous variables are appropriate instruments for their current values.[9]

6. Conclusions

Syndicated lending allows banks to diversify risk and manage capital effectively, this may be particularly useful and enhance lending to developing countries, where risk perceptions tend to be elevated. But syndication appears to be sticky, such that a shock that reduces one bank's lending in this market may have impacts on the ability of its co-lenders to continue to lend. Theoretical models suggest both resilience and fragility in banking networks depending critically on the nature of the shock and how it impacts the network.

A main contribution of our paper is to show evidence for this theoretical notion, as we find that the co-lender effect is driven by shocks to co-lenders that are central in the network, while shocks that hit banks on the periphery have little impact. In addition, we find evidence that banks that have a banking crisis in their home country or have exposures to countries that suffer a banking crisis reduce lending in this market.

Furthermore, we find that the network became less dense and centrality declined after the global financial crisis. The large global banks became less central and new players entered, such

[9] We start instrumenting with the third lag because differenced residuals appear to follow an AR(2) process, making second lags of endogenous variables inappropriate instruments.

as South-South lenders including the Chinese official banks. In line with the theoretical analysis of financial networks, we find evidence that this increased the resilience of the network to the shocks in the sample after the global financial crisis.

We also consider the role of the private sector arms of multilateral development banks (MDBs) that participate in the international syndicated lending market. MDBs appear to play a catalytic role as when they introduce banks to a borrowing country, those financial institutions subsequently increase their lending. However, perhaps because of their small size, we do not find MDB's mitigate shocks.

The theory suggests that the nature and the size of the shock is also important. The Covid-19 crisis has likely placed significant strain on all banks, including banks that are central to the network, and it is certainly no normal shock. Our results suggest that contagion through the syndicated lending market may exacerbate declines in loan volumes to developing countries in this ongoing crisis. When more data becomes available, further research will be able to confirm the extent of the impacts.

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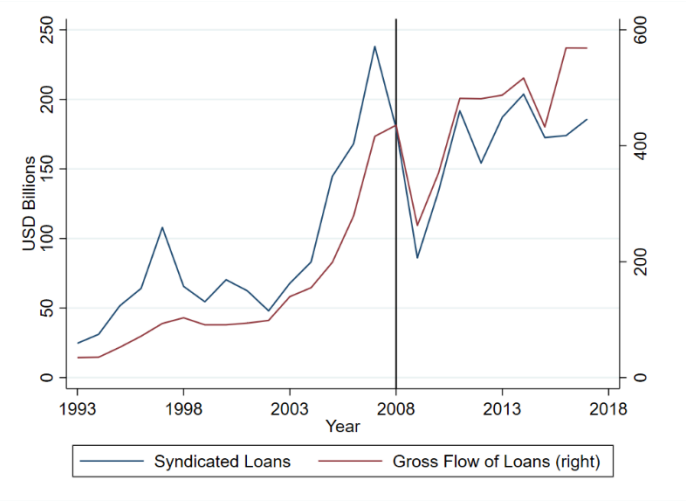
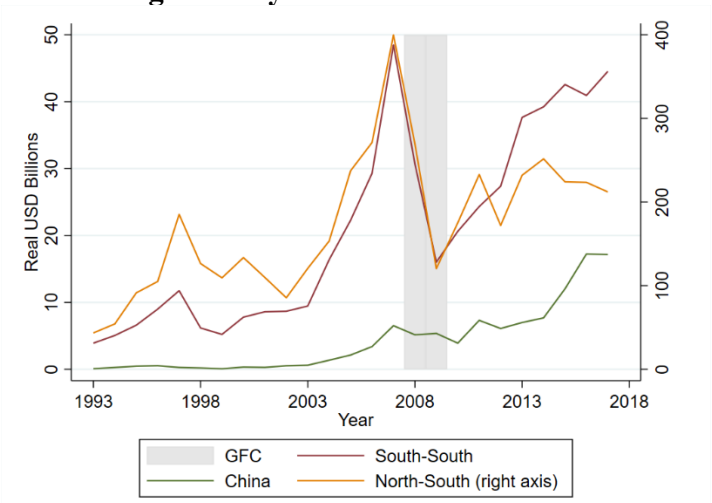
Tables and Figures

Figure 1. Cross-Border Syndicated Lending Is an Important Element of Total Gross Credit Flows to Developing Countries



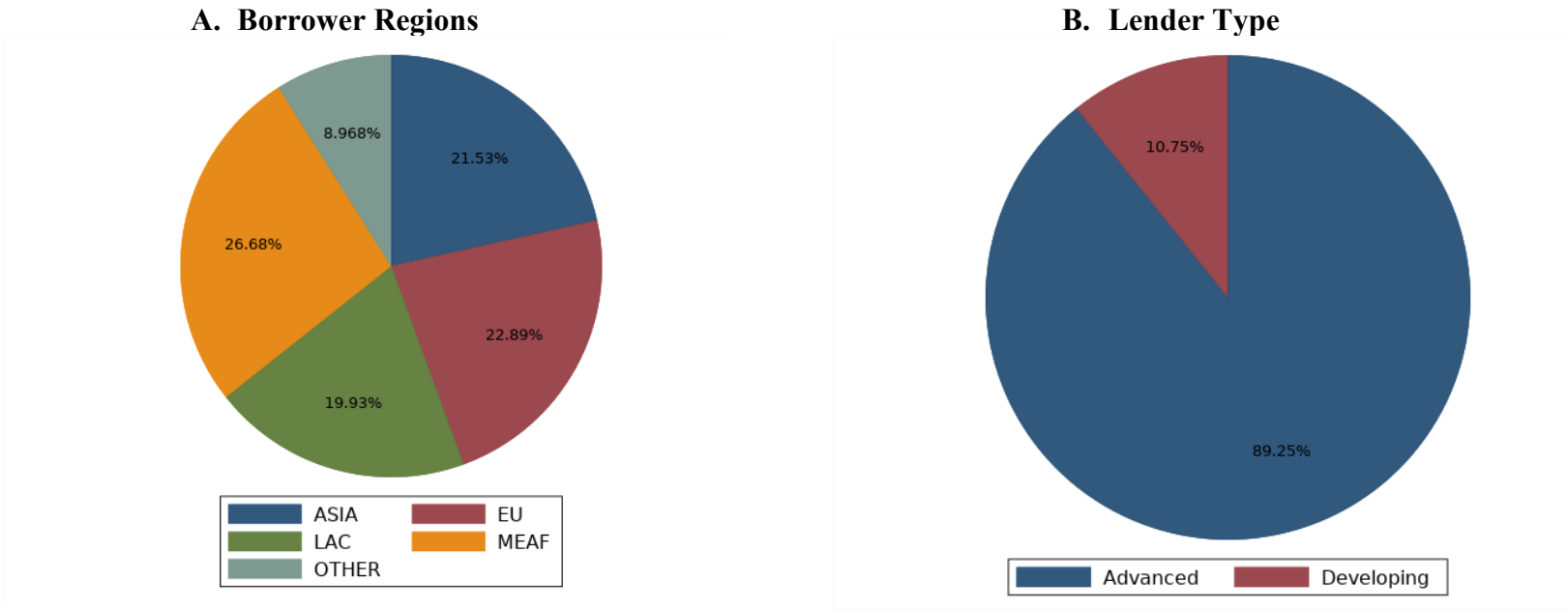
Note: The figure shows the co-movement between the nominal amount of Syndicated Loans and the Gross Flow of Loans for low and middle-income countries during 1993-2017. The agreement of new syndicated lending is closely associated with the actual flow (disbursements) of commercial lending to developing countries. Gross flow of loans is the gross flows (disbursements) of non-guaranteed (PNG) long-term commercial bank loans and public and publicly guaranteed (PPG) commercial bank loans from private banks and other financial institutions from World Bank data.
Source: Authors' calculations based on Refinitiv and World Bank International Debt Statistics.

Figure 2. Syndicated Loan Market



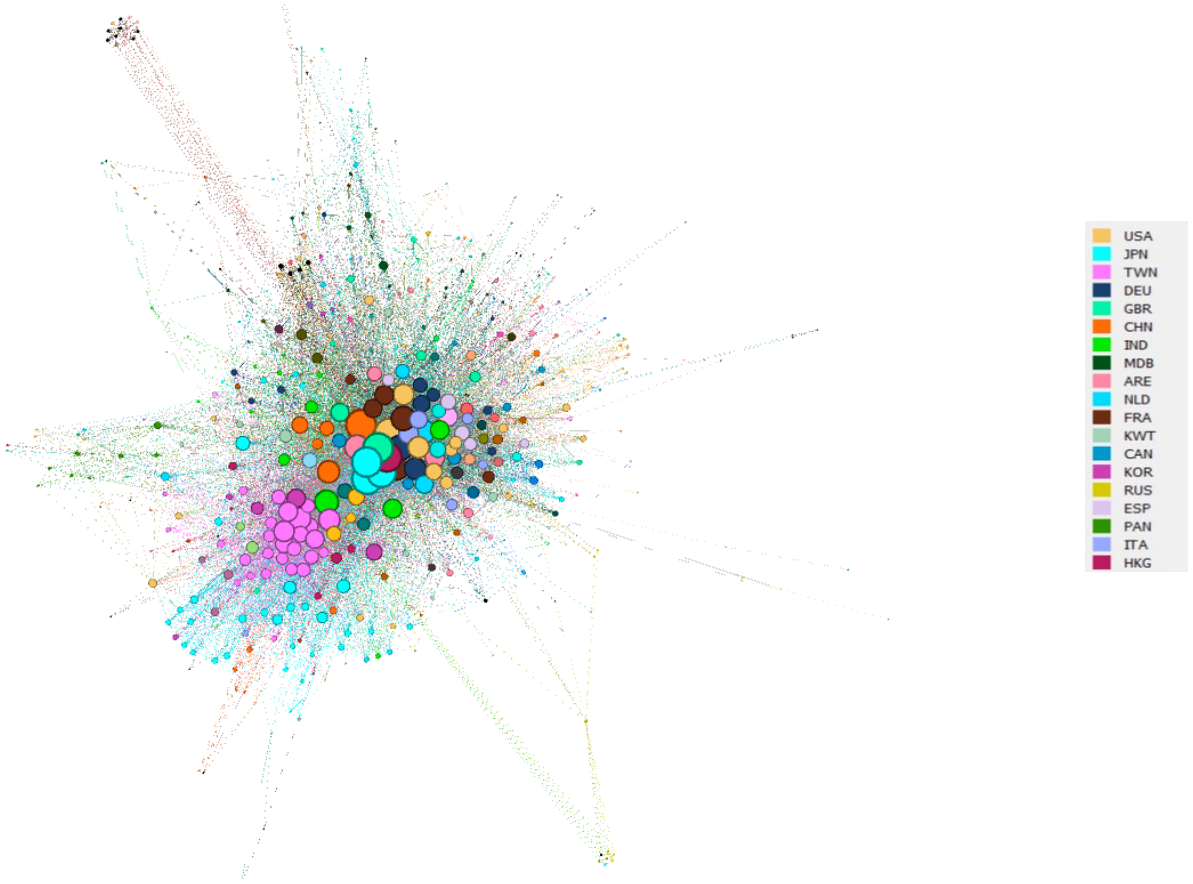
Note: The figure shows the evolution of syndicate lending to Emerging and Developing Economies (South) by lenders during 1993-2017.
Source: Authors' calculations based on Refinitiv.

Figure 3. Syndicated Loan Market Participants



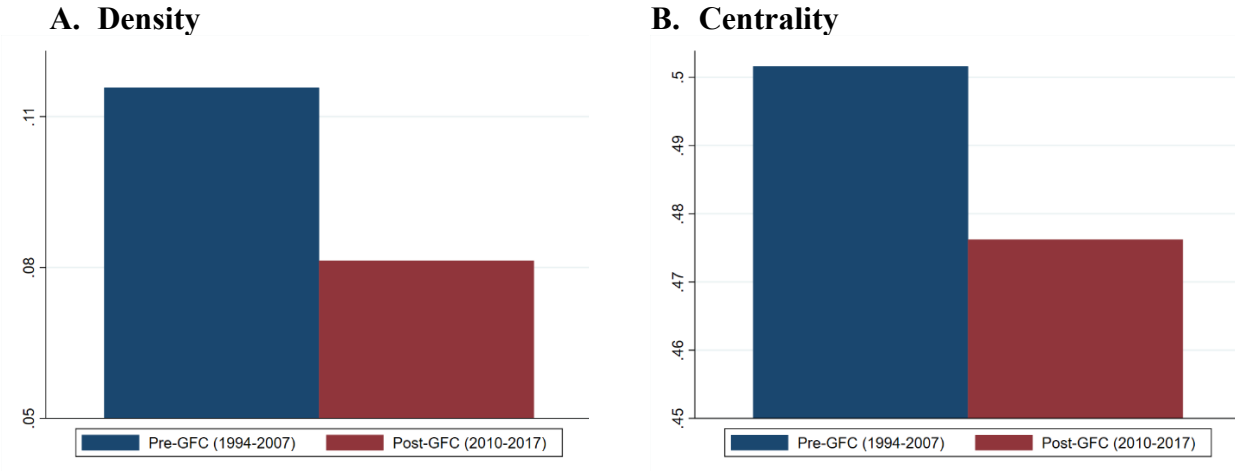
Note: Panel A depicts the distribution of syndicate loans by borrower region and panel B shows the share of Advanced and Developing lender countries share during 1993-2017.
Source: Authors' calculations based on Refinitiv.

Figure 4. 2017 Network



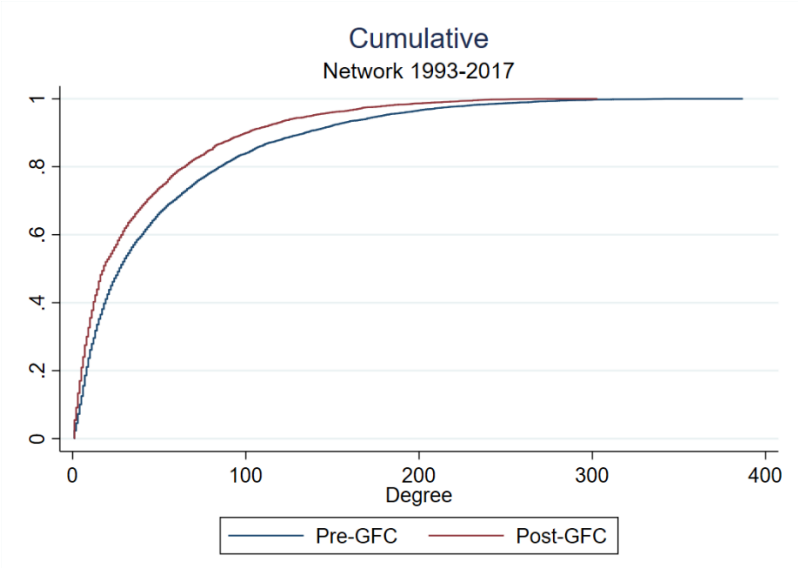
Note: Figure 4 illustrates the lending network for 2017. Each bubble represents a bank, and the size of each bubble is in proportion to the number of co-lenders of that institution. The colors show the nationalities of the banks in question. Banks (bubbles) are placed close to each other when they syndicate loans together. As it is common for banks from the same country to form syndicates, bubbles of the same color tend to be close to each other. At the center of the network are the large global banks from the United States, Europe and Japan. Taiwan is also important in the cross-border syndicated loan market, and some Chinese banks have now become central players. There are some clusters quite far away from the central mass. Typically, these consist of banks from some emerging countries that also participate in cross-border lending but that do not co-lend much with the central players.
Source: Authors' calculations based on Refinitiv.

Figure 5. Network Measures: Centrality and Density



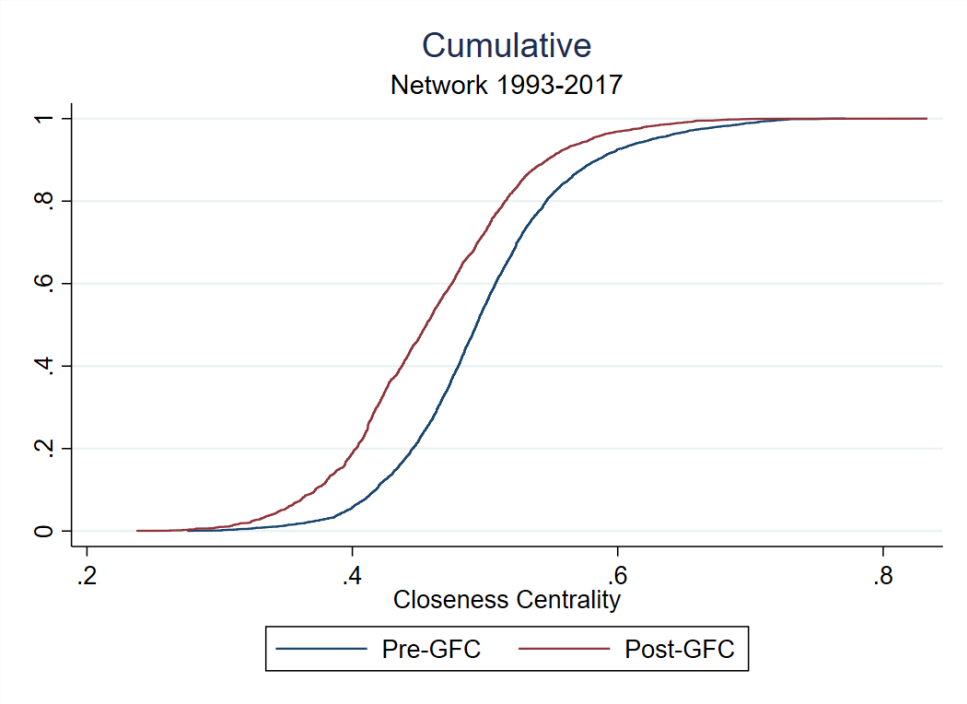
Note: This figure shows that average network characteristics are different if we compare the pre and the post GFC periods. In Panel A, Density, which is a measure of how close the network is to complete, has fallen after the GFC. In Panel B, Centrality also decreased in the Post-GFC period, indicating that the banks are less connected to other banks in the network.
Source: Authors' calculations based on Refinitiv.

Figure 6. The Cumulative Distribution Bank Degree before and after the Global Financial Crisis



Note: The figure illustrates how the cumulative frequency distribution of the Degree shifts to the left after the GFC, implying that the banks in the network have fewer connections with other banks.
Source: Authors' calculations based on Refinitiv.

Figure 7. The Cumulative Distribution of Bank Closeness Centrality before and after the Global Financial Crisis



Note: The figure illustrates how the cumulative frequency distribution of the Centrality shifts to the left after the GFC, implying that the banks in the network are less central.
Source: Authors' calculations based on Refinitiv.

Table 1. Summary Statistics

	Obs.	Mean	Std. Dev.	Min	Max
Panel A. Loans					
Amount of loans (Real USD, millions)	16,628	292.5	490.2	2.701	8,580
Number of lenders per loan	16,628	7.525	6.776	1	69
Panel B. Loans (Reduced Sample)					
Amount of loans (Real USD, millions)	16,510	279.3	480.9	1.350	8,580
Number of lenders per loan	16,510	6.809	6.126	1	58
Panel C. Loans with MDB Participation					
Amount of loans (Real USD, millions)	902	267.1	417.0	4.508	4,302
Number of lenders per loan	902	6.778	6.186	1	50
Panel D. Bank-Year level Data					
Amounts of loans (Real USD, millions)	7,125	648.1	1,752	0	28,771
Number of co-lenders	7,125	53.93	63.82	0	387
Bank in country with systemic crisis	5,800	0.103	0.304	0	1
Portfolio exposed to crisis (%)	7,125	5.442	17.72	0	100
Proportion of co-lenders in crisis (%)	7,125	7.711	17.21	0	100
Central Lenders	7,125	0.345	0.475	0	1
Panel E. Country-Bank-Year level Data					
Amounts of loans (Real USD, millions)	323,725	14.85	87.88	0	5,765
Number of co-lenders	323,725	57.17	75.84	0	387
Bank in country with systemic crisis	284,725	0.0986	0.298	0	1
Portfolio exposed to crisis (%)	323,725	4.651	15.39	0	100
Proportion of co-lenders in crisis (%)	323,725	5.918	15.05	0	100
Central Lenders	323,725	0.343	0.475	0	1

Note: The table reports descriptive statistics for selected variables in our analysis. Loan characteristics correspond to the loan-bank-year panels, and can be found in Panels A, B and C. Panel A contains the full sample of syndicated loans to developing countries in 1993-2017. In Panel B we restrict the sample and keep the 285 banks that lend 95 percent of the total amounts lent through syndicated loans to developing countries in 1993-2017. Finally, Panel C shows the loan characteristics when an MDB is present. Panels D and E report the variables used in our regressions. Panel D contains the variables at the bank-year level for the reduced sample. The sample is further reduced to 232 banks that have 88 percent of the market share since the information for systemic banking crisis is not available for all countries. Panel E contains the variable at the borrower country-year level.
Source: Authors' calculations based on Refinitiv and Laeven and Valencia (2018).

Table 2. Network Summary Statistics

	Obs.	Mean	Std. Dev.	Min	Max
Density	25	0.103	0.0207	0.0690	0.145
Degree	11,111	45.36	53.88	1	387
Closeness Centrality	11,111	0.491	0.0944	0.238	1
Betweenness Centrality	11,111	245.1	838.4	0	17,808

Note: The table reports descriptive statistics for network characteristics relevant for our analysis. Density is calculated for the network at the year level. Degree, closeness centrality and betweenness centrality are calculated at the bank-year level.
Source: Authors' calculations based on Refinitiv.

Table 3. Effect of Shocks on Bank Lending

	(1) Amount Lent Real USD (ln)	(2) Amount Lent Real USD (ln)	(3) Amount Lent Real USD (ln)	(4) Amount Lent Real USD (ln)
Amount Lent Real USD (ln) $_{t-1}$	0.6436***	0.5013***	0.6109***	0.4370***
	(0.033)	(0.041)	(0.040)	(0.053)
Degree $_{t-1}$	0.0094***	0.0075***	0.0110***	0.0109***
	(0.001)	(0.001)	(0.001)	(0.002)
Home Shock $_{t-1}$	-0.1609	-0.1461	-0.2855**	-0.2874**
	(0.148)	(0.178)	(0.111)	(0.117)
	-	-	-	-
Exposure Shock $_{t-1}$	0.0101***	0.0116***	0.0049***	0.0051***
	(0.002)	(0.002)	(0.002)	(0.002)
	-		-	
Proportion of co-lenders in crisis $_{t-1}$	0.0051***	-0.0038**	0.0087***	-0.0073**
	(0.002)	(0.002)	(0.003)	(0.003)
Bank FE	No	Yes	No	Yes
Year FE	No	No	Yes	Yes
No. Banks	232	232	232	232
No. Lender Countries	45	45	45	45
Average Dep. Var.	4.130	4.130	4.130	4.130
Average Home Shock	0.106	0.106	0.106	0.106
Average Exposure Shock	5.822	5.822	5.822	5.822
Proportion co-lenders in crisis	8.137	8.137	8.137	8.137
Observations	5,568	5,568	5,568	5,568
R-squared	0.664	0.697	0.680	0.714

Note: The table reports estimations of equation (1). In column (1) no fixed effects are added; in column (2) we control for bank fixed effects (FE); in column (3) we control for year FE; in column (4) we control for both bank and year FE. The dependent variable in all specifications is Amount; the natural logarithm of amount (in real USD) lent by a bank in cross-border syndicated lending to developing countries. All regressions include a constant term (coefficients not shown). These regressions are based on the reduced sample where we keep banks with 88 percent of the market share of syndicate loans. Our sample period is 1993-2017 and the dimension of the panel is Bank-Year. Standard errors are clustered at the country level; *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations based on Reifinitiv and Laeven and Valencia (2018).

Table 4. The Role of Fringe and Central Co-lenders

	(1) Amount Lent Real USD (ln)	(2) Amount Lent Real USD (ln)	(3) Amount Lent Real USD (ln)	(4) Amount Lent Real USD (ln)
Amount (ln) $_{t-1}$	0.4370***	0.4374***	0.4273***	0.4276***
	(0.053)	(0.053)	(0.054)	(0.054)
Degree $_{t-1}$	0.0109***	0.0109***	0.0094***	0.0094***
	(0.001)	(0.001)	(0.001)	(0.001)
Home Shock $_{t-1}$	-0.2874**	-0.2911**	-0.2838**	-0.2889**
	(0.117)	(0.112)	(0.115)	(0.113)
Exposure Shock $_{t-1}$	-0.0051***	-0.0051***	-0.0051***	-0.0052***
	(0.002)	(0.002)	(0.002)	(0.002)
Proportion of Co-lenders in Crisis $_{t-1}$	-0.0073**		-0.0065**	
	(0.003)		(0.003)	
Proportion of Fringe Co-lenders in Crisis $_{t-1}$		-0.0057		-0.0050
		(0.006)		(0.008)
Proportion of Central Co-lenders in Crisis $_{t-1}$		-0.0077**		-0.0069**
		(0.003)		(0.003)
Central Lender $_{t-1}$			0.3111***	0.3152***
			(0.102)	(0.108)
Proportion of Co-lenders in Crisis $_{t-1}$ # Central Lender $_{t-1}$			-0.0015	
			(0.003)	
Proportion of Fringe Co-lenders in Crisis $_{t-1}$ # Central Lender $_{t-1}$				-0.0004
				(0.010)
Proportion of Central Co-lenders in Crisis $_{t-1}$ # Central Lender $_{t-1}$				-0.0025
				(0.004)
Bank FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
No. Lenders	232	232	232	232
No. Lender Countries	45	45	45	45
Average Dep. Var.	4.130	4.130	4.130	4.130
Average Home Shock	0.106	0.106	0.106	0.106
Average Exposure Shock	5.822	5.822	5.822	5.822
Proportion Co-lenders in Crisis	8.137	8.137	8.137	8.137
Proportion Fringe Co-lenders in Crisis over Total Co-lenders	2.152	2.152	2.152	2.152
Proportion Central Co-lenders in Crisis over Total Co-lenders	5.985	5.985	5.985	5.985
Observations	5,568	5,568	5,568	5,568
R-squared	0.714	0.714	0.715	0.715

Note: The table reports estimations of equation (1). All columns present both bank and year FE. The dependent variable in all specifications is Amount; the natural logarithm of amount (in real USD) lent by a bank in cross-border syndicated lending to developing countries. All regressions include a constant term (coefficients not shown). These regressions are based on the reduced sample where we keep banks with 88 percent of the market share of syndicate loans. Our sample period is 1993-2017 and the dimension of the panel is Bank-Year. Standard errors are clustered at the country level; *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' calculations based on Reifinitiv and Laeven and Valencia (2018).

Table 5. Resilience of the Network over Time

	(1)	(2)	(3)
	Amount (ln)	Amount (ln)	Amount (ln)
Amount (ln) $_{t-1}$	0.4370***	0.5231***	0.4853***
	(0.053)	(0.039)	(0.045)
Home Shock $_{t-1}$	-0.2874**	-0.1590	-0.1701
	(0.117)	(0.178)	(0.130)
Exposure Shock $_{t-1}$	-0.0051***	-0.0118***	-0.0056***
	(0.002)	(0.002)	(0.002)
Degree $_{t-1}$	0.0109***	0.0071***	0.0095***
	(0.002)	(0.001)	(0.001)
Proportion of Co-lenders in Crisis $_{t-1}$	-0.0073**	-0.0042**	-0.0270***
	(0.003)	(0.002)	(0.008)
2008-2009			0.0382
			(0.155)
Post 2010			0.3357**
			(0.127)
2008-2009 # Proportion of Co-lenders in Crisis $_{t-1}$			0.0153
			(0.010)
Post 2010 # Proportion of Co-lenders in Crisis $_{t-1}$			0.0283***
			(0.007)
Real GDP Growth of Bank Country $_{t-1}$		-0.0077	0.0087
		(0.015)	(0.012)
Bank FE	Yes	Yes	Yes
Year FE	Yes	No	No
No. Lenders	232	232	232
No. Lender Countries	45	45	45
Average Dep. Var.	4.130	4.130	4.130
Average Home Shock	0.106	0.106	0.106
Average Exposure Shock	5.822	5.822	5.822
Proportion Co-lenders in Crisis	8.137	8.137	8.137
Observations	5,568	5,304	5,304
R-squared	0.714	0.711	0.718

Note: The table reports estimations of equation (2). In column (1) we control for both bank and year FE; and in columns (2) and (3) we control for bank FE and include Real GDP Growth of Bank's Country as a control. The dependent variable in all specifications is Amount; the natural logarithm of amount (in real USD) lent by a bank in cross-border syndicated lending to developing countries. All regressions include a constant term (coefficients not shown). These regressions are based on the reduced sample where we keep banks with 88 percent of the market share of syndicate loans. Our sample period is 1993-2017 and the dimension of the panel is Bank-Year. Standard errors are clustered at the country level; *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' calculations based on Reifinitiv and Laeven and Valencia (2018).

Table 6. The Role of MDBs in Shock Propagation

	(1)	(2)	(3)
	All	Lenders introduced by MDBs	Lenders not introduced by MDBs
	Conditional Amount (ln)	Conditional Amount (ln)	Conditional Amount (ln)
Home Shock $_{ct-1}$	-0.0027	0.3875	-0.0109
	(0.049)	(0.869)	(0.046)
Exposure Shock $_{ct-1}$	-0.0002	0.0122	-0.0002
	(0.001)	(0.015)	(0.001)
Degree $_{ct-1}$	0.0038***	0.0034***	0.0038***
	(0.000)	(0.001)	(0.000)
Proportion of Co-lenders in Crisis $_{ct-1}$	0.0001	-0.0036	-0.0006
	(0.002)	(0.034)	(0.002)
Post MDB $_{ct-1}$	0.3462***	1.2953***	0.2379***
	(0.063)	(0.195)	(0.063)
Home Shock $_{ct-1}$ # Post MDB $_{ct-1}$	-0.0874	-0.4322	-0.0770
	(0.078)	(0.896)	(0.100)
Exposure Shock $_{ct-1}$ # Post MDB $_{ct-1}$	-0.0029	-0.0165	-0.0034
	(0.003)	(0.016)	(0.004)
Proportion of Co-lenders in Crisis $_{ct-1}$ # Post MDB $_{ct-1}$	0.0019	0.0175	0.0017
	(0.002)	(0.033)	(0.002)
Country-bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
No. Country-banks	4,277	367	3,910
No. Lenders	714	146	690
No. Borrower Countries	110	68	102
No. Lender Countries	79	41	79
Average Dep. Var.	4.061	4.062	4.061
Average Home Shock	0.122	0.134	0.121
Average Exposure Shock	5.044	5.965	4.948
Proportion co-lenders in crisis	11.41	11.59	11.39
Observations	23,559	2,215	21,344
R-squared	0.618	0.632	0.619

Note: The table reports estimations of equation (3). All columns present both country and year fixed effects. The dependent variable in column (1) is Amount; the natural logarithm of amount (in real USD) borrowed by a country in cross-border syndicated lending to developing countries from all lenders other than MDBs. The dependent variable in column (2) is the same as in column (1), but from lenders that were introduced by MDBs through syndicates, and finally the dependent variable in column (3) is the same as in column (1), but from lenders that were not introduced by MDBs through syndicates. All regressions include a constant term (coefficients not shown). These regressions are based on the full sample excluding the MDBs and the observations for which the amount lent by bank *i* to country c is equal to zero. Our sample period is 2000-2017, and the dimension of the panel is Borrower Country-Year. Standard errors are clustered at the country level; *** p<0.01, ** p<0.05, * p<0.1.

Table 7. Robustness Check

	(1)	(2)	(3)	(4)	(5)	(6)
	Betweenn. Centrality p90	Closeness Centrality p75	Winsorized		Banks that lend every year	
	Amount Lent Real USD (ln)	Amount Lent Real USD (ln)	Amount Lent Real USD (ln)	Amount Lent Real USD (ln)	Amount Lent Real USD (ln)	Amount Lent Real USD (ln)
Amount (ln) $_{t-1}$	0.4368***	0.4374***	0.4385***	0.4390***	0.5392***	0.5417***
	(0.053)	(0.053)	(0.053)	(0.053)	(0.058)	(0.059)
Home Shock $_{t-1}$	-0.2849**	-0.2936**	-0.2829**	-0.2878**	-0.0691	-0.0378
	(0.110)	(0.115)	(0.118)	(0.113)	(0.073)	(0.082)
Exposure Shock $_{t-1}$	-0.0051***	-0.0052***	-0.0051***	-0.0051***	-0.0028*	-0.0025
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Degree $_{t-1}$	0.0109***	0.0109***	0.0108***	0.0108***	0.0034***	0.0034***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Proportion of Co-lenders in Crisis $_{t-1}$			-0.0073**		-0.0193***	
			(0.003)		(0.004)	
Proportion of Fringe Co-lenders in Crisis $_{t-1}$	-0.0078	-0.0041		-0.0053		-0.0261***
	(0.005)	(0.006)		(0.006)		(0.006)
Proportion of Central Co-lenders in Crisis $_{t-1}$	-0.0068*	-0.0081**		-0.0079**		-0.0167***
	(0.004)	(0.003)		(0.003)		(0.005)
Central Lender $_{t-1}$						
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. Lenders	232	232	232	232	57	57
No. Lender Countries	45	45	45	45	22	22
Average Dep. Var.	4.130	4.130	4.126	4.126	7.078	7.078
Average Home Shock	0.106	0.106	0.106	0.106	0.100	0.100
Average Exposure Shock	5.822	5.822	5.822	5.822	8.127	8.127
Proportion Central lenders	0.170	0.342	0.356	0.356	0.833	0.833
Proportion Co-lenders in Crisis	8.137	8.137	8.137	8.137	10.66	10.66
Proportion Fringe Co-lenders in Crisis over Total Co-lenders	3.923	1.994	2.152	2.152	3.883	3.883
Proportion Central Co-lenders in Crisis over Total Co-lenders	4.214	6.143	5.985	5.985	6.781	6.781
Observations	5,568	5,568	5,568	5,568	1,368	1,368
R-squared	0.714	0.714	0.713	0.713	0.879	0.879

Note: The table reports estimations of the robustness checks for our baseline regression in equation (1). All columns present both bank and year fixed effects. The dependent variable in all specifications is Amount; the natural logarithm of amount (in real USD) lent by a bank in cross-border syndicated lending to developing countries. In columns (1) and (2) we use a different measure of centrality, in columns (3) and (4) we winsorize the dependent variable at the 1 percent level, and in columns (5) and (6) we restrict the sample to the banks that lent every year. All regressions include a constant term (coefficients not shown). Our sample period is 2000-2017 and the dimension of the panel is Bank-Year. Standard errors are clustered at the country level; *** p<0.01, ** p<0.05, * p<0.1.

Table 8. GMM

	(1)	(2)	(3)	(4)
	Amount Lent Real USD (ln)	Amount Lent Real USD (ln)	Amount Lent Real USD (ln)	Amount Lent Real USD (ln)
Amount (ln) $_{t-1}$	0.8421***	0.8095***	0.8543***	0.8225***
	(0.041)	(0.042)	(0.041)	(0.041)
Home Shock $_{t-1}$	-0.2153**	-0.1772**	-0.2513***	-0.2187***
	(0.090)	(0.082)	(0.090)	(0.082)
Exposure Shock $_{t-1}$	-0.0038**	-0.0059***	-0.0047***	-0.0062***
	(0.002)	(0.002)	(0.002)	(0.002)
Degree $_{t-1}$	0.0012	0.0038**	0.0007	0.0031*
	(0.002)	(0.002)	(0.002)	(0.002)
Proportion of Co-lenders in Crisis $_{t-1}$	-0.0157***	-0.0177***		
	(0.003)	(0.003)		
Proportion of Fringe Co-lenders in Crisis $_{t-1}$			0.0034	-0.0033
			(0.007)	(0.007)
Proportion of Central Co-lenders in Crisis $_{t-1}$			-0.0223***	-0.0221***
			(0.004)	(0.004)
Central Lender $_{t-1}$				
Bank FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Lag limit	3-6	3-15	3-6	3-15
Instruments	188	243	189	244
Number of banks	232	232	232	232
AR (3)	0.216	0.220	0.204	0.211
Hansen	0.129	0.310	0.147	0.353
Observations	5,568	5,568	5,568	5,568

Note: The table reports the results from estimating a system-GMM. All columns present both bank and year FE. The dependent variable in all specifications is Amount; the natural logarithm of amount (in real USD) lent by a bank in cross-border syndicated lending to developing countries. All regressions include a constant term (coefficients not shown). These regressions are based on the reduced sample where we keep banks with 88 percent of the market share of syndicate loans. Our sample period is 1993-2017 and the dimension of the panel is Bank-Year. Bottom rows report p-values for the Arellano-Bond test for AR(3) in differences and the Hansen test of joint validity of instruments. Windmeijer's finite-sample correction for the two-step covariance matrix, corrected standard errors clustered at the country level in parentheses; *** p<0.01, ** p <0.05, * p<0.1.