Coordinated Financial Crisis Resolution*

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Abstract

Exposed creditors face a dilemma when debtor countries are in financial distress. Even though additional loans to the debtor may help minimize losses on their existing claims, they fear that their efforts alone are insufficient to prevent default of the debtor country. Why do creditors increase their exposure to distressed debtor countries if they lack the capacity to close the financing gap individually? Whereas previous work has analyzed individual creditors' lending decisions in isolation, we argue that creditors' lending decisions are inherently interdependent. The potential for significant losses across creditor groups provides incentives for informal coordination. Since coordination leads to a decline in the perceived risks of lending, individual creditor's decisions to provide loans or offer debt restructuring are conditioned on the likelihood that the debtor receives support from other sources. We use a stochastic actor-oriented model to analyze how networks of financial rescue strategies of four central creditor groups to over 100 debtor countries co-evolve between 1992 and 2013. We find that creditors' decisions to offer financial support are inherently interdependent across creditor groups. The findings highlight that informal coordination across creditor groups plays a central role in international financial rescues.

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The COVID-19 pandemic has presented governments around the world with significant health, social, political, and economic challenges. It is now widely recognized that the pandemic has triggered the most serious economic crisis since World War II, surpassing even the devastating 2007-08 Global Financial Crisis. The nature of the crisis is unprecedented and will likely keep economic uncertainty and volatility at very high levels for some time to come. By 2021, over 60 percent of low-income countries were at risk of or already in debt distress, compared to only 30 percent facing debt distress back in 2015 (World Bank, 2021). The COVID-19 crisis has led to an unprecedented number of countries falling into or being on the verge of financial difficulties or even default. With so many countries experiencing serious financial vulnerabilities, the current surge in demand for emergency financing from the International Monetary Fund (IMF) comes with little surprise. The IMF was created with the aim of preventing financial crises from happening (or at least resolving them quickly) by lending to countries with balance-of-payments difficulties, enabling them to make payments on at least their short-term debt.[1] Yet, even before the COVID-19 pandemic, the surge in the volume of financial flows and the number and type of creditors during the 1970s made financial crisis resolution more complex and too onerous for the IMF to handle alone. Debtors now have to negotiate with multiple creditors from the private sector (i.e., private financial institutions and individual bondholders) and the official sector (i.e., official bilateral lenders, multilateral institutions, and central banks).[2] The explosion in financial lending presents a formidable challenge to creditors. For those that are exposed to a debtor country, a failure to continue lending may provoke a default and the loss of existing claims. Exposed creditors have strong incentives to offer crisis lending, even at an expected loss, if this lending averts an immediate default and if the expected loss does not exceed the gain of no default (Krugman, 1985, 88). But no creditor is able to close the financing gap unilaterally. Even if lending occurs, the debtor might still default and the creditor would lose not only its existing claims, but the new claims it incurred in order to prevent the default. Since the expected gains from crisis lending are not likely to exceed the costs, creditors may shy away from crisis lending in the first place (Roubini and Setser, 2004).

Research that examines why and how financial rescues occur, and whether they are effective, has focused almost exclusively on individual creditor decisions without taking into account the strategic interactions between them. Despite the importance of effective coordination for global financial stability we know little about how the decisions of creditors affect each other in the resolutions of financial crises.[3]

[1]The IMF assumed a number of lender of last resort functions (Bagehot, 1873) and IMF loans were supposed to act as an immediate catalyst for other investments by signaling that policy reform would be undertaken (Boughton, 2000, 274).

[2]The IMF, World Bank, regional development banks, G-7, Group of Ten, and the group of bilateral creditors that meet in the Paris Club are collectively known as the official sector.

[3]The literature on catalytic financing has discussed the ability of IMF loans to lead to more private financial flows usually through so-called voluntary bail-ins (Corsetti, Guimaraes and Roubini, 2003), but little work has tried to understand the explicit negotiations and discussions that occur across creditor groups during times of financial need. The work on private creditors and the IMF by Gould (2003, 2006) is an important exception. See also Bunte (2019) and Arias, Mosley and Rosendorff (2020) who analyse the demand for different types of creditors and debt instruments by debtor countries. Such an analysis is the more important as the choice of instruments has direct implications for governments' policy-making autonomy and

We develop a theory of informal international coordination during financial crisis resolution. This work is meant to complement the current literature, which has focused on creditor and debtor-level determinants of lending decisions. We argue that lending decisions are not only driven by concerns of individual exposure but also the prospects for international coordination. Even though creditors shy away from developing rigid rules about coordination to reduce expectations of large-scale bailouts for systemically important countries, their lending decisions are informally coordinated to protect against crisis contagion and to ensure global financial stability. Decisions both within and across creditor groups are mutually reinforcing. In times of debtor distress, exposed creditors want to prevent a default of the debtor through additional lending, but also worry that the loans may not be sufficient to prevent the country's default, which would further increase their losses. Even if creditors have strong preferences for resolving the crisis, they may shy away from offering support if it would be insufficient to close the financing gap. Informal coordination with other creditors can minimize the risks of ineffective crisis resolution. If other creditors participate in the rescue effort, the creditors' perceived risks of lending decline and their expectations to recover not only new claims but also existing claims increases. It is therefore in the collective interests of exposed creditors to lend to a debtor to avert default. When creditors coordinate, they each become more willing to provide additional loans or to restructure existing ones. The IMF plays a central role because its unique ability to impose and monitor policy conditionality provides important signals to other creditor groups about lending risks.

To test the empirical implications of our argument, we analyze the extent to which the bail-ins and bail-outs of the IMF, bilateral official creditor governments, the Paris Club, and the London Club are coordinated and mutually reinforcing.[4] Drawing from recent empirical work on international trade, alliances and defense cooperation networks (Manger, Pickup and Snijders, 2012; Chyzh, 2016; Kinne and Bunte, 2018), we use a stochastic actor-oriented model (SAOM) to model the co-evolution of the decisions of these four creditor groups to lend to over 100 debtor countries in the time period of 1992 to 2013. The network approach allows us to analyze whether the decisions of each creditor group are affected by the lending decisions of other creditor groups while controlling for within network effects that have been shown to matter in previous work on individual creditor groups. In doing so, we develop a new application to the class of "disjoint" multiplex networks, where it is impossible that a tie exists for any given pair of actors across all four networks (Ripley et al., 2019).

We find that the decisions of bilateral official creditors, the IMF, the London Club, and the Paris Club are mutually dependent and reinforcing. Receiving a loan from one creditor group significantly and substantially increases the likelihood of receiving loans from other creditors as well. IMF conditionality also serves as an important credibility mechanism to reduce the expected risks of financial rescues from other creditor groups. Our findings underscore the importance of modeling these decisions using a network

financial stability within debtor countries (Mosley, 2003; Ballard-Rosa, 2020).

[4]Historically, these four groups have been the main actors during crisis resolution. We focus on those actors as there is a limitation to the number of networks we can analyze in the SAOM framework given the relative rarity of rescues across the network (1,291 instances out of 416,176 total possible dyads). In Appendix D, we control for sovereign bond debt as a potential additional dimension.

framework. Specifically, we find that cross-network effects account for at least 50% of the expected variation in loans and debt restructuring in every year in our sample.

The findings shed light on the complex nature of international cooperation during financial crises. The resolution of financial crises involves decisions over a large number of financial instruments, including IMF and official bilateral lending, sovereign debt restructuring and rescheduling through the Paris Club and other informal channels, swap agreements, and private sector involvement. Much scholarship has analyzed the causes of IMF loans and its conditionality,[5] and there is increasing work to explain the politics of sovereign debt restructuring, private sector involvement, and official bilateral loans.[6] We build on these insights of creditor-specific factors that explain lending decisions, such as creditor exposure to the debtor country, but analyze the coordination between different creditor groups and instruments during financial crisis resolution.[7] The strong findings that coordinated rescues are positively reinforcing are particularly interesting in light of the mixed and conditional evidence for catalytic lending. Further, our findings offer some positive outlook in this time of unprecedented economic and financial distress. Coordinated financial rescues are not only likely to address financial woes more effectively, but are common in most cases.

The implications of our findings go beyond the study of coordinated financial rescues. Coordination to provide international public goods almost invariably involves numerous actors and strategies. For example, efforts to support sustainable economic development involves bilateral and multilateral official donors, non-governmental organizations, and other private actors. Donors can also pursue various strategies ranging from the provision of foreign aid to technical assistance to trade policies. Attempts to address civil conflict could involve military interventions, economic or political sanctions, diplomacy, and other means, provided by both bilateral, regional, and multilateral entities. But even though cooperation and coordination across actors and the use of different strategies appears essential in international cooperation, and strategies are often highly contingent on each other, we know very little about how actors and their decisions affect each other.

The Rationale for Coordination in Lending

To motivate the main assumptions of our theory, we begin by substantiating three major claims. First, even though the IMF is a central actor in international financial crisis resolution its resources are not sufficient to resolve any given financial crisis unilaterally. Second, the surge in international financial flows and the proliferation of creditors has increased demands for coordinated financial rescues. Third, several attempts since the

[5]For example, Thacker (1999); Vreeland (1999); Stone (2008); Dreher (2009); Dreher, Sturm and Vreeland (2009); Copelovitch (2010*a*,*b*); Rickard and Caraway (2014).

[6]Among others, Gould (2003, 2006); Rosas (2006); Reinhart and Trebesch (2016); Cheng, Diaz-Cassou and Erce (2016); Schneider and Slantchev (2018); McDowell (2017); **?**); Schneider and Tobin (2020); Ferry (2019).

[7]Gould (2003, 2006) studies how the increasing reliance of the IMF on private creditors has affected their influence on IMF conditionality. The study provides an very important starting point for our theoretical analysis of the mutual coordination of creditor types.

1980s to develop more formal coordination mechanisms have largely failed both for ideological and practical reasons.

The IMF emerged as the central actor and coordinator in the post-World War II global financial architecture. The organization's lending aims to restore its members' balance of payments while at the same time minimizing the risk of moral hazard by limiting the size of the loans and requiring macroeconomic policy adjustments. The underlying idea is that an IMF program restrains investors long enough for the debtor to make the necessary macroeconomic adjustments to restore its finances. Participation in an IMF program would serve as a credible signal to private investors that a country has sound financial institutions and follows sensible policies, or at least that such policy adjustments are forthcoming. This "good housekeeping seal of approval" (Bordo, Mody and Oomes, 2004), and the expectation that the IMF will monitor and enforce a debtor country's policies (Tirole, 2002) should serve as a catalyst for further investment from other actors, including voluntary debt restructurings with private creditors or more foreign direct investment (Vreeland, 2003).

Theoretically straightforward, the approach has one major caveat. The loan can only be effective in reassuring creditors if it is sufficiently large to cover all of the debtor's short-term liabilities. This caveat has been a major obstacle to the success of the catalytic lending approach.[8] As financial crises have become more common, and virulent, the IMF's resource constraints have limited its ability to resolve financial crises independently.[9] By design, the IMF is ill-equipped to fill the external financing gaps of crisis countries especially during liquidity crises; its financial resources in relation to cross border capital flows have even declined over the last two decades and its crisis response is slower than what is needed to protect countries against a sudden run and potential contagion to other countries (McDowell, 2017, 30f.). When the IMF does step in, the size of the loans are typically just enough to cover "the most obvious sources of payment difficulties" (Roubini and Setser, 2004, 19). In 1995, the IMF approved a loan for Mexico of up to approximately $17.8 billion, which was the largest-ever loan approved by the IMF at the time, both in terms of amount and overall quota (about 688.4%) (IMF, 1995). Still, the amount was insufficient to address Mexico's financing gap adequately. Experts estimated that Mexico would have needed at least $50 billion in order to satisfy just the portion of debt that was maturing in the near term. This was more than double what the IMF *de facto* provided. Similarly, the IMF loan of $30 billion to the Greek government in 2010 was the largest loan in the IMF's history, but was still insufficient to address Greece's financing gap.

These challenges became apparent in the late 1970s. The poor economic performance of industrialized and industrializing countries in the 1970s combined with pressure to liberalize macroeconomic policies such as floating exchange rates along with sharp increases in oil prices led to a significant expansion of international private credit markets, and a shift of creditors from the developed to the developing world (Lipson, 1981; Cohen, 1982).

[8]The empirical evidence on a catalytic effect is weak (see FN 3). For this reason, many observers have called for more coercive forms of private sector involvement.

[9]For a succinct discussion of these issues, see McDowell (2017, Chapter 2). The Meltzer Commission also discusses the limits of IMF financing as a central concern in their recommendations for IMF reform (International Financial Institution Advisory Commission, 2000).

Many developing countries borrowed heavily from private creditors during this period, and commercial banks, faced with declining demands in developed markets, were more than willing to supply the loans. When these countries first began to exhibit financial distress in the late 1970s and early 1980s, they turned to the IMF for help, which was now confronted with much greater demands for liquidity for troubled economies and with a greater number of more diverse types of creditors (some of them with little incentive to help the countries in need).

As the IMF's former historian, James Boughton, put it: the "single greatest problem faced by the Fund in the 1980s was to garner the financial resources to meet the demand for its services" (Boughton, 2001, 44). Even though the member countries agreed to increase IMF quotas three times in the period that immediately followed (in 1980, 1983, and 1990), these reforms were not sufficient to equip the IMF with sufficient resources to address future crises. The IMF increasingly had to rely on supplementary financiers to help ensure the success of its loan programs (Gould, 2003, 555). Jacques Polak, former director of research and a former executive director of the IMF, noted early on:

> "Traditionally, a key component of any Fund arrangement was that the resources provided by the Fund together with those from the World Bank, aid donors, commercial banks, and other sources, would cover the country's projected balance-of-payments gap. In the absence of an integral financing package, the Fund could not be confident that the degree of adjustment negotiated with the country would be sufficient. To this end the Fund sought financial assurances from other suppliers of financial assistance."[10]

The actors that participate in these crisis resolution efforts are diverse, ranging from bilateral and multilateral official creditors to private creditors. The main creditor groups include official multilateral creditors (the IMF, the World Bank, or the Bank of International Settlements) who provide bailouts, official bilateral creditors who provide bailouts (usually but not exclusively the G-7 countries) and bail-ins (usually, but not exclusively through the Paris Club), and private creditors (including mainly commercial banks and bondholders) who negotiate private debt-restructuring of commercial or bond debt (often through Bank Advisory Committees, commonly known as the London Club).[11]

The Brady Plan of the 1980s was an early attempt to coordinate across different groups. It called on the IMF, the World Bank, the United States and other official creditor countries to cooperate with commercial bank creditors to reduce the debt of crisis countries in the developing world. During the Mexican Peso crisis in 1994/95, international cooperation on a financial rescue package included the IMF, the U.S. government, a coalition of Latin American countries, Canada, and private commercial banks. The second financial rescue package for Greece in 2012 involved the IMF, European countries, as well as a large consortium of private commercial banks. And the financial package for Ireland in 2010 was

[10] Cited in Gould (2006, 6).

[11] The Paris Club members are the governments of most of the largest economies in the world, which come together on a case-by-case basis to discuss debt restructuring or debt relief of states in financial crisis. The London Club members are private commercial banks, which also come together on a case-by-case basis to discuss debt restructuring or debt relief.

cobbled together by the IMF, the European Financial Stability Facility, the National Pension Reserve Fund, and other bilateral creditors such as the United Kingdom, Denmark, and Sweden.

Even though coordination appears essential for sustainable crisis resolution, creditors have developed remarkably few formal coordination mechanisms, norms, and enforcement capacities. This is not for lack of trying. The main obstacles to a formalization of coordinated crisis resolution are ideological differences and moral hazard concerns. Most official creditors have shied away from a formalization of crisis resolution in fear of moral hazard. Clear expectations for bailouts and bail-ins could make debtors less likely to take their promises to repay seriously and creditors more willing to pursue risky lending and investment strategies, thereby increasing the likelihood of future financial instability. For example, the bailout to Mexico in 1995 was sharply criticized for bailing out private creditors and creating an incentive for more imprudent lending in the future. At the same time, clear expectation of a no-bailout would obliterate any hope for debtors to stabilize. Many decision-makers have therefore strategically refrained from developing rigid rules around the participation and responsibilities of these various actors.

Beyond moral hazard concerns, official creditors have ideological differences about the involvement of the private sector, and its formalization. Even though the Brady Plan called for collective action between official and private creditors early on, it was the large-scale IMF bailout to Mexico in 1995 that initiated a wave of discussions about the coordination across various creditor groups, and a more serious involvement of the private sector. It was also the Mexican bailout that showcased the ideological differences amongst official creditors (Roubini and Setser, 2004, 187). Whereas the U.S. supported large-scale financial support for illiquid (but not insolvent) countries, it did not support a more coercive approach to private sector involvement. European creditors, on the other hand, opposed massive unconditional liquidity provision. These ideological differences resulted in an ambivalent approach toward formalized coordination.

To this day few formalized mechanisms exist to ensure coordination across creditor groups. A notable exception is the Paris Club's requirement that the debtor country negotiates an IMF program before it restructures official debt.[12] Furthermore, one of its key principles is the "Comparability of Treatment Clause", which calls for equal burden-sharing across all groups, including private creditors as well as official creditors who are not members of the Paris Club. But even those formalized attempts do not offer clear expectations, and are subject to much contention across creditor groups. Establishing comparability is extremely challenging, and in practice, the Paris Club often focuses on establishing that some progress in private negotiations has been made (Sturzenegger and Zettelmeyer, 2007, 141). Most other attempts at enforcing collective action are *ad hoc*. For example, the IMF has repeatedly conditioned its support on the ability of crisis countries to seek private or official debt restructuring deals. In 1982, the IMF conditioned its support on the ability of private creditors to provide new loans for Mexico and get a "critical mass" of a minimum of 80% of the over 600 exposed banks to agree to participate (Rhodes,

[12]The Paris Club has concluded several agreements with countries that were not IMF members or did not satisfy the precondition of having an IMF loan. For example, Venezuela did not need IMF liquidity, but agreed on enhanced surveillance by the IMF. Other examples are deals with Colombia, Yugoslavia, and Cuba (Rieffel, 2003, 159).

2011, 212).

Coordinated Financial Crisis Resolution

We build on historical evidence and existing theories of international lending to develop a theory about internationally coordinated financial crisis resolution. We argue that creditors' lending decisions are inherently interdependent. The potential for significant losses across creditor groups provides incentives for informal coordination to address these concerns. If other creditors are willing to coordinate, the perceived risks of lending decline. Creditors become less concerned that they will lose their existing claims. As a consequence, individual creditor's decisions to provide loans or debt relief are conditioned not only on their own exposure to the debtor, but also on the likelihood that the debtor receives support from other sources.

When the IMF or a finance minister from one of the G-7 receives a phone call from a finance minister to let them know that the country is rapidly running out of foreign reserves, and that it cannot get additional loans from the international capital market to serve the maturing claims, this usually has serious financial and economic consequences for private and public creditors that are exposed to that country. In these situations, without a large influx of capital, the country is likely to default on its debt (Roubini and Setser, 2004, 1). In the case of default, creditors who hold maturing claims lose the principal and interest owed by the defaulting country; the potential losses are tremendous. While a few creditors get paid in full, and a few investors can sell their local currency for a foreign currency at a better price, the run on foreign reserves will likely require other creditors to take significant losses in the subsequent debt restructuring. For example, in 2001 Argentina defaulted on $132 billion in loans, resulting in serious financial losses for its creditors.

Creditors face a dilemma when considering whether to offer new loans, negotiate haircuts, or other measures to grant the debtor states financial reprieve. Exposed creditors have incentives to offer liquidity to help the debtor state serve its short-term debt because they worry about losing their existing claims in the case of default. However, if they expect that these new or renewed loans would not have a calming effect on financial markets and prevent default, they could face even larger financial losses. Unless massive liquidity is committed, there remains a great deal of uncertainty around the effectiveness of crisis resolution. And at least since the 1980s, creditors have not been able to provide the necessary liquidity individually. Instead of providing new loans, creditors could try to protect their assets by withdrawing loans that mature (instead of rolling over the claims) and by increasing interest rates on new loans. While this option is more costly to those creditors who hold claims that do not mature immediately–and are very unlikely to be paid back if there is a run on the country's foreign reserves–creditors may choose this option if they believe that other creditors will do the same. To minimize their losses, each creditor has an incentive to exit while other creditors roll over their claims or provide additional liquidity. By calling maturing loans, creditors decrease their exposure and the potential effect a default would have on their losses.

Even though the incentives to exit are strong, creditors know that if all creditors were

to exit, the results could be catastrophic, and therefore, have a collective interest in avoiding this outcome. Collective action can lead to support that is sufficient to avert a subsequent default. In a situation where lack of collective action leads to catastrophic outcomes for both debtor and creditors, creditors strongly prefer to coordinate and their individual decisions depend on the decisions of other exposed creditors.

Despite the lack of formal coordination and enforcement mechanisms, creditors can rely on informal coordination because actors overlap across creditor groups. Within the official sector, the G-7 countries are the main players that tend to participate in Paris Club negotiations, have the most votes on the IMF Executive Board, and are also in a position to offer large-scale financial support. Being represented in virtually all official creditor groups allows official creditors to provide and receive more information about the intent of other creditors; and it generates opportunities for coordination. The G-7 finance ministers meet regularly, at least twice and up to four times a year in stand-alone meetings (plus informal meetings at the sidelines of other meetings). When countries experience financial crises, the finance ministers of the G-7 countries are in constant contact to discuss and coordinate their strategies. The G-7 are at the center of crisis resolution. They discuss the amounts and forms of official support as well as alternative strategies with other creditor groups to adopt and implement coordinated crisis resolution approaches. There is significant overlap at the administrative level as well. For example, the G-7 finance ministers have appointed deputies who meet in advance of the official meetings to discuss the most sensitive issues. These deputies are in contact with each other on an almost daily basis (Rieffel, 2003, 26). Many of them have experience across institutions. Two Paris Club chairmen, Jacques de Larosière and Michel Camdessus, became managing directors of the IMF after their term at the Paris Club. Finally, when the Paris Club meets, it always invites the IMF as an observer.

For the private sector, coordination has been more challenging and highly conditional on individual creditors' ability to induce collective action. Whereas commercial banks have historically been open to debt restructuring deals, the number of banks who are exposed to a debtor country is often large–over 600 banks were exposed to Mexico in the early 1980s–and coordination more difficult. Yet, the same large banks tend to be involved in most restructuring negotiations, and there has been some consistency in the bankers who chaired or served on the Bank Advisory Committees.[13] Personality matters as well. Some bankers were central to improving coordination efforts within the group of private creditors. Bill Rhodes from Citibank, who wrote an entire book about his attempts to improve coordination, is a notable example. His (in)famous strategy was to keep everyone at the negotiation table day and night until agreement was reached. During the Argentina crisis in 1992, the IMF had asked private creditors to resolve commercial bank debts as a condition for reimbursing its $3.6 billion multi-year loan (Rhodes, 2011, 71f). During the annual meeting of the Inter-American Development Bank where all major parties (including the World Bank, the IMF, major banks and governments) participated, Rhodes collected and brought all bankers to a hotel and did not let them out of the room except to eat or to go to he bathroom. He would not even let them go back to their hotel to sleep.

[13]Rieffel (2003, 118) provides a table with BAC Chairmen, which illustrates remarkable overlap across time.

As he recalls:

> "By Sunday night, you got the feeling that the participants would have said yes to almost anything just to be able to go to bed (...) (Rhodes, 2011, 72).

The Institute of International Finance (IIF), which was founded in 1983, significantly improved coordination both within the group of private creditors, but also between the private and the public sector. The IIF started to collect data on bank exposures in the major borrowing countries (Rieffel, 2003, 161). This information was vital for coordination efforts across exposed banks. It now has more than 450 members from over 70 countries and is a central mechanism for banks to coordinate their efforts.

There is also substantial informal coordination between the public and the private sector, especially the IMF and the major G-7 finance ministers on the official side, and the London Club members on the private side.[14] Coordination is highly informal and *ad hoc*, often occurring during phone calls and in meetings in hallways and corridors at the sidelines of official conferences. When Mexico was running out of reserves, the Mexican president called the chairman of the Fed, U.S. Secretary of the Treasury, and the managing director of the IMF separately. The negotiations that started with bilateral meetings between top U.S. banks evolved rapidly:

> "We quickly developed an unusual international working arrangement among competing commercial banks, regulators, international financial institutions, creditor countries, and many of the borrowing countries. Rather than exclude the official sector from negotiations, I regularly kept in touch with officials at the International Monetary Fund, the World Bank, the U.S. Treasury, and central banks around the world, including the Federal Reserve, both in Washington and New York. I wanted to keep the creditor countries aware of our progress so that official-sector aid from the IMF and various governments could be coordinated with the private sector" (Rhodes, 2011, 209).

This network of central actors improves the information of each individual creditor group. Being able to observe other actors' decisions and actions affects the risk calculus of creditors who want to avoid the debtor's default by offering new loans but also worry about the risks associated with further increasing their exposure. If other creditors are willing to increase their exposure by offering new loans, the likelihood increases that immediate financing needs are met and a panic might be prevented. This lowers the perceived risks of lending for other actors. If creditors are more confident that funding from other sources is forthcoming, they should be more willing to commit to further loans. As a consequence, the strategies and decisions of exposed creditor groups should be mutually contingent on each other. This explains why the Paris Club conditions its support on the existence of an IMF program, and the London Club often refuses to even meet unless the crisis state has reached or made significant progress toward an agreement with the IMF. The approval of an IMF loan to Algeria in 1994 unlocked agreements about debt relief with both the Paris Club and the London Club (Boughton, 2012, 689). The IMF loan to

[14] There is very little explicit coordination between the Paris Club and the London Club (Roubini and Setser, 2004, 260).

Mozambique in 1990 was followed by the rescheduling of most of Mozambique's debt to official creditors through a Paris Club agreement as well as further financial commitments from bilateral creditors a few years later (Boughton, 2012, 731).

Private and official creditors often rely on IMF loans as an anchor, but the IMF also often conditions its support on the willingness (and ability) of debtor states to attract additional sources of funding to complete the IMF package. As early as 1958, the IMF required Argentina to request financial assistance from sources other than the IMF (Gould, 2003).[15] During the Mexico crisis in 1982, the IMF managing director indicated that without private sector involvement, he would not recommend to his Executive Board the amount of IMF financing that was negotiated under the program which Mexico would need to meet the interest payments on its bank debt. Given the extent of bank exposure (Mexico's outstanding debt accounted for 44% of the total capital of the nine largest U.S. banks), "it was clear that without coordinated action on the part of banks and the official sector, it was possible that a wave of defaults could destabilize the global banking system and throw the entire world into a depression" (Rhodes, 2011, 63). For Rhodes, the case was clear: "cooperation was in everyone's interest" (Rhodes, 2011, 67). In the end, over 500 banks participated in the deal. One day after a critical mass of banks had agreed to a restructuring deal, the IMF board approved its loan program (Rieffel, 2003, 158).

In 1999, the IMF conditioned its support for Ecuador on the country's willingness to seek debt restructuring from private and official creditors through the London and Paris Clubs. Paris Club members themselves announced that their help would be contingent on London Club support. Boughton (2012, 613) summarizes the mutual contingencies during this episode succinctly:

> For each of these targeted agreements, creditors would normally expect the government to reach a prior agreement with the IMF on a stand-by arrangement. That agreement, in turn, would require the Fund to have a solid assurance that Ecuador could finance its external payments. This circle could be squared if all of the main parties could reach tentative agreements, conditional on the others, so that the IMF could coordinate the complex package and bring all the negotiations to a conclusions. Any slippage would be fatal."

The financial crisis resolution efforts in South Korea in 1997 further demonstrate the importance of getting everyone on board. The IMF and the U.S. Treasury had agreed on emergency financing, but wanted commercial banks to roll over short-term bank loans. The initial IMF loan was made contingent on private sector involvement. When a new president was elected in South Korea, the private sector itself insisted on the country committing to IMF austerity (Rhodes, 2011, 97). Resolution efforts often have to strike this very delicate balance.

Creditors rely on each other to minimize the risks of crisis lending. Since no actor is able to provide sufficient liquidity, the conditioning of support on the willingness of other creditors to spring into action is not uni-directional. Creditor coordination efforts during the Mexico crisis in the 1990s illustrate this very well. Mexican officials initially

[15] In the 2000s, it even turned down Argentina's request for additional loans because the country did not want to pursue a restructuring of its loans (Rhodes, 2011).

tried to avoid the IMF and approached potential bilateral creditors first. However, they were later pressed to accept the IMF and its conditionality because "no official creditor–including the United States–was willing to advance its own money bilaterally without the IMF's written assurance that Mexico was implementing a sound economic policy program" (Boughton, 2012, 469). But at the same time, the IMF also relied on the U.S. to offer additional liquidity since its loan was too small to cover the external financing gap. James Boughton described the IMF contribution to the bailout as just the "seed money" to a larger package (Boughton, 2012, 470). More generally, the IMF's rules require it to ensure that each program is fully financed. If the U.S. had refused to dispense funds under its own agreement with Mexico, the program would have been under-financed, and the IMF would have likely had to suspend its own program as well. Cottarelli and Giannini (2003, 11) describe the dilemma elegantly: "More bluntly, under the new practice it was unclear who was being made hostage to whom."

The IMF can only provide partial liquidity insurance and depends on supplementary financing from other creditors to help ensure the success of its programs, and in turn, other creditors depend on each other for additional liquidity and the IMF to help facilitate their financing transactions and make borrowers' commitments more credible. During the Peso crisis, officials knew that the liquidity needed to prevent the crisis from worsening "likely exceeded the means of bilateral creditors, or of the IMF and other multilateral agencies acting as a group" (Boughton, 2012, 469). Concerted multilateral action under the lead of the IMF appeared the only viable course for many. Similarly, no one believed that the proposed IMF loan to Thailand during the Asian Financial Crisis in 1997 would be sufficient to stem the crisis (Boughton, 2012, 508). During a meeting of the "Friends of Thailand" in Tokyo, a package of about $16 billion ($4 billion from the IMF) was assembled that included contributions from the IMF, Japan, China, the World Bank, the Asian Development Bank, and six central banks (Reserve Bank of Australia, the Hong Kong Monetary Authority, Bank Indonesia, the Bank of Korea, Bank Negara Malaysia, the Monetary Authority of Singapore). In addition, the Thai government secured the promises of its largest private creditors (mainly banks from Japan) that they would maintain their credit lines (Boughton, 2012, 509).

What the IMF lacks in liquidity it makes up in its ability to foster credibility in the international financial markets. The importance of the IMF in these coordinated rescues depends less on its financial resources (which usually fall short of what is deemed necessary), and more on its information advantage and credibility in imposing, monitoring, and enforcing austerity and other policy reforms. Neither bail-ins nor bail-outs will fail if the debtor country takes advantage of the financial breathing space to make the policy adjustments needed to address the major economic imbalances that gave rise to the crisis. In signing an IMF agreement, the IMF signals that the debtor country has sound fiscal institutions and follows sensible policies. In addition, the IMF agreements ensure that if necessary, the country's receipt of loans are conditioned on the implementation of further policy reforms to address the underlying macroeconomic problems. As a consequence, while the IMF requires debtor states to attract other means of financing (or some restructuring deal) through official or private creditors, these actors informally or formally require debtor states to engage in an IMF program. For example, London Club packages often include "comfort letters" from the IMF to reassure that the IMF program

has a viable chance and that the IMF would monitor and enforce the progress made under the program (Rieffel, 2003, 125).

More generally, official and private lenders accept the IMF agreement as a signal that the debtor intends to crack down on its deficit. Lenders typically renegotiate their own claims on that condition. When the Fund reaches an agreement with a country, other creditors (instead of rushing to ask for their own money) are willing to increase their lending because it has entered a period of stabilization under the tight controls of an IMF standby agreement (Lipson, 1981). IMF involvement in Brazil in the 1980s was seen as critical for commercial banks to be able to find a restructuring deal with the government. In 1983, Bill Rhodes even flew to Brazil to convince the government to implement the IMF conditions it had failed to implement, which caused the IMF to stop payment. Participating banks became worried that they would lose their investments without policy reform, and they had relied on the IMF program to ensure its delivery (Rhodes, 2011, 80).

The importance of IMF conditionality is perhaps best demonstrated in cases where the IMF was not involved. During the Peruvian financial crisis in 1976, U.S. banks agreed on a loan without IMF support (Lipson, 1981, 623). Peru's creditors thought that they could ensure adherence to an effective stabilization program by establishing a system for continuous monitoring of the Peruvian economy and by making the second installment of their loan formally contingent upon satisfactory performance. Yet, when the loan's second installment came due and Peru was unable to meet its obligations, no delay was ever seriously considered despite Peru's evident failure to meet its policy commitments. The banks, as private institutions, simply did not have the legal or political leverage to dictate policy directly to a sovereign government. Instead, the banks found themselves drawn deeply and visibly into Peruvian politics. For the private sector, there was only one lesson to be drawn from this disastrous episode: commercial banks could not impose conditions, only the IMF could. Since then, private lenders have refused to depart from that practice. The Peruvian case has remained the only one where private creditors attempted to extract fiscal policy reforms from a debtor country in crisis without the involvement of the IMF (Cohen, 1982).

To summarize, exposed creditors have a strong collective incentive to act, and their lending strategies depend upon each other. If creditors observe that other creditors are willing to lend, their perceived risk of increasing their own exposure declines, which increases their own willingness to lend to avert default of the debtor country. Observing agreements with other creditor groups can serve as a catalyst for additional funding from other actors as well. The IMF plays a pivotal role in the success of this informal risk reduction process because of its ability to impose and monitor policy conditionality. The IMF depends on other creditors to help ensure the success of its loan programs and its future bargaining leverage with debtors. In turn, other creditors depend on the IMF to help facilitate their financing transactions and make debtors' commitments more credible.

Research Design

To test our theoretical argument, we analyze the four most prominent official creditor groups and their lending strategies to over 100 debtor countries over the post-Cold-War

period 1992–2013: IMF loans, official bilateral loans, and sovereign debt restructuring from the Paris Club and the London Club.[16] Lending decisions depend on a set of specific considerations within each group of creditors as well as across the creditor groups. In the case of official bilateral lending, for example, a creditor country's decision whether or not to offer a new loan to a debtor depends on features such as their own exposure to the debtor country as well as economic factors in the debtor country. Our argument suggests that this decision also depends on decisions made by other creditor groups, notably whether the IMF offers a loan to this debtor or whether the Paris Club or the London Club reschedule or restructure maturing claims. We can therefore consider each creditor group as one network in the larger network of financial crisis resolution.

Capturing these intricate interdependencies necessitates a research design that explicitly assesses all of these possible across- and within-network determinants. The within-network dependencies suggest that we cannot simply model each network using conventional regression approaches without violating core assumptions of strict exogeneity and residual independence. While standard network models can address these issues, the across-network dependencies suggest that we also cannot treat each network as exogenous and model each financial support network separately. To solve these issues, we adopt a framework of co-evolving network dynamics and employ a stochastic actor-oriented model (SAOM) (Van De Bunt, Van Duijn and Snijders, 1999).[17]

Following Kinne and Bunte (2018), we interpret this framework as a longitudinal multiplex network that is composed of multiple "layers." Each layer is a network that consists of ties between actors that change over time, where the outcome variable of interest is the existence of a tie between actors. In our case, these layers correspond to the bilateral loan network, the IMF loan network, and the networks of sovereign debt rescheduling through the Paris Club and the London Club. The actors are either creditors—such as a bilateral official creditor, the IMF, or debt holders represented by the Paris Club and the London Club—or debtors. A tie exists if financial support is extended between two actors. We are using binary ties to signify whether or not financial support exists, that is, whether or not the IMF provided a loan to a debtor country in a given year, whether or not a creditor country offered a loan in a given year, and whether or not the London Club or the Paris Club offered debt restructuring in any given year.[18] Because the IMF's ability to impose conditions is central, we also estimate regressions that focus on whether or not the IMF imposed conditionality and present those in Appendix D. Each dependent variable is coded as 1 if a loan/debt restructuring took place, and 0 if not.

To test our hypotheses, we assess two sets of four-network systems: one with *IMF loans* as an outcome for the IMF network, and one with *IMF conditional loans* as an outcome for the IMF network. For each system, the SAOM for the multiplex of financial support is given by

[16]See Appendix A for a full list of countries included in the sample.

[17]The SAOM has been applied in several international relations studies to model systems with multiple networks (Manger, Pickup and Snijders, 2012; Kinne and Bunte, 2018; Warren, 2010, 2016; Kinne, 2013, 2016; Chyzh, 2016).

[18]Data are from Das, Papaioannou and Trebesch (2012); Bon and Cheng (2020); Schneider and Tobin (2020); and the IMF.

$$f_i^Y(w,x,y,z) = \sum_k \beta_k^Y s_{ki}^Y(w,x,y,z) \text{ (Bilateral Loan Network)}$$
$$f_i^X(w,x,y,z) = \sum_k \beta_k^X s_{ki}^X(w,x,y,z) \text{ (IMF Network)}$$
$$f_i^W(w,x,y,z) = \sum_k \beta_k^W s_{ki}^W(w,x,y,z) \text{ (Paris Club Network)}$$
$$f_i^Z(w,x,y,z) = \sum_k \beta_k^Z s_{ki}^Z(w,x,y,z) \text{ (London Club Network)}$$

where each utility function corresponds to one of the three layers in the network as labeled above. The right-hand side variables capture the personal network of each actor i for each layer of the network Y, X, W, and Z, respectively. These variables are one of three types: (1) node-level or dyad-level covariates, such as debtor financial crisis, creditor economic development, or economic exposure between actors; (2) endogenous network effects, such as "activity," which captures the cumulative extent to which a debtor/creditor is receiving/offering financial support; or (3) cross-network effects, such as the extent to which receiving/offering financial support in one network leads to receiving/offering support in another network. The β vectors are the parameters that indicate how strongly each component affects the evolution of each layer in the multiplex network.

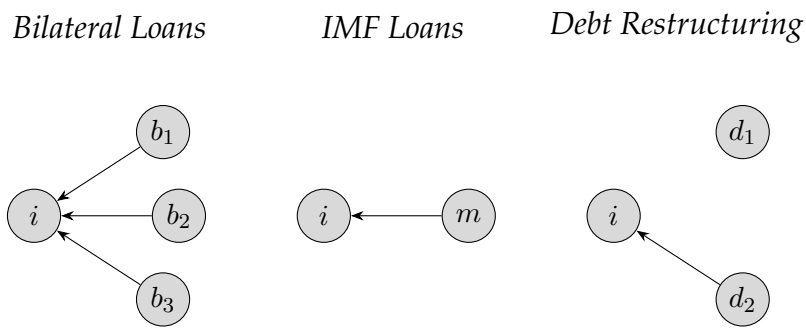
Our network structure differs from prior uses of the SAOM framework in international relations in one noticeable aspect. Creditors can *only* form ties with debtors in one of the four networks: for example, the IMF can only form a tie in the IMF loan network, since it cannot extend a bilateral official loan nor can it offer restructuring of debt through the London or Paris Club deliberations. Likewise, a creditor country offering a bilateral loan cannot extend an IMF loan or individually offer to restructure London Club debt. As such, we are modeling what is referred to as a "disjoint" network, whereby it is impossible that a tie exists for any given pair of actors (i, j) across all four networks (Ripley et al., 2019).[19]

Figure 1 provides an illustration of this structure for a hypothetical debtor country across all four networks (for simplicity, we group the two debt relief networks together visually even though we model them separately). In the left panel, country i is the recipient of bilateral loans from three creditor countries (b_1, b_2 and b_3); in the center panel, i is receiving a loan from the IMF (m); and in the right panel, i is receiving debt restructuring from the Paris Club (d_2) but not the London Club (d_1).

Figure 2 shows the actual multiplex financial rescues network with the four disjoint layers of bilateral loans, IMF loans, and debt restructuring from the Paris Club and London Club. Each layer is a cumulative network of all ties over the entire time period, from 1992 to 2013, simply for illustrative purposes. In the models below, we separate the data to analyze it as a longitudinal multiplex of 22 annual financial rescue networks. Rather than considering these as separate networks, this characterization allows for direct esti-

[19]This aspect of the specification inherently limits our ability to include within-network effects such as transitivity and cross-network effects such as tie closure.

Figure 1



mation of the correspondence between receiving loans in one network to receiving loans in any other networks.

With this in mind, we test the empirical implications of our argument with the cross-network effect *in-degree popularity*$_i$, which captures states' overall financial support activity in another network.[20] With four layers in our multiplex network, we have twelve different *in-degree popularity*$_i$ cross-network effects (see Appendix B).

To account for non-network influences on receiving financial support, we rely on the literature for the determinants of rescues from each of our networks. We describe the determinants and differences across networks below and include variable definitions and sources in Appendix B. For each network, we categorize each of our covariates into five categories: liquidity versus solvency, economic exposure, political factors, geography, and additional controls.

Liquidity versus Solvency. One important factor in crisis resolution is whether the debtor is insolvent (i.e., a perceived inability to meet the requirements of their overall external debt obligations) or illiquid (i.e., an inability to service its foreign debt). Solvency and liquidity problems have distinct solutions. If a country is insolvent, debt reduction would be considered more appropriate to ease the crisis. If it is illiquid, an increase in short term debt would be necessary. It is not clear that these two conditions are entirely separable. If crisis countries were simply illiquid, they should be able to borrow freely from the international capital market. Yet an inability to borrow freely does not imply insolvency or no creditor would be willing to even discuss additional lending, let alone increasing their exposure in the short term as is often the case (Krugman, 1985). Further, solutions meant to ease short-term liquidity constraints could lead to long-term issues of solvency. Thus, while we need to control for liquidity and solvency in our networks, these factors are not likely pure determinants of a creditor's decision, but rather, measures of creditor uncertainty.[21] We rely on the macroeconomic literature on sovereign debt crises which commonly uses *Short-term Debt to Foreign Exchange Reserves* as the main measure

[20]This is technically captured by the `outPopIntn` term in `RSiena`, which is defined by the out-degrees of i in one network times the out-degrees of i in another network. We focus only on debtor country popularity, however, since creditors are disjoint across networks. Therefore the "out-degree" here refers somewhat confusingly to a debtor country receiving financial support from another node in the network.

[21]Our goal is not to determine whether it is a problem of liquidity or solvency, but merely to control for the effect of either on the likelihood of a network rescue.

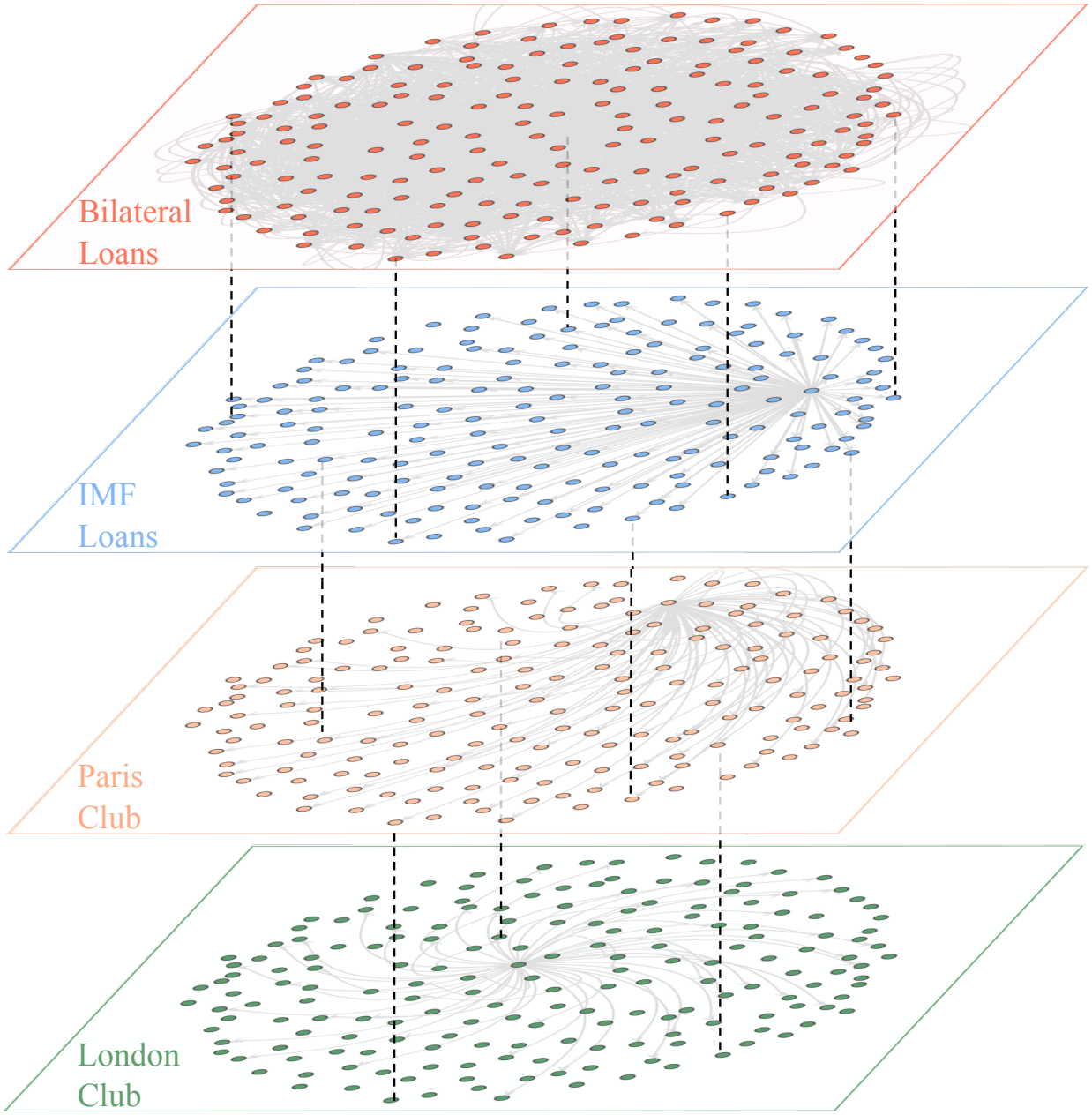


Figure 2: Multiplex network of financial rescues, cumulative across 1992–2013. The presence of a tie within each network represents a loan between two actors: a bilateral loan between creditor and debtor countries (top network); a loan between the IMF and a debtor country (second network); or debt restructuring between either the Paris Club (third network) or London Club (bottom network) and a debtor country. The positioning of nodes is fixed across networks, and is only illustrative; the location of a node does not signal relative importance or centrality of an actor.

of liquidity and *External Debt to GNI* to measure solvency (Feder, Just and Ross, 1981; Detragiache and Spilimbergo, 2001; Horn, Reinhart and Trebesch, 2020).

Economic Exposure. The relevant measures for exposure vary by network. For the London Club, we measure exposure of commercial banks as the outstanding commercial bank debt owed by the debtor country (*Commercial Debt [Exposure])*. To proxy for Paris Club risk, we focus on total sovereign government debt owed by the debtor country as a proxy for the risk of any given sovereign participating in the Paris Club negotiations (*Government Debt [Exposure]*).[22] For the bilateral loan and IMF networks we have data only on bilateral outgoing loans (not repayments), so we are not able to account for the sovereign's direct exposure to the debtor country. Following the convention in the literature we use trade exposure as a proxy.[23] We measure *Trade Exposure* as the logged amount of a creditor country's sum of exports to and imports from the crisis country. Data are from the IMF's Direction of Trade Statistics. For the IMF, we average *Trade Exposure* over the IMF's largest shareholders, the G5 countries (Copelovitch, 2010*a*,*b*).

Political Factors. To account for strategic interest in the crisis country, we measure the difference in UN General Assembly ideal points of the creditor and debtor countries toward the U.S.-led liberal order. Data from Strezhnev and Voeten (2012). We use the negative absolute difference in the ideal points of both sides of each dyad to get a measure of *Preference Dissimilarity*. For the bilateral network, we measure the difference in ideal points between the debtor country and the potential creditor. For the IMF and the Paris Club we follow Copelovitch (2010*a*,*b*) and measure the average difference in ideal points between the debtor country and each of the G-5 countries. We do not include political factors for the London Club since commercial banks are not driven by geopolitical concerns, but focus on commercial profits. For the bilateral loan network we further include an indicator of whether the creditor and debtor countries are in a joint alliance. *Alliance* is a dummy variable equal to one in any year that a dyad is involved in a defense pact. Data are from the Correlates of War Alliances data set.

Geography. Countries in closer geographic proximity are more likely to offer financial assistance and are more likely to be exposed to economic spillovers (Tirole, 2015; Horn, Reinhart and Trebesch, 2020). The bilateral loan network includes the logged *Distance* (in miles) between the creditor and debtor country. For the IMF and the Paris Club, we include the minimum distance between the debtor country and the members of the G-5. We exclude distance for the London Club. Data are from Gleditsch and Ward (2001).

Other Control Variables. The remaining control variables are standard in the literature. All four networks include a series of variables to control for the macroeconomic policies, economic stability, and additional economic risk factors of the debtor country. These variables include: the debtor's GDP per capita, GDP growth, and the current account as a percentage of GDP. Data from the World Bank. We also include a dummy variable equal to one to indicate if a country is experiencing a currency crisis, balance-of-payments crisis, sovereign-debt crisis, or a banking crisis (Valencia and Laeven, 2012; Reinhart and Rogoff, 2009). In the Bilateral, IMF and Paris network models we include the GDP per capita of

[22]The sovereign and commercial debt data come from the World Bank's International Debt Statistics Database.

[23]We also used the alternative measure for bank exposure, with little change in the results.

the lending country (average over the members of the G-5) to account for the economic health of the networks. The IMF network model includes three additional determinants of the likelihood of a new IMF loan: (i) the log of the IMF's liquidity ratio, as an indicator of the ability of the IMF to lend, (ii) a dummy variable equal to one if the debtor country has ever received an IMF loan before and IMF quota review, and (iii) a dummy variable equal to one in years that the IMF has reviewed and changed their quotas.

Results

Across all four networks and both model specifications, we find positive and significant estimates for cross-network effects: financial crisis lending decisions are highly contingent on each other. Figure 3 presents our estimates for network influence effects for the four networks in the model in which IMF loans are measured broadly as any loan received from the IMF, with or without conditions. To ease interpretation, we rescale the coefficients in the plot by standard deviation; the non-rescaled estimates can be found in Appendix D (Table S1), which is what we refer to when interpreting the coefficient magnitudes using the log-odds framework. Beginning with the bilateral loan network, we find that receiving an IMF loan increases the probability of receiving a bilateral loan by 62 per cent ($\exp 0.48 = 1.62$). A creditor country would be 62 per cent more likely to extend a bilateral loan to a debtor country that has received an IMF loan when compared to a debtor that has not received a loan from the IMF. This effect is roughly one-third the size of the Paris Club sovereign debt restructuring cross-network effects, where we find that receiving sovereign debt restructuring from the Paris Club increases the probability of receiving a bilateral loan by 186 per cent ($\exp 1.05 = 2.86$), a roughly two-fold increase. We find the largest cross-network effects for London Club debt restructuring, where the effect is a six-fold increase in the probability of receiving a bilateral loan.[24] Overall, these findings strongly suggest that bilateral loan decisions are highly contingent on the lending decisions of other creditor groups.

Turning to the IMF loans network, we find that receiving a bilateral loan increases the probability of receiving an IMF loan by 82 per cent ($\exp 0.60 = 1.82$). The cross-network effects for IMF loans of sovereign debt restructuring are slightly larger than compared to the bilateral loan network: recipients of Paris Club and London Club debt restructuring correspond to a 2.3-fold (3.3x odds) and 8.5-fold (9.5x odds) increase, respectively, in the probability of getting an IMF loan. The likelihood that the IMF is willing to lend to debtor countries significantly depends on the willingness of other creditor groups to contribute to the financial rescue package. To understand the magnitude of these results, consider the hypothetical example in our illustration in Figure 1, where country i receives debt relief from the Paris Club. Compare this to a hypothetical country j that receives no such debt relief. Holding other country and system characteristics fixed, our results indicate that country i is 3.3 times more likely to receive an IMF loan than country j. With a

[24] The magnitudes for the London Club coefficients are considerably higher given the relative infrequency of this kind of debt restructuring and the high overlap with bilateral loans: of the 70 London Club debt restructurings loans in our sample, 53 (or, 75 per cent) of the debtor countries were also recipients of a bilateral loan in that same year.

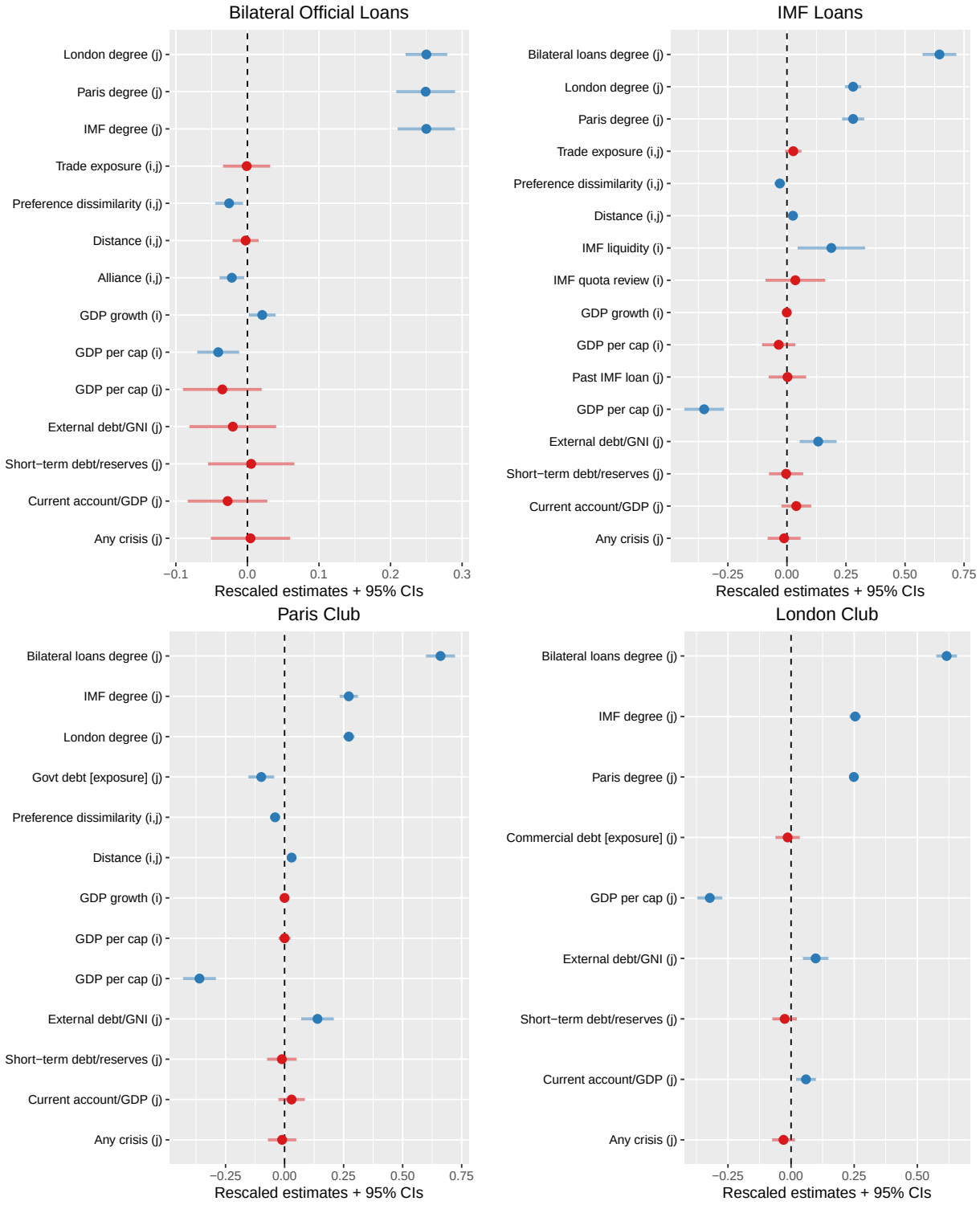


Figure 3: Coefficient plot for stochastic actor-oriented model for multiplex network of bilateral loans, IMF loans (*under IMF program = 1, 0 otherwise*), Paris Club and London Club restructurings.

baseline of 1,064 loans out of 4,092 IMF–debtor-country dyads in our data, this is quite a large effect—enough to shift the average country from not likely ($\approx 26\%$) to receive a loan to being more likely than not ($\approx 86\%$) to receive an IMF loan.

The cross-network effects in the sovereign debt relief networks largely track those of the bilateral loan and IMF loans networks. The more bilateral loans a debtor country receives, the greater its probability of also receiving debt restructuring through the Paris Club: debtors receiving bilateral loans are 84 per cent ($\exp(0.61) = 1.84$) more likely to receive Paris Club debt restructuring, and 77 per cent more likely to receive London Club debt restructuring, when compared to debtors not bailed out by bilateral creditors. At the same time, recipients of IMF loans are 70 per cent and 64 per cent more likely to see their Paris Club and London Club debt respectively restructured compared to non-IMF-loan recipients.

In sum, the results in Figure 3 are highly suggestive of the coordination between creditor groups, with mutually reinforcing lending strategies that suggest that creditors want to offer liquidity but aim to minimize risk. These results are robust to (i) using IMF loans that are lent with conditions (Appendix C, Figures S2 and S3); (ii) including bilateral loans credited from OECD countries only (Appendix D, Table S4); (iii) replacing trade exposure with a measure of bank exposure (Appendix D, Table S5); and (iv) controlling for debtor-country sovereign bond debt (Appendix D, Table S6).[25]

Overall, these results support our expectations that creditor decisions display strong interdependencies. The provision of financial support in one creditor network unlocks greater support from both other creditor networks. Specifically, debtors receiving loans in any given network have a significantly increased probability of receiving loans from other creditor groups.[26]

To scholars of financial rescues, the paucity of statistically significant estimates for the control variables in the bilateral and IMF loans models may at first seem alarming. On the one hand, it could indicate that knowledge that a country has received a loan, conditional on the known factors that determine loan receipt (e.g., all of our non-network covariates), is a much more powerful predictor of receiving a loan, conditional on similar non-network factors. On the other hand, because our models are focused on estimating endogenous and cross-network effects, estimates for non-network variables could be attenuated. This is partly because these covariates are themselves highly correlated with the outcomes in other networks within the multiplex. We examine this by looking at network models without cross-network effects and at conventional models with and without network effects. First, we remove the cross-network effects from the existing SAOM mulitplex network to find that exposure is now statistically and substantively significant

[25]We find small but positive and significant effect of bond debt on the probability of a bilateral loan and on the probability of a London Club haircut.

[26]Our analysis focuses on decisions to lend during times of financial distress, and we find little evidence of free riding. This is consistent with prior work that finds that creditor coordination problems tend to be more important than free rider problems during crisis resolution (Ghosal and Miller, 2003; Wright, 2005). Of course, creditors may still have incentives to free ride on the efforts of others by minimizing the size of the loans or debt restructuring. This is something our network models cannot fully capture. In Appendix E, we discuss the potential for free riding and use descriptive data on debt restructuring deals to show that private creditors, which have the greatest incentives and opportunities to free ride, have not done so to the extent that one might expect.

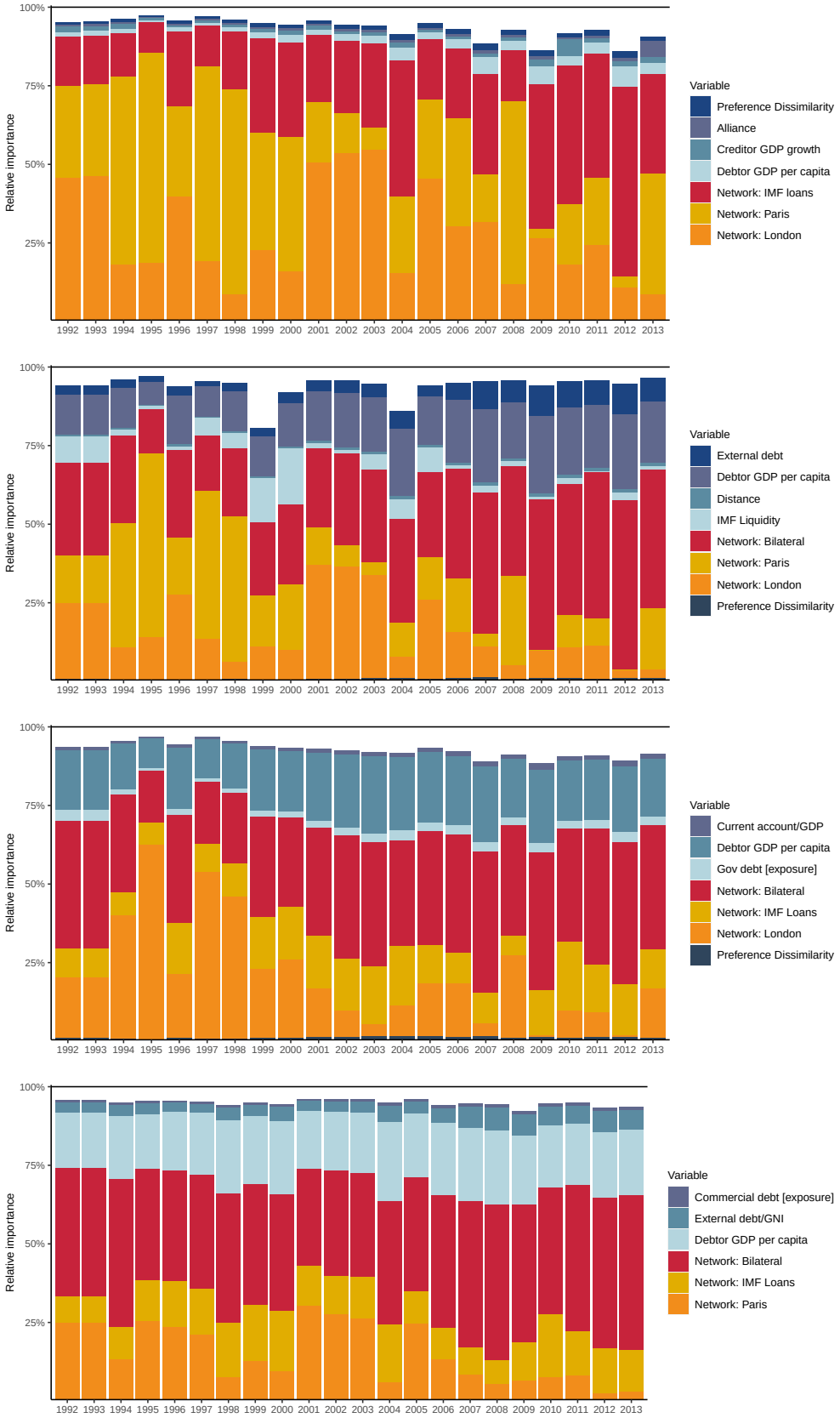


Figure 4: Relative importance of network and non-network variables in predicting financial rescues: bilateral loans (*top*), IMF loans (*middle*), Paris Club and London Club debt restructuring (*bottom two panels*). The expected relative importance is rescaled such that the total explained variation in each outcome sums to 100%. Any remaining relative importance within each year—denoted by the white space between the top of the graph and the top of the stacked bar—corresponds to all other non-labeled covariates in the model.

(Table S7 in Appendix D). The coefficient on exposure suggests that a logged-unit increase in trade exposure between a debtor and creditor country corresponds to a 12 per cent ($\exp(0.11) = 1.12$) increase in the likelihood of receiving a bilateral loan. Many of the other covariates are now statistically significant as well, including debtor external debt and short-term debt as well as whether the debtor is experiencing either a currency crisis, sovereign-debt crisis, or a banking crisis.

The same pattern emerges if we run conventional models that include pseudo-network covariates instead of the SAOM multiplex framework (Table S9 in the appendix).[27] While the network effects in these models cannot be credibly estimated—this is the very essence of the problem we aim to solve using the SAOM framework—we find results for the non-network covariates that conform with prior work. Exposure is statistically significant in both the bilateral and IMF loan models. Interestingly, the latter result is attenuated in the IMF loan model when we include network covariates in conventional logit models (Table S8 in Appendix E). Both the SAOM without cross-network effects and the logit models suggest that exposure in particular is conditioned by international coordination.

With this in mind, it is important to state that our findings do *not* suggest that all non-network factors are irrelevant for understanding crisis lending. Using the Indlekofer and Brandes (2013) diagnostic of the predictive relative importance (RI) of the variables for each year of financial rescues, we find that these covariates still account for much of the expected variation in loans and debt restructuring. Figure 4 (second panel) illustrates that for the probability of receiving an IMF loan in 1999, for example, bilateral loans and debt relief deals from the Paris and London clubs together account for 50% RI; this can be interpreted as a roughly 50% expected impact on predicted loans, with the remaining 50% coming from non-network covariates. By contrast, the RI values for network covariates in the bilateral loans network in Figure 4 (top panel) are never below 75% for any year in the sample, further evidence of the outsize role of coordinated lending in bilateral loan decisions.

Conclusion

The IMF, originally conceived of as a lender of last resort to countries experiencing severe balance of payments crises has never quite been able to take on this role. Instead, the IMF serves as an anchor to all major international creditors, restoring confidence in an otherwise risky process. Creditors, including multinational, sovereign and private groups informally coordinate their lending decisions to ensure international financial stability and that the decisions made across and within creditor groups are mutually reinforcing. Given the risks involved in increasing exposure during times of debtor distress, individual creditor groups pay very close attention to what other creditors decide. The willingness of other creditors to provide new loans to a debtor decreases the risk of default, which increases the willingness of other actors to offer new loans or restructure existing loans. In a world where coordination over global public goods often fails without formal enforcement mechanisms, the informal coordination evident in financial crisis resolution

[27] We also present a model with a continuous dependent variable for IMF loans, which we cannot include in our SAOMs specifications given its limitations for non-discrete outcomes (Ripley et al., 2019).

may be able to serve as a model of success. Mutual dependencies and informal access to information about actor decisions appear central in explaining informal coordination.

Our findings shed light on the complex nature of international cooperation. The resolution of these crises involve multiple players and decisions over a large number of financial instruments. Our findings that coordinated rescues are positively reinforcing are particularly interesting in light of the mixed and conditional evidence for catalytic lending. And more important, at a time when low and middle income countries are experiencing unprecedented levels of debt and many are on the verge of crisis, our findings offer cautious optimism that coordination is likely to occur and could stave off crises, perhaps minimizing the economic and political impacts of the COVID-19 pandemic.

Our work is only a first step towards explaining informal coordination in crisis resolution. Beyond the examination of similar informal coordination networks in other policy areas, it would be important to examine the dynamics of coordination efforts. Our findings offer insights into the basic incentives to coordinate during times of crises, but coordination necessarily brings to the surface renewed concerns about creditor's free-riding incentives. In particular, are certain creditors holding out for others to move before committing to enter? Or, are creditors waiting to to see how much others are lending before moving forward? Addressing these questions would be a natural next step in research on crisis coordination and we provide some initial insights in the appendix. Finally, our findings show that the informal coordination amongst creditors leads to a greater willingness to lend and forgive. We do not yet understand the economic and political implications of this coordination. Such research, in conjunction with existing research on debtor strategies, would be central to contributing to more effective international financial crisis resolution in an increasingly complex global financial system.

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Supporting Information for:
Coordinated Financial Crisis Resolution

To be published as Online Appendix

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E Creditor Coordination and Free Riding **20**

A List of countries included in the sample

Creditor countries		
Australia	Hungary	Portugal
Austria	Iceland	Slovak Republic
Belgium	Ireland	Slovenia
Canada	Israel	South Korea
Chile	Italy	Spain
Czech Republic	Japan	Sweden
Denmark	Luxembourg	Switzerland
Estonia	Mexico	Turkey
Finland	Netherlands	United Kingdom
France	New Zealand	United States
Germany	Norway	
Greece	Poland	

Debtor countries		
Afghanistan	Georgia	Oman
Albania	German Democratic Republic	Pakistan
Algeria	Ghana	Panama
Angola	Grenada	Papua New Guinea
Antigua and Barbuda	Guatemala	Paraguay
Argentina	Guinea	Peru
Armenia	Guinea-Bissau	Philippines
Azerbaijan	Guyana	Qatar
Bahamas	Haiti	Romania
Bangladesh	Honduras	Russia
Barbados	Hong Kong	Rwanda
Belarus	India	Saint Kitts and Nevis
Belize	Indonesia	Saint Lucia
Benin	Iran	Saint Vincent and the Grenadines
Bhutan	Iraq	Samoa
Bolivia	Jamaica	Sao Tome and Principe
Bosnia and Herzegovina	Jordan	Saudi Arabia
Botswana	Kazakhstan	Senegal
Brazil	Kenya	Seychelles
Bulgaria	Kosovo	Sierra Leone
Burkina Faso	Kuwait	Singapore
Burundi	Kyrgyz Republic	Solomon Islands
Cambodia	Laos	South Africa
Cameroon	Latvia	Sri Lanka
Cape Verde	Lebanon	Sudan
Central African Republic	Lesotho	Swaziland
Chad	Liberia	Syria
China	Libya	Taiwan
Colombia	Lithuania	Tajikistan
Comoros	Macedonia	Tanzania
Congo	Madagascar	Thailand
Costa Rica	Malawi	Timor
Cote d'Ivoire	Malaysia	Togo
Croatia	Maldives	Tonga
Cuba	Mali	Trinidad and Tobago
Cyprus	Malta	Tunisia
Democratic Republic of Congo	Mauritania	Turkmenistan
Djibouti	Mauritius	Uganda
Dominica	Moldova	Ukraine
Dominican Republic	Mongolia	United Arab Emirates
Ecuador	Montenegro	Uruguay
Egypt	Morocco	Uzbekistan
El Salvador	Mozambique	Vanuatu
Equatorial Guinea	Myanmar	Venezuela
Eritrea	Nepal	Vietnam
Ethiopia	Nicaragua	Yemen
Fiji	Niger	Zambia
Gabon	Nigeria	Zimbabwe
Gambia	North Korea	

B Variables included in SAOM multiplex network model

Below is a list of all covariates included in each equation of the multiplex model. *Variables in italics refer to cross-network effects*.

Bilateral Loan Equation:

- Liquidity: short term debt/foreign exchange reserves
- Solvency: External debt/GNI
- Exposure: Trade Exposure (IMF Direction of Trade Statistics)
- Political: Preference similarity–bilateral, Alliance
- Geography: Distance–bilateral
- Debtor GDP per capita
- Debtor GDP growth
- Debtor current account as a percentage of GDP
- Election Timing
- Creditor GDP per capita
- Creditor GDP growth
- Dummy for crisis (if any): currency crisis, sovereign-debt crisis, or a banking crisis.
- *Bilateral Loan: IMF in-degree popularity*$_i$. Tendency for countries receiving an IMF loan to receive a bilateral loan.
- *Bilateral Loan: Paris Club in-degree popularity*$_i$. Tendency for countries receiving Paris Club debt restructuring to receive a bilateral loan.
- *Bilateral Loan: London Club in-degree popularity*$_i$. Tendency for countries receiving London Club debt restructuring to receive a bilateral loan.

IMF Loan Equation:

- Liquidity: short term debt/foreign exchange reserves
- Solvency: External debt/GNI
- Exposure: Trade exposure—G5 (IMF Direction of Trade Statistics)
- Political: Preference similarity—G5 average
- Geography: Distance—minimum to G5
- Debtor GDP per capita
- Debtor GDP growth
- Debtor current account as a percentage of GDP
- IMF Liquidity ratio

- Past IMF loan
- Type of crisis (if any): currency crisis, sovereign-debt crisis, or a banking crisis.
- *IMF: bilateral loan in-degree popularity*$_i$. Tendency for countries receiving a bilateral loan to receive an IMF loan.
- *IMF: Paris Club in-degree popularity*$_i$. Tendency for countries receiving Paris Club debt restructuring to receive an IMF loan.
- *IMF: London Club in-degree popularity*$_i$. Tendency for countries receiving London Club debt restructuring to receive an IMF loan.

Paris Club Equation:

- Liquidity: short term debt/foreign exchange reserves
- Solvency: External debt/GNI
- Exposure: G5–Log of sovereign government debt (WB)
- Political: Preference similarity—G5 average
- Geography: Distance–minimum
- Debtor GDP per capita
- Debtor GDP growth
- Debtor current account as a percentage of GDP
- Type of crisis (if any): currency crisis, sovereign-debt crisis, or a banking crisis.
- *Paris Club: bilateral loan in-degree popularity*$_i$. Tendency for countries receiving a bilateral loan to receive Paris Club debt restructuring.
- *Paris Club: IMF in-degree popularity*$_i$. Tendency for countries receiving an IMF loan to receive Paris Club debt restructuring.
- *Paris Club: London Club in-degree popularity*$_i$. Tendency for countries receiving London Club debt restructuring to receive Paris Club debt restructuring.

London Club Equation:

- Liquidity: short term debt/foreign exchange reserves
- Solvency: External debt/GNI
- Exposure: Log of outstanding commercial bank debt (WB)
- Political: –
- Distance: –
- Debtor GDP
- Debtor GDP per capita
- Debtor GDP growth
- Debtor current account as a percentage of GDP

- Brady Deal
- Type of crisis (if any): currency crisis, sovereign-debt crisis, or a banking crisis.
- *London Club: bilateral loan in-degree popularity*$_i$. Tendency for countries receiving a bilateral loan to receive London Club debt restructuring.
- *London Club: IMF in-degree popularity*$_i$. Tendency for countries receiving an IMF loan to receive London Club debt restructuring.
- *London Club: Paris Club in-degree popularity*$_i$. Tendency for countries receiving Paris Club debt restructuring to receive London Club debt restructuring.

C IMF Conditionality Results

Figure S1 presents our estimates for a model specification in which IMF loans are measured as any loan received from the IMF with conditions; a zero tie value in this case indicates either not receiving an IMF loan, or receiving a loan without conditions.[28]

The results for the cross-network effects are similar in magnitude and direction. We find that IMF conditionality has a positive and significant impact of lending decisions in other networks. Looking at the non-rescaled estimates in Table S2, receiving IMF conditionality increases the probability of receiving a bilateral loan by 56 percent. At the same time, IMF conditionality is influenced by the other creditors' decisions. For the IMF conditionality network, receiving a bilateral loan increases the probability of an IMF loan with conditions by 82 per cent. The debt restructuring cross-network effects in the IMF conditionality network are nearly identical at 3.3-fold and 9.6-fold increases in probability of receiving a loan. For the Paris Club network, receiving a bilateral loan or IMF conditionality increases the probability of sovereign debt relief by 84 percent and 62 percent, respectively.

The differences across the two sets of multiplex networks arise in our estimates for two control variables: IMF liquidity and G5-averaged GDP per capita. In the set of networks with IMF loans (with or without conditions) as an outcome variable, we find that IMF liquidity is positively correlated with receiving an IMF loan, while G5-averaged GDP per capita is not correlated with receiving a loan. By contrast, in the set of networks with IMF conditionality as an outcome variable, this pattern is reversed. Here IMF liquidity is no longer statistically significant, while G5-averaged GDP per capita is. Furthermore, there is considerably increased uncertainty in estimating the other creditor-level coefficients, as indicated by the wider confidence intervals for IMF liquidity, IMF quota review, and G5-averaged GDP growth.

[28] We also analyzed the influence of hard versus soft conditions, but found no substantial difference in results. See Table S3 and Figure S2 for results from the model with IMF loans with soft conditionality as the outcome variable for the IMF network.

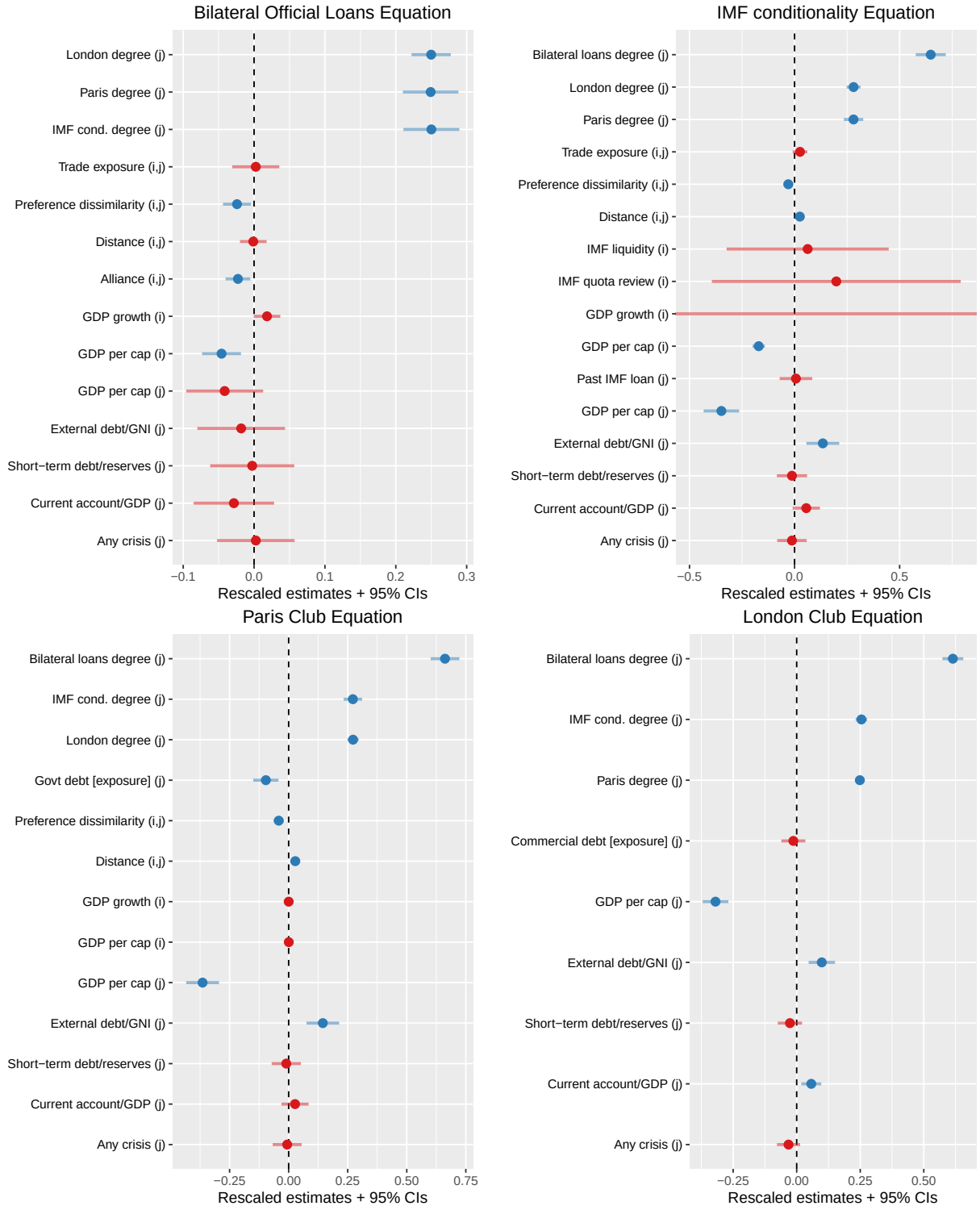

Figure S1: Coefficient plot for stochastic actor-oriented model for multiplex network of bilateral loans, IMF conditionality (*under IMF program with conditions = 1, 0 otherwise*), Paris Club, and London Club debt restructuring.

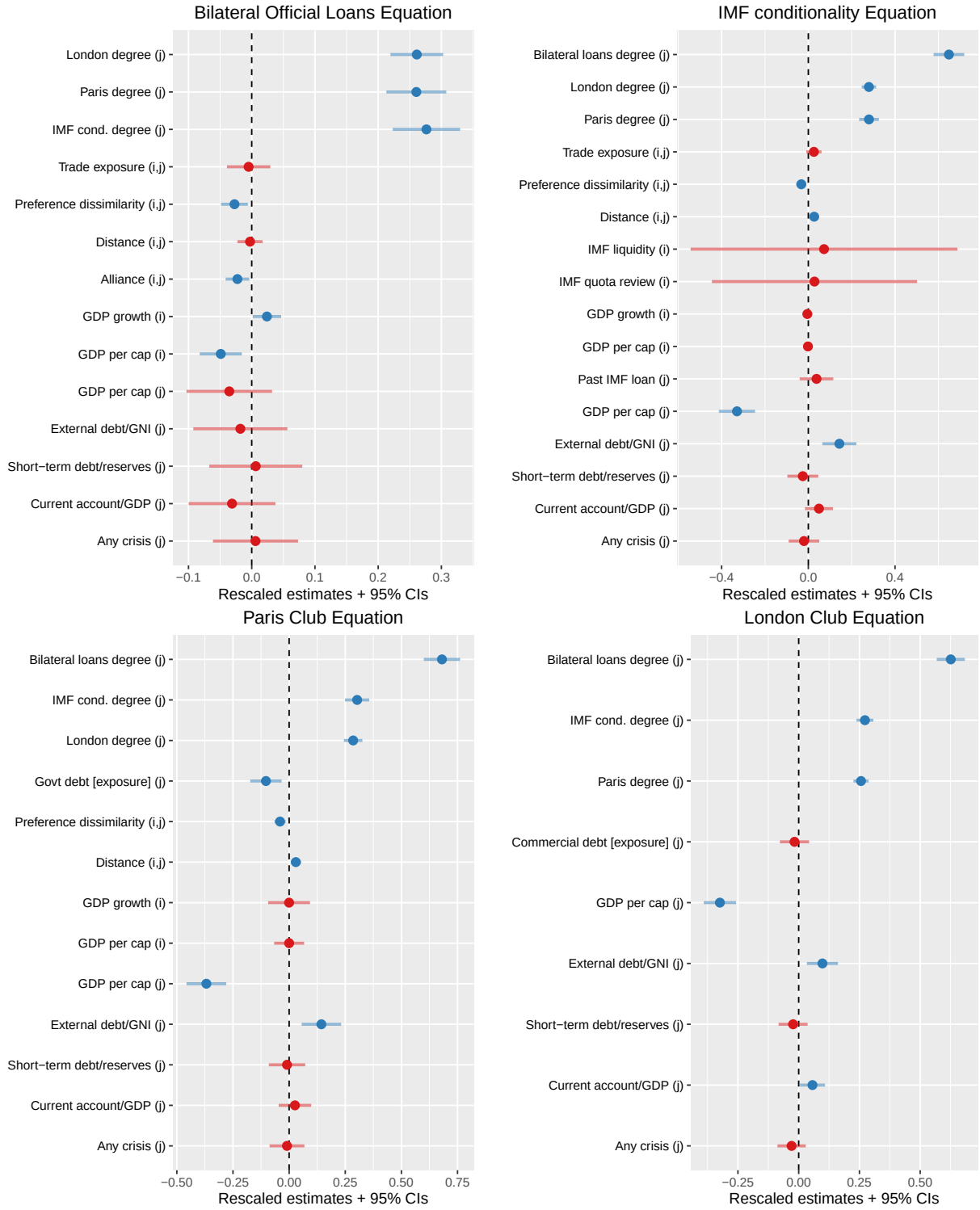

Figure S2: Coefficient plot for stochastic actor-oriented model for multiplex network of bilateral loans, IMF soft conditionality (*under IMF program with soft conditions = 1, 0 otherwise*), Paris Club, and London Club debt restructuring. Compare to Figure S1 in the main text.

D Network models - Additional Tables

	Coefficient	Std. error	Conv.
Bailouts equation			
Reciprocity	0.00	(NA)	5.40
Distance (i,j)	-0.02	(0.07)	-0.00
Preference dissimilarity (i,j)	-0.20	(0.08)	-0.00
Alliance (i,j)	-0.58	(0.23)	-0.00
Trade exposure (i,j)	-0.00	(0.01)	-0.02
GDP growth (i)	0.25	(0.12)	-0.02
GDP per cap (i)	-2.10	(0.77)	0.03
GDP per cap (j)	-0.02	(0.02)	0.00
Current account/GDP (j)	-0.00	(0)	0.02
External debt/GNI (j)	-0.04	(0.05)	0.01
Short-term debt/reserves (j)	0.00	(0.03)	0.01
Any crisis (j)	0.01	(0.08)	-0.02
IMF degree (j)	0.48	(0.04)	0.02
Paris degree (j)	1.05	(0.09)	0.00
London degree (j)	1.99	(0.12)	-0.01
IMF loans equation			
Reciprocity	0.00	(NA)	3.52
Distance (i,j)	0.36	(0.15)	0.01
Trade exposure (i,j)	0.02	(0.01)	0.00
Preference dissimilarity (i,j)	-0.21	(0.08)	-0.02
GDP per cap (i)	-96.31	(98.99)	0.24
GDP growth (i)	-0.17	(1.09)	-0.04
GDP per cap (j)	-0.23	(0.03)	0.00
Current account/GDP (j)	0.01	(0)	0.02
External debt/GNI (j)	0.23	(0.07)	-0.01
Short-term debt/reserves (j)	-0.00	(0.03)	-0.03
Any crisis (j)	-0.03	(0.1)	-0.01
Past IMF loan (j)	0.00	(0.09)	0.01
IMF liquidity (i)	3.78	(1.46)	0.01
IMF quota review (i)	1.28	(2.32)	-0.01
Bilateral loans degree (j)	0.60	(0.03)	0.00
Paris degree (j)	1.19	(0.1)	0.00
London degree (j)	2.26	(0.14)	-0.00
Paris Club equation			
Reciprocity	0.00	(NA)	3.25
Distance (i,j)	0.43	(0.14)	0.02
Preference dissimilarity (i,j)	-0.28	(0.08)	0.00
GDP per cap (i)	-1.80	(426.87)	-0.01
GDP growth (i)	-0.00	(24.79)	0.01
GDP per cap (j)	-0.24	(0.02)	-0.00
Current account/GDP (j)	0.00	(0)	0.01
External debt/GNI (j)	0.25	(0.06)	0.01
Short-term debt/reserves (j)	-0.01	(0.03)	0.00
Any crisis (j)	-0.03	(0.08)	-0.00
Govt debt [exposure] (j)	-0.03	(0.01)	-0.00
Bilateral loans degree (j)	0.61	(0.03)	-0.00
IMF degree (j)	0.53	(0.04)	0.02
London degree (j)	2.20	(0.1)	0.00
London Club equation			
Reciprocity	0.00	(NA)	3.10
GDP per cap (j)	-0.21	(0.02)	-0.02
Current account/GDP (j)	0.01	(0)	-0.00
External debt/GNI (j)	0.17	(0.05)	-0.01
Short-term debt/reserves (j)	-0.02	(0.02)	0.01
Any crisis (j)	-0.08	(0.06)	-0.00
Commercial debt [exposure] (j)	-0.00	(0)	-0.00
Bilateral loans degree (j)	0.57	(0.02)	-0.01
IMF degree (j)	0.50	(0.02)	-0.02
Paris degree (j)	1.06	(0.04)	0.00

Table S1: Estimates from a stochastic actor-oriented model on four networks. Parenthetics indicate whether the measure is dyadic (i, j), debtor-monadic (i), or creditor-monadic (j). Coefficient estimates are roughly interpretable as log-odds ratios, but are not rescaled as in the coefficient plots in the main text. Convergence t-statistics are listed in the final column; values less than 0.15 generally imply that the algorithm has converged for each individual element.

	Coefficient	Std. error	Conv.
Bailouts equation			
Reciprocity	0.00	(NA)	5.43
Distance (i,j)	-0.01	(0.07)	0.25
Preference dissimilarity (i,j)	-0.19	(0.08)	0.12
Alliance (i,j)	-0.60	(0.24)	-0.26
Trade exposure (i,j)	0.00	(0.01)	-0.06
GDP growth (i)	0.22	(0.12)	-0.07
GDP per cap (i)	-2.36	(0.72)	-0.37
GDP per cap (j)	-0.03	(0.02)	-0.24
Current account/GDP (j)	-0.00	(0)	-0.01
External debt/GNI (j)	-0.03	(0.06)	-0.02
Short-term debt/reserves (j)	-0.00	(0.02)	-0.26
Any crisis (j)	0.01	(0.08)	-0.04
IMF cond. degree (j)	0.44	(0.04)	-0.00
Paris degree (j)	1.05	(0.08)	-0.01
London degree (j)	1.99	(0.11)	-0.02
IMF loans equation			
Reciprocity	0.00	(NA)	3.59
Distance (i,j)	0.36	(0.15)	-0.01
Trade exposure (i,j)	0.01	(0.01)	-0.01
Preference dissimilarity (i,j)	-0.21	(0.08)	0.05
GDP per cap (i)	-448.70	(39.8)	5.24
GDP growth (i)	-248.32	(709.05)	7.32
GDP per cap (j)	-0.23	(0.03)	-0.01
Current account/GDP (j)	0.01	(0)	0.14
External debt/GNI (j)	0.24	(0.07)	-0.05
Short-term debt/reserves (j)	-0.01	(0.03)	-0.12
Any crisis (j)	-0.03	(0.1)	-0.01
Past IMF loan (j)	0.01	(0.09)	-0.03
IMF liquidity (i)	1.25	(3.95)	0.18
IMF quota review (i)	7.14	(10.86)	0.27
Bilateral loans degree (j)	0.60	(0.03)	-0.03
Paris degree (j)	1.20	(0.1)	0.00
London degree (j)	2.27	(0.14)	0.02
Paris Club equation			
Reciprocity	0.00	(NA)	3.37
Distance (i,j)	0.40	(0.15)	-0.24
Preference dissimilarity (i,j)	-0.30	(0.08)	-0.23
GDP per cap (i)	19.78	(22.16)	0.09
GDP growth (i)	0.59	(2.1)	0.11
GDP per cap (j)	-0.24	(0.02)	-0.03
Current account/GDP (j)	0.00	(0)	-0.11
External debt/GNI (j)	0.25	(0.06)	0.14
Short-term debt/reserves (j)	-0.01	(0.03)	0.15
Any crisis (j)	-0.02	(0.09)	0.23
Govt debt [exposure] (j)	-0.03	(0.01)	0.16
Bilateral loans degree (j)	0.61	(0.03)	0.01
IMF cond. degree (j)	0.49	(0.04)	-0.00
London degree (j)	2.20	(0.1)	0.06
London Club equation			
Reciprocity	0.00	(NA)	3.09
GDP per cap (j)	-0.21	(0.02)	0.04
Current account/GDP (j)	0.01	(0)	-0.04
External debt/GNI (j)	0.17	(0.05)	0.00
Short-term debt/reserves (j)	-0.02	(0.02)	-0.06
Any crisis (j)	-0.09	(0.06)	-0.01
Commercial debt [exposure] (j)	-0.00	(0)	0.01
Bilateral loans degree (j)	0.57	(0.02)	-0.06
IMF cond. degree (j)	0.46	(0.02)	-0.01
Paris degree (j)	1.06	(0.04)	-0.02

Table S2: Estimates from a stochastic actor-oriented model on four networks, IMF loan conditionality. Refer to notes in Table S1 for more detail on interpretation.

	Coefficient	Std. error	Conv.
Bailouts equation			
Reciprocity	0.00	(NA)	5.37
Distance (i,j)	-0.02	(0.07)	0.01
Preference dissimilarity (i,j)	-0.21	(0.08)	0.01
Alliance (i,j)	-0.60	(0.25)	-0.02
Trade exposure (i,j)	-0.00	(0.01)	-0.04
GDP growth (i)	0.29	(0.14)	0.01
GDP per cap (i)	-2.52	(0.88)	0.00
GDP per cap (j)	-0.02	(0.02)	-0.01
Current account/GDP (j)	-0.00	(0)	0.03
External debt/GNI (j)	-0.03	(0.07)	-0.02
Short-term debt/reserves (j)	0.01	(0.03)	-0.00
Any crisis (j)	0.02	(0.09)	0.00
IMF cond. degree (j)	1.43	(0.14)	-0.00
Paris degree (j)	1.10	(0.1)	0.00
London degree (j)	2.08	(0.17)	0.01
IMF loans equation			
Reciprocity	0.00	(NA)	3.27
Distance (i,j)	0.39	(0.15)	0.00
Trade exposure (i,j)	0.01	(0.01)	0.01
Preference dissimilarity (i,j)	-0.23	(0.08)	0.03
GDP per cap (i)	-10.55	(52.34)	-0.00
GDP growth (i)	-2.59	(1.86)	0.01
GDP per cap (j)	-0.22	(0.03)	-0.01
Current account/GDP (j)	0.01	(0)	0.01
External debt/GNI (j)	0.25	(0.07)	0.01
Short-term debt/reserves (j)	-0.02	(0.03)	-0.00
Any crisis (j)	-0.05	(0.1)	-0.02
Past IMF loan (j)	0.08	(0.09)	-0.01
IMF liquidity (i)	1.51	(6.54)	-0.02
IMF quota review (i)	1.06	(9.01)	0.02
Bilateral loans degree (j)	0.60	(0.03)	0.01
Paris degree (j)	1.19	(0.1)	0.01
London degree (j)	2.26	(0.14)	-0.01
Paris Club equation			
Reciprocity	0.00	(NA)	3.34
Distance (i,j)	0.43	(0.16)	-0.01
Preference dissimilarity (i,j)	-0.28	(0.09)	0.01
GDP per cap (i)	3.01	(1116.22)	0.02
GDP growth (i)	-0.29	(130.27)	0.00
GDP per cap (j)	-0.24	(0.03)	-0.00
Current account/GDP (j)	0.00	(0)	0.00
External debt/GNI (j)	0.25	(0.08)	0.00
Short-term debt/reserves (j)	-0.01	(0.03)	0.01
Any crisis (j)	-0.03	(0.11)	0.02
Govt debt [exposure] (j)	-0.03	(0.01)	-0.01
Bilateral loans degree (j)	0.63	(0.04)	-0.00
IMF cond. degree (j)	1.58	(0.14)	-0.01
London degree (j)	2.30	(0.17)	-0.01
London Club equation			
Reciprocity	0.00	(NA)	3.08
GDP per cap (j)	-0.21	(0.02)	0.01
Current account/GDP (j)	0.01	(0)	-0.01
External debt/GNI (j)	0.17	(0.06)	-0.00
Short-term debt/reserves (j)	-0.02	(0.02)	-0.01
Any crisis (j)	-0.08	(0.08)	0.01
Commercial debt [exposure] (j)	-0.00	(0)	-0.01
Bilateral loans degree (j)	0.58	(0.03)	-0.00
IMF cond. degree (j)	1.43	(0.09)	-0.01
Paris degree (j)	1.09	(0.07)	0.01

Table S3: Estimates from a stochastic actor-oriented model on four networks, IMF soft conditionality. Refer to notes in Table S1 for more detail on interpretation.

	Coefficient	Std. error	Conv.
Bailouts equation			
Reciprocity	0.00	(NA)	5.20
Distance (i,j)	0.00	(0.07)	-0.01
Preference dissimilarity (i,j)	-0.22	(0.08)	0.00
Alliance (i,j)	-0.60	(0.23)	0.02
Trade exposure (i,j)	0.01	(0.01)	0.03
GDP growth (i)	0.26	(0.11)	0.02
GDP per cap (i)	-2.08	(0.74)	-0.00
GDP per cap (j)	-0.02	(0.02)	0.01
Current account/GDP (j)	-0.00	(0)	-0.02
External debt/GNI (j)	-0.04	(0.06)	-0.02
Short-term debt/reserves (j)	-0.00	(0.02)	-0.00
Any crisis (j)	-0.01	(0.08)	-0.00
IMF degree (j)	0.49	(0.04)	0.02
Paris degree (j)	1.06	(0.09)	-0.00
London degree (j)	2.01	(0.12)	0.00
IMF loans equation			
Reciprocity	0.00	(NA)	3.59
Distance (i,j)	0.38	(0.16)	0.01
Trade exposure (i,j)	0.02	(0.01)	-0.02
Preference dissimilarity (i,j)	-0.22	(0.09)	-0.01
GDP per cap (i)	-95.46	(90.5)	0.26
GDP growth (i)	-0.16	(1.02)	-0.01
GDP per cap (j)	-0.24	(0.03)	0.00
Current account/GDP (j)	0.01	(0)	-0.00
External debt/GNI (j)	0.24	(0.07)	-0.01
Short-term debt/reserves (j)	-0.00	(0.03)	-0.00
Any crisis (j)	-0.03	(0.1)	0.02
Past IMF loan (j)	-0.00	(0.1)	0.00
IMF liquidity (i)	3.82	(1.36)	0.04
IMF quota review (i)	1.29	(2.17)	0.01
Bilateral loans degree (j)	0.62	(0.04)	-0.02
Paris degree (j)	1.19	(0.1)	0.01
London degree (j)	2.26	(0.14)	-0.00
Paris Club equation			
Reciprocity	0.00	(NA)	3.31
Distance (i,j)	0.43	(0.15)	0.01
Preference dissimilarity (i,j)	-0.29	(0.08)	-0.01
GDP per cap (i)	4.98	(409.5)	-0.01
GDP growth (i)	-0.09	(34.41)	-0.02
GDP per cap (j)	-0.24	(0.02)	-0.01
Current account/GDP (j)	0.01	(0)	-0.01
External debt/GNI (j)	0.25	(0.06)	-0.01
Short-term debt/reserves (j)	-0.01	(0.03)	-0.02
Any crisis (j)	-0.03	(0.09)	0.02
Govt debt [exposure] (j)	-0.03	(0.01)	0.03
Bilateral loans degree (j)	0.63	(0.03)	-0.01
IMF degree (j)	0.53	(0.04)	0.00
London degree (j)	2.18	(0.1)	0.00
London Club equation			
Reciprocity	0.00	(NA)	3.08
GDP per cap (j)	-0.21	(0.02)	0.01
Current account/GDP (j)	0.01	(0)	0.00
External debt/GNI (j)	0.17	(0.05)	0.00
Short-term debt/reserves (j)	-0.02	(0.02)	-0.00
Any crisis (j)	-0.09	(0.07)	0.01
Commercial debt [exposure] (j)	-0.00	(0)	0.01
Bilateral loans degree (j)	0.59	(0.02)	0.00
IMF degree (j)	0.49	(0.02)	0.01
Paris degree (j)	1.05	(0.04)	-0.00

Table S4: Estimates from a stochastic actor-oriented model on four networks, bilateral loans from OECD countries only. Refer to notes in Table S1 for more detail on interpretation.

	Coefficient	Std. error	Conv.
Bailouts equation			
Reciprocity	0.00	(NA)	5.43
Distance (i,j)	-0.03	(0.07)	-0.02
Preference dissimilarity (i,j)	-0.20	(0.08)	0.00
Alliance (i,j)	-0.50	(0.24)	-0.00
Bank exposure (i,j)	-0.04	(0.02)	-0.00
GDP growth (i)	0.24	(0.12)	0.00
GDP per cap (i)	-1.89	(0.78)	0.00
GDP per cap (j)	-0.02	(0.02)	0.00
Current account/GDP (j)	-0.00	(0)	-0.02
External debt/GNI (j)	-0.04	(0.06)	-0.01
Short-term debt/reserves (j)	0.01	(0.02)	0.02
Any crisis (j)	0.01	(0.08)	-0.01
IMF degree (j)	0.48	(0.04)	-0.01
Paris degree (j)	1.05	(0.08)	-0.02
London degree (j)	1.98	(0.11)	0.01
IMF loans equation			
Reciprocity	0.00	(NA)	3.53
Distance (i,j)	0.38	(0.15)	-0.02
Bank exposure (i,j)	0.04	(0.02)	0.01
Preference dissimilarity (i,j)	-0.24	(0.08)	-0.00
GDP per cap (i)	-98.27	(108.47)	0.22
GDP growth (i)	-0.19	(1.17)	-0.03
GDP per cap (j)	-0.23	(0.03)	0.01
Current account/GDP (j)	0.00	(0)	-0.02
External debt/GNI (j)	0.24	(0.07)	-0.00
Short-term debt/reserves (j)	-0.01	(0.03)	0.01
Any crisis (j)	-0.04	(0.1)	-0.02
Past IMF loan (j)	0.01	(0.09)	-0.00
IMF liquidity (i)	3.79	(1.46)	0.01
IMF quota review (i)	1.31	(2.34)	0.01
Bilateral loans degree (j)	0.60	(0.03)	0.00
Paris degree (j)	1.20	(0.1)	-0.02
London degree (j)	2.26	(0.14)	-0.00
Paris Club equation			
Reciprocity	0.00	(NA)	3.40
Distance (i,j)	0.43	(0.15)	-0.04
Preference dissimilarity (i,j)	-0.28	(0.08)	-0.00
GDP per cap (i)	-0.04	(491.77)	-0.02
GDP growth (i)	0.15	(9.03)	0.03
GDP per cap (j)	-0.24	(0.02)	0.02
Current account/GDP (j)	0.00	(0)	-0.02
External debt/GNI (j)	0.25	(0.06)	-0.02
Short-term debt/reserves (j)	-0.01	(0.03)	0.01
Any crisis (j)	-0.03	(0.09)	-0.03
Govt debt [exposure] (j)	-0.03	(0.01)	0.00
Bilateral loans degree (j)	0.61	(0.03)	0.00
IMF degree (j)	0.53	(0.04)	-0.00
London degree (j)	2.20	(0.1)	0.03
London Club equation			
Reciprocity	0.00	(NA)	3.09
GDP per cap (j)	-0.21	(0.02)	-0.00
Current account/GDP (j)	0.01	(0)	0.02
External debt/GNI (j)	0.17	(0.05)	0.01
Short-term debt/reserves (j)	-0.02	(0.02)	0.01
Any crisis (j)	-0.08	(0.06)	-0.01
Commercial debt [exposure] (j)	-0.00	(0)	-0.04
Bilateral loans degree (j)	0.57	(0.02)	0.00
IMF degree (j)	0.50	(0.02)	-0.02
Paris degree (j)	1.06	(0.04)	-0.01

Table S5: Estimates from a stochastic actor-oriented model on four networks, with bank exposure instead of trade exposure. Refer to notes in Table S1 for more detail on interpretation.

	Coefficient	Std. error	Conv.
Bailouts equation			
Reciprocity	0.00	(NA)	5.42
Distance (i,j)	-0.04	(0.069)	-0.01
Preference dissimilarity (i,j)	-0.19	(0.078)	-0.02
Alliance (i,j)	-0.50	(0.233)	0.02
Trade exposure (i,j)	-0.05	(0.023)	-0.02
GDP growth (i)	0.24	(0.119)	0.02
GDP per cap (i)	-1.93	(0.791)	-0.02
GDP per cap (j)	-0.02	(0.019)	0.00
Current account/GDP (j)	-0.00	(0.004)	-0.00
External debt/GNI (j)	-0.02	(0.056)	-0.01
Short-term debt/reserves (j)	-0.00	(0.026)	-0.03
Any crisis (j)	0.00	(0.079)	0.00
Bond debt (j)	0.01	(0.005)	-0.00
IMF degree (j)	0.49	(0.039)	-0.01
Paris degree (j)	1.06	(0.091)	0.00
London degree (j)	2.00	(0.118)	0.02
IMF loans equation			
Reciprocity	0.00	(NA)	3.50
Distance (i,j)	0.37	(0.153)	0.01
Trade exposure (i,j)	0.04	(0.019)	0.00
Preference dissimilarity (i,j)	-0.24	(0.079)	-0.01
GDP per cap (i)	-96.54	(96.121)	0.22
GDP growth (i)	-0.17	(1.064)	-0.04
GDP per cap (j)	-0.23	(0.03)	-0.00
Current account/GDP (j)	0.01	(0.004)	0.01
External debt/GNI (j)	0.25	(0.069)	-0.02
Short-term debt/reserves (j)	-0.01	(0.029)	-0.03
Any crisis (j)	-0.04	(0.098)	-0.01
Bond debt (j)	0.01	(0.008)	0.00
Past IMF loan (j)	-0.01	(0.09)	0.01
IMF liquidity (i)	3.79	(1.46)	0.01
IMF quota review (i)	1.30	(2.256)	0.00
Bilateral loans degree (j)	0.60	(0.034)	0.01
Paris degree (j)	1.20	(0.108)	-0.00
London degree (j)	2.27	(0.142)	-0.00
Paris Club equation			
Reciprocity	0.00	(NA)	3.29
Distance (i,j)	0.41	(0.146)	-0.00
Preference dissimilarity (i,j)	-0.28	(0.078)	0.00
GDP per cap (i)	2.18	(488.132)	-0.02
GDP growth (i)	-0.05	(32.836)	-0.01
GDP per cap (j)	-0.23	(0.024)	0.03
Current account/GDP (j)	0.00	(0.004)	0.00
External debt/GNI (j)	0.28	(0.062)	0.00
Short-term debt/reserves (j)	-0.02	(0.027)	-0.00
Any crisis (j)	-0.04	(0.088)	0.02
Govt debt [exposure] (j)	-0.03	(0.008)	-0.00
Bond debt (j)	0.01	(0.007)	0.01
Bilateral loans degree (j)	0.61	(0.029)	0.01
IMF degree (j)	0.54	(0.038)	-0.01
London degree (j)	2.22	(0.1)	-0.01
London Club equation			
Reciprocity	0.00	(NA)	3.04
GDP per cap (j)	-0.21	(0.017)	-0.01
Current account/GDP (j)	0.01	(0.003)	-0.01
External debt/GNI (j)	0.19	(0.048)	-0.01
Short-term debt/reserves (j)	-0.03	(0.02)	-0.00
Any crisis (j)	-0.09	(0.065)	-0.01
Commercial debt [exposure] (j)	-0.00	(0.003)	-0.01
Bond debt (j)	0.01	(0.005)	-0.02
Bilateral loans degree (j)	0.57	(0.019)	-0.01
IMF degree (j)	0.50	(0.023)	0.02
Paris degree (j)	1.07	(0.039)	0.01

Table S6: Estimates from a stochastic actor-oriented model on four networks, controlling for sovereign bond debt in all models. Refer to notes in Table S1 for more detail on interpretation.

	Coefficient	Std. error	Conv.
Bailouts equation			
Network density	-6.19	(0.09)	0.04
Reciprocity	0.00	(NA)	0.95
Distance (i,j)	-0.58	(0.09)	-0.00
Preference similarity (i,j)	0.15	(0.13)	-0.03
Alliance (i,j)	-0.93	(0.39)	0.03
Trade exposure (i,j)	0.11	(0.01)	0.00
GDP growth (i)	0.07	(0.08)	0.01
GDP per cap (i)	1.09	(0.3)	0.01
GDP per cap (j)	-0.40	(0.03)	0.06
Current account/GDP (j)	0.00	(0.01)	-0.02
External debt/GNI (j)	-0.34	(0.06)	-0.04
Short-term debt/reserves (j)	0.07	(0.03)	0.01
Any crisis (j)	0.32	(0.1)	0.06

Table S7: Estimates for the bilateral loans equation from a stochastic actor-oriented model on four networks, excluding cross-network effects. The only network effects that are included are within-network: a coefficient term for network density in each specification. Refer to notes in Table S1 for more detail on interpretation.

Table S8: Logit models with network covariates.

	Dependent variable:			
	Bilateral loan	IMF loan	Paris club	London club
	(1)	(2)	(3)	(4)
Distance (i,j)	-0.303^{***}	-0.048	0.188	
	(0.032)	(0.226)	(0.435)	
Preference dissimilarity (i,j)	0.345^{***}	-1.244^{***}	0.159	
	(0.031)	(0.134)	(0.231)	
Alliance (i,j)	-0.007			
	(0.090)			
Trade exposure (i,j)	0.208^{***}	0.012		
	(0.008)	(0.009)		
Gov debt [exposure] (j)			-0.068	
			(0.091)	
Commercial debt [exposure] (j)				-0.026
				(0.018)
GDP growth (i)	-0.059^{***}	-0.083^{**}	0.053	
	(0.008)	(0.037)	(0.075)	
GDP per cap (i)	0.470^{***}	-1.644	-2.177^{*}	
	(0.044)	(1.050)	(1.299)	
GDP per cap (j)	0.061^{**}	-0.458^{***}	-0.313^{***}	0.340^{**}
	(0.026)	(0.064)	(0.116)	(0.171)
Current account/GDP (j)	-0.023^{***}	0.017^{**}	-0.020	-0.054^{*}
	(0.004)	(0.008)	(0.015)	(0.029)
External debt/exports (j)	0.147^{***}	0.529^{***}	0.754^{***}	0.952^{***}
	(0.040)	(0.104)	(0.178)	(0.281)
Short-term debt/reserves (j)	0.026	-0.074^{*}	0.002	-0.067
	(0.018)	(0.044)	(0.076)	(0.122)
Any crisis (j)	0.350^{***}	0.163	0.280	1.325^{***}
	(0.051)	(0.151)	(0.240)	(0.334)
Past IMF loan (j)		2.271^{***}		
		(0.439)		
IMF liquidity (i)		-0.212^{*}		
		(0.115)		
IMF quota review (i)		0.377^{***}		
		(0.134)		
Constant	-10.338^{***}	19.374^{*}	17.425	-10.136^{***}
	(0.580)	(10.716)	(13.974)	(1.775)
IMF degree (j)	0.259^{***}		2.135^{***}	0.991^{***}
	(0.049)		(0.254)	(0.344)
Bilateral loans degree (j)		0.119^{***}	0.055	0.033
		(0.027)	(0.048)	(0.063)
Paris degree (j)	0.156^{**}	1.983^{***}		0.011
	(0.076)	(0.254)		(0.437)
London degree (j)	0.124	0.873^{**}	0.079	
	(0.118)	(0.368)	(0.441)	
Observations	51,729	1,725	1,725	1,769

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table S9: Logit models without network covariates.

	Dependent variable:			
	Bilateral loan	IMF loan	Paris club	London club
	(1)	(2)	(3)	(4)
Distance (i,j)	-0.299^{***}	-0.263	0.035	
	(0.032)	(0.213)	(0.391)	
Preference dissimilarity (i,j)	0.321^{***}	-1.019^{***}	-0.235	
	(0.031)	(0.121)	(0.203)	
Alliance (i,j)	0.041			
	(0.089)			
Trade exposure (i,j)	0.207^{***}	0.017^{*}		
	(0.008)	(0.009)		
Gov debt [exposure] (j)			0.059	
			(0.076)	
Commercial debt [exposure] (j)				-0.023
				(0.018)
GDP growth (i)	-0.059^{***}	-0.073^{**}	0.040	
	(0.008)	(0.036)	(0.075)	
GDP per cap (i)	0.470^{***}	-2.419^{**}	-3.648^{***}	
	(0.044)	(1.000)	(1.212)	
GDP per cap (j)	0.036	-0.446^{***}	-0.434^{***}	0.318^{*}
	(0.025)	(0.060)	(0.106)	(0.169)
Current account/GDP (j)	-0.024^{***}	0.012	-0.017	-0.057^{**}
	(0.004)	(0.008)	(0.014)	(0.029)
External debt/exports (j)	0.215^{***}	0.614^{***}	0.929^{***}	1.071^{***}
	(0.039)	(0.099)	(0.165)	(0.270)
Short-term debt/reserves (j)	0.022	-0.084^{**}	-0.074	-0.087
	(0.018)	(0.042)	(0.068)	(0.112)
Any crisis (j)	0.384^{***}	0.312^{**}	0.324	1.414^{***}
	(0.050)	(0.142)	(0.227)	(0.325)
Past IMF loan (j)		2.555^{***}		
		(0.436)		
IMF liquidity (i)		-0.183^{*}		
		(0.111)		
IMF quota review (i)		0.264^{**}		
		(0.130)		
Constant	-10.249^{***}	28.568^{***}	34.105^{***}	-9.817^{***}
	(0.580)	(10.193)	(13.015)	(1.761)
Observations	51,729	1,725	1,725	1,769

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table S10: AR(1)-Logit and OLS models without network covariates, AR(1) standard errors clustered by dyad.

	Dependent variable:				
	Bilateral loan (dummy)	IMF loan (dummy)	IMF loan (logged)	Paris club (dummy)	London club (dummy)
	(1)	(2)	(3)	(4)	(5)
Constant	-7.93^{***}	39.74^{**}	27.88^{**}	33.89^{*}	-9.80^{***}
	(1.17)	(13.70)	(9.96)	(13.98)	(1.62)
Distance (i,j)	-0.29^{**}	-0.34	-0.30	0.03	
	(0.10)	(0.42)	(0.21)	(0.40)	
Preference dissimilarity (i,j)	0.28^{***}	-0.83^{***}	-0.97^{***}	-0.23	
	(0.07)	(0.21)	(0.11)	(0.21)	
Alliance (i,j)	0.54				
	(0.30)				
Trade exposure (i,j)	0.05^{***}	0.00	0.02^{*}		
	(0.01)	(0.01)	(0.01)		
Gov debt [exposure] (j)				0.06	
				(0.08)	
Commercial debt [exposure] (j)					-0.02
					(0.02)
GDP growth (i)	0.00	-0.07^{*}	-0.09^{*}	0.04	
	(0.01)	(0.03)	(0.04)	(0.07)	
GDP per cap (i)	0.55^{***}	-3.46^{**}	-2.09^{*}	-3.63^{**}	
	(0.06)	(1.33)	(0.98)	(1.24)	
GDP per cap (j)	0.08	-0.39^{***}	-0.12^{*}	-0.44^{**}	0.32^{*}
	(0.06)	(0.11)	(0.06)	(0.14)	(0.16)
Current account/GDP (j)	-0.01	0.01	-0.01	-0.02	-0.06^{*}
	(0.00)	(0.01)	(0.01)	(0.02)	(0.03)
External debt/exports (j)	-0.03	0.61^{***}	0.41^{***}	0.93^{***}	1.08^{***}
	(0.06)	(0.15)	(0.09)	(0.19)	(0.23)
Short-term debt/reserves (j)	0.02	-0.12	-0.01	-0.07	-0.10
	(0.03)	(0.06)	(0.04)	(0.10)	(0.09)
Any crisis (j)	0.10	0.10	0.56^{***}	0.33	1.38^{***}
	(0.07)	(0.18)	(0.14)	(0.24)	(0.29)
Past IMF loan (j)		2.27^{***}	1.18^{***}		
		(0.59)	(0.22)		
IMF liquidity (i)		-0.12	-0.29^{**}		
		(0.14)	(0.11)		
IMF quota review (i)		0.23^{*}	0.24		
		(0.10)	(0.13)		
Num. obs.	51729	1725	1725	1725	1769
Num. clust.	2920	87		87	88

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

E Creditor Coordination and Free Riding

The empirical results support our argument that creditors pay close attention to the strategies of other creditors when deciding to increase their exposure to a debtor country. Their strategies are highly contingent on each other. The potential for a catastrophic outcome allows creditors to overcome collective action problems by coordinating informally, especially if they are exposed to the debtor country. But even though creditors may agree to participate in the rescue efforts, they do not necessarily agree on how the burden should be distributed and free rider incentives could emerge.

Unfortunately, these free rider issues are difficult to examine empirically due to data constraints. As we show in our qualitative work, much of the coordination happens behind closed doors in high level meetings. Since coordination happens in private, we do not have information about the actors' expectations or the timing of any deals made. This makes it virtually impossible to capture free riding by actors (where we would expect them to hold out on participating in the hope that other actors would contribute sufficient resources to close the financing gap).[29]

It is similarly impossible to derive measures of "fair" burden-sharing especially across different creditor groups since the instruments vary across creditors and are not comparable. As a first attempt to assess burden sharing, we compare debt-restructuring by the Paris Club and the London Club, which is particularly interesting given that the private sector should have stronger incentives to free ride.

Although the concept of fair burden-sharing is illusive, it generally implies that creditors carry a share of the costs of crisis resolution that is equivalent to their exposure to the debtor country. Yet, variations in incentives and cost expectations across creditor groups may affect a differential willingness to take on a larger burden. Most important, while the official sector is concerned about financial insecurity for a number of reasons, private creditors' only objective is to maximize their private returns. Because their main goal is profit, they have fewer incentives to write off their claims than official creditors. In the past, the London Club has largely resisted political pressure and focused on financial fundamentals (Rieffel, 2003, 112). In addition to having fewer benefits from coordination, they also tend to be more likely to get paid back than members of the Paris Club and official bilateral creditors. Official bilateral creditors tend to be junior to private creditors (Schlegl, Trebesch and Wright, 2019), which increases private creditors' incentives to hold out in the hope that official creditors engage more exhaustively. Indeed, in about 25% of cases, the total amount provided by official creditors exceeded the countries' financing needs and thus facilitated the private sector's withdrawal from the country instead of generating an incentive for additional capital inflows (van der Veer and de Jong, 2008).

As a consequence, the private sector has a greater incentive to minimize its burden in financial crisis resolution. This could occur either by holding out until other creditors have implemented support mechanisms, or by providing a smaller share of the overall burden. At the same time, private creditors face much higher obstacles to coordination. Restructuring negotiations for private creditors typically imply finding and dealing with

[29] One alternative strategy would be to assess those incentives in greater detail through a historical case study.

hundreds of syndicated loans worth billions of dollars packaged and distributed to hundreds of banks in various corners of the globe (Rhodes, 2011, 212). Everyone has to be brought on board to minimize holdout problems. Most countries have enormous and widespread global investor bases, and some countries don't even maintain a full or accurate list of their private creditors. It is estimated that between 500 and 1000 banks were exposed to Mexico in 1982. 800 banks were invited to the restructuring meeting; only 115 initially sent representatives (Rhodes, 2011, 84). The difficulties of coordination makes the response of private creditors much slower than the response of official creditors. Challenges mounted with the increasing importance of bond debt. Whereas commercial banks have organized in the London Club, bondholders are even more diverse and unorganized, and therefore difficult to coordinate. The mechanisms of a bond restructuring also differ from those of a bank restructuring. Bond exchanges typically re-profile either the country's entire stock of bonded debt or a significant chunk of it, while it is often possible to reschedule bank claims as they come due.[30]

As a consequence, one might expect that while private creditors participate in the international coordination they largely free ride on the efforts of official creditors who take the largest burden of crisis resolution. The IMF's approach to this has focused on obtaining voluntary private sector involvement through the so-called catalytic approach. The hope is that official intervention will trigger voluntary participation by private creditors. For example, Brazil was able to involve the private sector voluntarily as part of its modified IMF program. When bank exposure is high, the private sector has a greater incentive to coordinate in order to avoid catastrophic outcomes for the banking sector. When voluntary coordination fails, official creditors have pursued more compulsory measures, which involve debt standstills. If creditors indicate that their participation is conditional on private sector involvement, this decision to withhold support can trigger a debtor country to threaten private creditors with debt standstills in order to get them on board (Roubini and Setser, 2004, p165). Over time, the IMF has become more willing to use coercive approaches to private sector involvement, both for commercial banks and bondholders. In 1999, Ukraine was forced by the IMF to involve the private sector to cover its outstanding bond payments in order to avoid having to use IMF resources to reduce the claims of private lenders (Rieffel, 2003, 212). In Ecuador, the IMF even signaled its intend by lending into arrears after Ecuador had missed a payment on its discount Brady bonds (Rieffel, 2003, 213).[31]

The Paris Club has been particularly concerned about distributional conflict since it is junior for repayments compared to private creditors and official multilateral creditors.

[30]Other differences are overstated: bond exchanges can be used to push out maturities, just as bank loans coming due can be rescheduled to provide a country with breathing space. Indeed, depending on the maturity profile of its bonded debt, the debtor even may have more time to take preemptive action with bonds, typically long-term instruments, than with bank loans (Roubini and Setser, 2004, 162). Many countries have been able to restructure bonds, and the Paris Club has included bondholders in its requests for burden sharing. The Cologne Communique clearly indicated that claims of bondholders should not be viewed as senior to to claims of banks, which made the official sector much more willing to force Ecuador to seek a restructuring of its bonded debt. Overall, international sovereign bonds have been restructured in a number of cases.

[31]Since 1996, the increasing willingness of the IMF to lend into arrears was seen as a hardening of the G-7 position on burden sharing with private creditors, including banks and bondholders.

The Paris Club's "comparability of treatment" clause has aimed at addressing distributional concerns. For example, Paris Club support for Ecuador in the 1990s was contingent on London Club support. As another example, the Paris and London Clubs coordinated closely during the financial crisis of Zaire. The Paris Club granted a three-year debt moratorium and rescheduled U.S.$ 1 billion in loans. The one hundred private creditors demanded tougher conditions, including continuing service on outstanding loans. The Paris Club accepted this even though its members did not agree with this approach (Lipson, 1981, 621). The agreement with Pakistan in 1999 even included a new provision that extended the comparability of treatment to three Eurobond issues (Rieffel, 2003, 211). Another strategy of the Paris Club members–who incidentally also have the most votes on the IMF Executive Board–has been to insist that any IMF lending take place only in the context of a general restructuring of all the country's external debt (Roubini and Setser, 2004, 257).

Figure S3 provides illustrative information on the number of restructurings and the number of nominal face value reductions from the 1970s to 2010.[32] Overall, there are more than 600 restructurings in 95 countries. Most are official restructurings through the Paris Club. Compared to its 447 restructurings, the London Club restructured debt in 186 cases (of those, 18 are sovereign bond restructurings). The first view indicates that official creditors have taken on the greatest share of the burden. But one has to be careful when interpreting these numbers. Not only was there little private lending until the 1980s, but the Paris Club was also reluctant to grant any debt relief in the initial years. This led to deals that did not address deeper solvency problems, which increased the likelihood of serial rescheduling.

Another way to assess burden sharing could be by focusing in on the share of deals in which debt relief was granted. Figure S3 illustrates that of the restructurings that happen, both the London Club and the Paris Club agreed to face value reductions at about the same rate, especially in more recent years. Figure S4 further indicates that the nominal reduction in debt has been relatively comparable over time. Although the annual aggregate numbers hide some of the existing variation, the Paris Club and the London Club have at times both taken on the leadership role with respect to the amount of debt they reduced as a percentage of their overall exposure.

The view that free rider problems do not loom as large as theoretically expected is further supported in the literature on hold outs. The theoretical work on financial crises has longed pointed towards creditor coordination problems as the primary reason for the inefficiencies of the negotiation process (Ghosal and Miller, 2003; Wright, 2005). While the empirical literature on hold-outs is quite limited, the few papers that look at this find that creditor behavior such as hold outs and litigation are not the dominant reason for restructuring delays or lack of coordination. Instead, delays are mainly a consequence of the actions (or lack of action) of the debtors themselves (Trebesch 2008; Ran et al 2011).

The descriptive evidence indicates that private creditors have not completely passed the buck onto official creditors, even though distributional concerns remain. Future research could shed more light on how internal dynamics and exposure can affect the extent

[32] The face value reduction shows the nominal debt reduction only and does not take into account creditor losses due to maturity extensions or changes in interest rates.

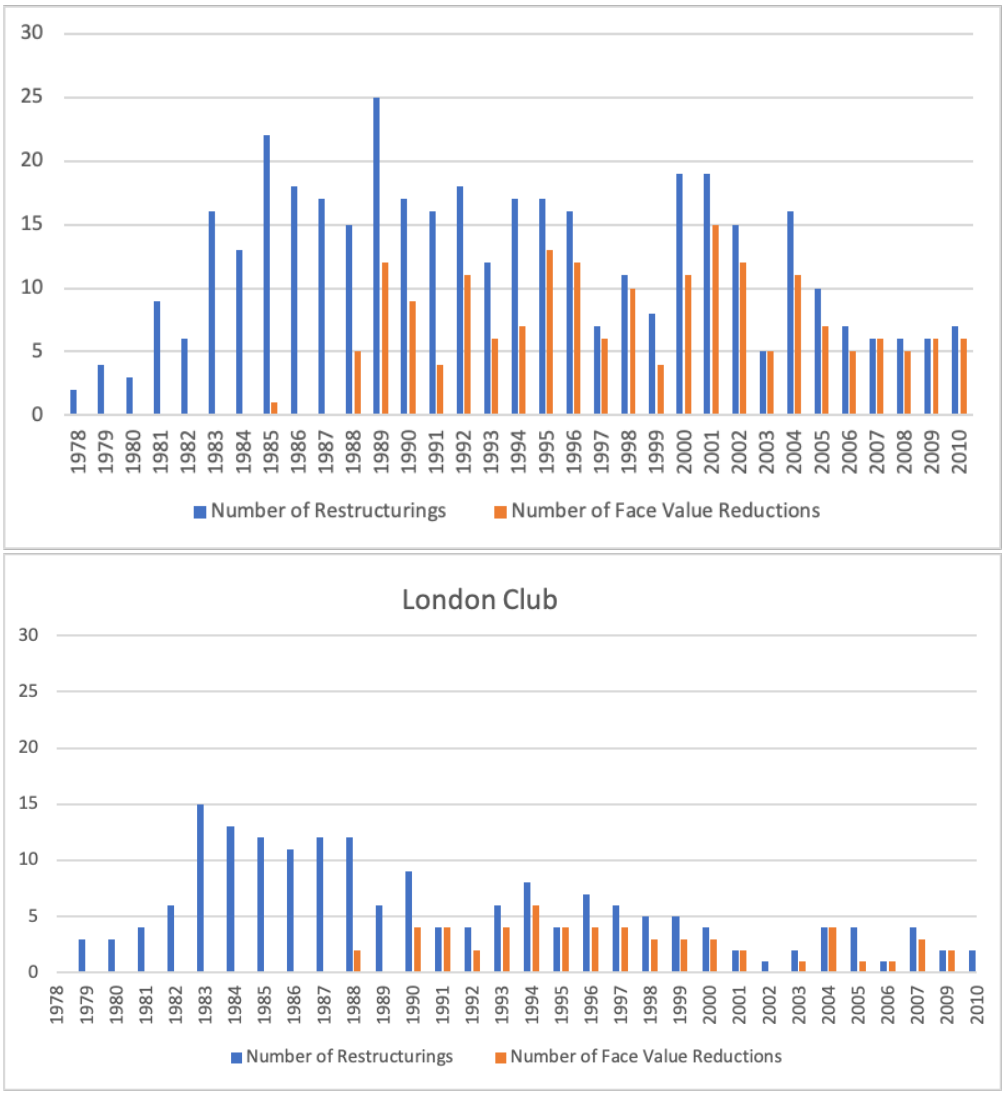

Figure S3: Number of Restructurings and Face Value Reductions in the Paris Club and London Club.

of free-riding in these crisis-resolution efforts by focusing on a comparison across all creditor groups as well as the timing of the decisions.

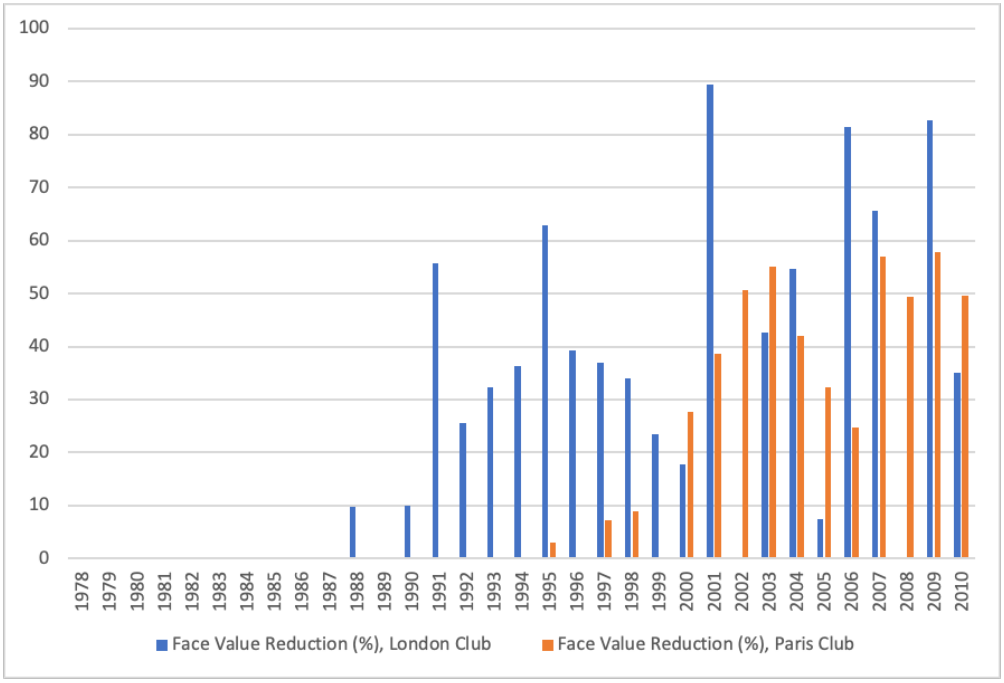

Figure S4: Face Value Reduction (%)