

# Coordinated Financial Rescues\*

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## Abstract

The paper analyzes the politics of coordinated international financial rescues. We argue that the strategies and decisions of official and private creditors to address financial crises in other countries are highly contingent on each other. Other actors' decisions and actions affect the risk calculus of creditors who want to avoid a default of the crisis country by offering loans but also worry that the loans may not be sufficient to prevent the country's default (which would increase their losses). The more other creditors are willing to lend or to forgive, the lower are the perceived risks of lending, which unlocks more financing from other creditors. And even though the IMF is not always the central actor with respect to loan size, its unique ability to impose and monitor policy conditionality provides important signals to other creditor groups. We use a stochastic actor-oriented model to analyze how networks of financial rescue strategies co-evolve over time. Our results reject notions of free riding across creditor groups and support our expectations that increases in financial support in one network are strongly related to support in other networks. They highlight that coordination across creditor groups plays a central role in international financial rescues.

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When the delegates of 44 nations met at Bretton Woods in July of 1944 to set up new rules for the international monetary system post-World War II, the main goal was to help rebuild the shattered postwar economy and to promote international economic cooperation. Proponents of the new institutions felt that global economic and monetary cooperation was necessary to maintain international peace and security.<sup>1</sup> A key element of the system was the International Monetary Fund (IMF), which would have, amongst other things, the responsibility and resources to restore balance to the borrowers' international payments. The prevailing vision was that IMF would lend resources to countries in crisis, enabling them to make payments on at least their short term debt. The resulting financial reprieve would allow the country in crisis to implement necessary macroeconomic reforms in order to restore the confidence of foreign investors.<sup>2</sup> The ability of the IMF to prevent financial crises from happening (or resolving them quickly if they occurred) was considered perhaps the most important strategy for avoiding the economic and political consequences of another Great Depression.

As the volume of financial flows and the number and type of creditors increased in the 1970s, financial crisis resolution became both more complex and too onerous for the IMF to handle alone. In times of financial distress, debtor countries increasingly had to negotiate with multiple creditors from the private sector (i.e., private financial institutions and individual bondholders) and the official sector (i.e., central banks, bilateral lenders and multilateral institutions).<sup>3</sup> The borrowing boom further implied that much more liquidity was needed when things turned bad; the need for liquidity in debtor countries was increasingly in excess of what the IMF could provide. Historically, the IMF has been underfunded and its resources have fallen woefully short of what crisis economies need in order to fully recover.<sup>4</sup> For example, even though the IMF bailout of Mexico in 1995 marked a new record in terms of its size, it fell far short of what was needed to manage the crisis (Boughton, 2016, 402).<sup>5</sup>

As financial crises became more common and more virulent, the IMF increasingly coordinated crisis resolution with other official and private sector creditors. For example, the resolution of the Mexican financial crisis in 1982

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<sup>1</sup>In his opening speech at the Bretton Woods conference, Henry Morgenthau said the "bewilderment and bitterness" resulting from the Great Depression became "the breeders of fascism, and finally, of war."

<sup>2</sup>That is, the IMF assumed a number of lender of last resort functions (Bagehot, 1873). In addition, the IMF loan was supposed to act as an immediate catalyst for other investments by signalling that policy reform would be undertaken (Boughton, 2000, 274). Whether the catalytic approach is effective has been subject to intense academic debate (Bauer, Cruz and Graham, 2012).

<sup>3</sup>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.

<sup>4</sup>There is, of course, also the prevailing debate about whether the IMF *should* provide sufficient liquidity.

<sup>5</sup>We use the terms "crisis loan," "rescue," and "bailout" interchangeably to refer to creditors' financial support to crisis countries. These terms have various positive and negative connotations; we do not want to endorse fully either the positive connotation of the term "rescue" or the negative connotation of the term "bailout."

was a cooperative effort between the IMF, a steering committee of international banks, and other official creditors (Boughton, 2001, 306-16).<sup>6</sup> During the Mexican crisis in 1994/5, the IMF provided a loan in coordination with significant bilateral loans from the United States and Canada as well as multilateral institutions including the World Bank and the Inter-American Development Bank. Similarly, the crisis resolution strategy during the Greek debt crisis beginning in 2010 involved the IMF, the European Union, and a large number of other official and private creditors.

Over time, the IMF has developed from the main (or only) provider of liquidity to an essential manager of coordinated lending and restructuring during international financial crises. Nowadays, almost all international official loans for crisis countries involve significant coordination and cooperation amongst myriad official and private actors (Frankel and Roubini, 2001; Boughton, 2016, 88). Yet, analyses to understand why and how financial rescues occur, and whether they are effective, have focused almost exclusively on individual creditor decisions without taking into account the coordination that occurs between them.<sup>7</sup> Despite the importance of effective coordination for international financial stability we know little about how decision-makers coordinate their strategies and how the decisions of creditors affect each other in the resolutions of financial crises.

In this paper, we develop a theory of international coordination during financial crisis resolution. 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 international financial stability. We argue that decisions both within and across creditor groups are mutually reinforcing. Other actors' decisions and actions affect the risk calculus of creditors who want to avoid a default of the crisis country by offering loans but also worry that the loans may not be sufficient to prevent the country's default (which would increase their losses). The more other creditors are willing to lend or to forgive, the lower are the perceived risks of lending in times of crisis, which unlocks greater financing from other actors. And even though the IMF is not always the central actor with respect to loan size, its unique ability to impose and monitor policy conditionality provides important signals to other creditor groups. The more stringent IMF conditionality, the more willing other creditors are to lend to the debtor state.

To test the empirical implications of our argument, we analyze the extent

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<sup>6</sup>A “Bagehotian” solution did not work in 1982 for Mexico which led the IMF to pursue a strategy of concerted lending. Concerted lending focuses on the involvement of private banks by asking them to “bail-in” crisis countries (usually through a restructuring of outstanding debt, sometimes including a significant reduction in the face-value of the debt). The strategy was inaugurated in November 1982, when Jacques de Larosiere, then Managing Director of the IMF, informed bankers that the IMF would not approve a request by Mexico for a US\$4 billion loan until private banks provided written assurances that they would as a group increase their Mexican exposure by US\$ 5 billion (Cottarelli and Giannini, 2003, 10-11).

<sup>7</sup>The work on private creditors and the IMF by Gould (2003, 2006) is an important exception.

to which financial rescues of different groups of official creditors—especially the IMF, bilateral official donors, and the Paris Club—are coordinated and mutually reinforcing.<sup>8</sup> We move beyond existing work that considers these rescues in isolation to analyze the extent to which the strategies and decisions of these different groups of creditors are mutually dependent. Drawing from recent empirical work on international alliances and defense cooperation networks (Kinne and Bunte, 2018; Warren, 2010, 2016; Kinne, 2013, 2016; Chyzh, 2016), we use a stochastic actor-oriented model (SAOM). This network approach allows us to analyze how 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. We find that rather than free-riding on the efforts of each other, the decisions of bilateral creditors, the IMF, and the Paris Club members are mutually dependent, and reinforcing. Receiving a loan from one creditor group significantly increases the likelihood of receiving loans from other creditors as well. IMF conditionality also serves as important credibility mechanism to reduce the expected risks of financial rescues from other creditor groups.

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,<sup>9</sup> and there is an increasing academic interest in understanding the politics of sovereign debt restructuring, private sector involvement, and official bilateral loans.<sup>10</sup> Our paper builds on these insights but analyzes the coordination between different types of creditors and instruments during financial crisis resolution.<sup>11</sup> The strong findings that coordinated rescues are positively reinforcing are particularly interesting in light of the mixed and conditional evidence for catalytic lending.

The implications 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

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<sup>8</sup>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. Instead of including a fourth network, we consider as a robustness check the impact of private creditors in this coordination effort using the London Club instead of the Paris Club. The results are largely the same as our baseline model (Figures 5 and 6).

<sup>9</sup>See, for example, Thacker (1999); Vreeland (1999, 2007); Stone (2002, 2008, 2011); Dreher (2009); Dreher, Sturm and Vreeland (2009); Copelovitch (2010*a,b*); Caraway, Rickard and Anner (2012); Rickard and Caraway (2014).

<sup>10</sup>See, among others, Gould (2003, 2006); Depetris and Kraay (2007); Dobbie and Song (2015); Reinhart and Trebesch (2016); Schneider and Slantchev (2018); McDowell (2017); Schneider (2019); Schneider and Tobin (2020); Leblang, Schneider and Tobin (2019); Ferry (2019); Vaughn (2019).

<sup>11</sup>Gould (2003, 2006) studies how the increasing reliance of the IMF on private creditors has affected their influence on IMF conditionality. The study provides a very important starting point for our theoretical analysis of the mutual coordination of creditor types.

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, etc.<sup>12</sup> Similarly, 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

The following discussion is primarily intended to provide some basis definitions and to motivate the main assumptions of our theory by substantiating two major claims. First, even though the IMF is a central actor in international financial crisis resolution its resources are not sufficient by themselves to fully address any given financial crisis. Second, the increasing amount of financial flows and the proliferation of creditors has increased demands for coordinated financial rescues.

Throughout history, many countries have experienced financial crises (Reinhart and Rogoff, 2009; Valencia and Laeven, 2012). These crises tend to erupt when the size of capital outflows and debt that countries must service exceed their foreign reserves. Governments attempt to lower this external financing gap through domestic policy adjustments in order to restore the confidence of investors (and avoid further panic), but these adjustments are rarely sufficient to address the problem fully (Frankel and Roubini, 2001).<sup>13</sup> The economic effects are profound. Financial crises lead to collapses in housing and equity prices, significant declines in economic output and employment, and explosions of government debt (Reinhart and Rogoff, 2009, 224).<sup>14</sup> In addition to their effects on domestic markets, the increasing integration of financial markets and economic interdependence fuels crisis contagion, and the effects of these crises on global economic activity are “breathtaking” (Reinhart and Rogoff, 2009, 225).

After the horrors of World War II, the International Monetary Fund (IMF) emerged as a central actor in efforts to increase international financial stability through cooperation. The IMF provides loans to its member countries to restore their balance of payments while at the same time minimizing the risk of moral

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<sup>12</sup>Scholars who focus on official development aid have even started to analyze coordination efforts (Aldasoro, Nunnenkamp and Thiele, 2010; Knack and Rahman, 2007; Steinwand, 2015).

<sup>13</sup>When global or regional financial liquidity is low, governments in crisis are much less capable of issuing debt in primary capital markets because investors pay more attention to political risk (Ballard-Rosa, Mosley and Wellhausen, 2019). This further deepens the influence of financial market considerations on governments’ policy autonomy and makes already bad matters worse (Mosley, 2000).

<sup>14</sup>These crises are also likely to affect sovereign debt markets in the crisis country and the region (Brooks and Kurtz, 2012; Brooks, Cunha and Mosley, 2015).

hazard. It attempts to do so by limiting the size of the loans and by requiring macroeconomic policy adjustments (Vreeland, 2007; Dreher, 2009; Dreher and Walter, 2010). The idea is that the commitment of the IMF would restrain investors long enough for the debtor country to make the necessary adjustments to restore its finances. In addition, participation in an IMF program would serve as a credible signal to investors that policy adjustments are forthcoming, thereby unlocking further investment from other actors (Vreeland, 2003; Jensen, 2004; Bauer, Cruz and Graham, 2012).<sup>15</sup> For the IMF program to be effective, that is, to reassure creditors that all claims will ultimately be met, the liquidity provided must be sufficiently large to cover all of the debtor’s short-term liabilities.<sup>16</sup>

Early on, the IMF was mostly able to achieve these goals, but as financial crises have become more common, its limited funds often mean it cannot function independently.<sup>17</sup> By design, the IMF is ill-equipped to fill the external financing gaps of crisis countries; its financial resources in relation to cross border capital flows have even declined over the last two decades (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). For example, 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; according to expert estimations, Mexico would have needed at least \$50 billion in order to satisfy just the portion of debt that was coming due 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 still not sufficient to address Greece’s financing gap. In both cases, the IMF relied on support from other private and official creditors.

Challenges to the central role of the IMF became particularly potent in the 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 as well as 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,

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<sup>15</sup>The idea of catalytic lending differs from coordinated lending in that it is not explicitly negotiated and coordinated. Catalytic lending assumes that the IMF provides a “seal of approval,” which will automatically lead to more capital inflows (mainly through foreign direct investments).

<sup>16</sup>This idea follows the well-known argument by Bagehot (1873) that emergency liquidity support, to be effective, must in principle be unlimited.

<sup>17</sup>Under the Stand-By Arrangements—the IMF’s workhorse lending instrument—a crisis country can request up to 145% of its quota annually and 435% cumulatively (access may be somewhat higher in exceptional circumstances). A country’s IMF quota is a weighted average of GDP (50%), openness (30%), economic variability (15%), and international reserves (5%). For a recent 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).

1982).<sup>18</sup> Many developing countries started to borrow heavily from private creditors during this period, and commercial banks, faced with declining demands in developed markets, were more than willing to lend. When countries first began to exhibit financial distress in the late 1970s and early 1980s, they turned to the IMF, which was now confronted not only with much higher demands for liquidity but also with a greater number of more diverse types of creditors (some of them with little incentives to bail out the countries in need).

As the IMF's former historian, James Boughton, put it: the "singlest 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. As a consequence, 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."<sup>19</sup>

International financial crisis resolution became coordinated (Gould, 2003, 2006; Boughton, 2016). From that point on, the strategies and terms were and continue to be explicitly negotiated between different actors, including other multilateral organizations (such as the World Bank or the Bank of International Settlements), the private sector, national governments, and groups of official creditors (such as the Paris Club) (Frankel and Roubini, 2001, 88). For example, during the Mexican Peso crisis in 1994/95, international cooperation on a financial rescue package included the IMF (U.S.\$ 18 billion), the U.S. government (U.S.\$ 20 billion), a consortium of Latin American countries (U.S.\$ 1 billion), Canada (U.S.\$ 1 billion), and some private commercial banks (U.S.\$ 3 billion). The multilateral financial package of U.S.\$ 42 billion for Brazil in 1998 included support from the IMF (U.S. \$18 billion), bilateral official creditors (especially from Japan), and multilateral development banks. The second financial rescue package for Greece in 2012 involved actors such as the IMF (€19.8 billion), European countries (€144.7 billion via the EFSF), as well as a large consortium of private commercial banks (which accepted a 50% write-off part of Greece's debt). And the financial package for Ireland in 2010 was

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<sup>18</sup>For a detailed historical overview, see Boughton (2001).

<sup>19</sup>Cited in (Gould, 2006, 6).

cobbled together by the IMF (€23 billion), the European Financial Stability Facility (€23 billion), the National Pension Reserve Fund (€18 billion) and other bilateral creditors such as the United Kingdom, Denmark, and Sweden.<sup>20</sup>

At least since the 1980s, the IMF has coordinated financial crisis resolution with other private and official creditors. The resulting strategies of the different actors are mutually contingent because no actor possesses sufficient liquidity to stem the crisis by itself. Historically, the existence (and success) of creditor coordination has been vital for financial crisis resolution and its effects on the debtor countries and international financial stability. Although we have gained an increasing understanding of individual crisis resolution strategies and actors (see the literature cited above), actors and their strategies are usually analyzed in isolation. In the following, we develop a theoretical argument to understand how these actors affect each other as well as their individual strategies during financial crisis resolution.

## Coordinated Financial Crisis Resolution

We build on historical evidence and existing theories of international lending to develop a theory about the international coordination of financial rescues. Assuming that the IMF relies on coordination with other creditors, we now analyze how the individual actors' decisions affect each other simultaneously during times of crisis. In a nutshell, we argue that other actors' decisions and actions affect the risk calculus of creditors who want to avoid a default of the crisis country by offering loans but also worry that the loans may not be sufficient to prevent the country's default (which would increase their losses). Given these calculations, creditors' decisions both within and across creditor groups should be mutually and positively reinforcing. The more other creditors are willing to lend or to forgive, the greater the likelihood that immediate financing needs are met and a panic might be prevented, which lowers the perceived risks of lending for other actors. If actors are more confident that funding from other sources is forthcoming, they should be more willing to commit their resources as well. In addition to lending and restructuring, the IMF's unique ability to impose and monitor policy conditionality provides important signals to other creditor groups. The more stringent the condition, the more willing other creditor groups are to lend to the debtor state.

Coordination between creditors is informal and varies, but there are some common underlying processes. When debtor countries face financial shortfalls, they usually approach the IMF or a major creditor seeking to reorganize their debt. The aim is to postpone impending repayments and secure new financing. As the IMF negotiates its agreement with the crisis country, private and official creditors conduct their own separate meetings. Using these informal arrangements, they make complete inventories of external debt and gather other

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<sup>20</sup><https://www.theguardian.com/business/ireland-business-blog-with-lisa-ocarroll/2010/nov/28/ireland-bailout-full-government-statement>, last accessed: September 2019.



economic information. Their agreements, which usually presuppose an IMF standby arrangement, aim to provide new financing and reschedule old debt.

The actors that participate in these crisis resolution efforts are diverse, ranging from bilateral and multilateral official creditors to private creditors. Since 1945, the IMF has established itself as the central actor in any coordinated rescue effort. The IMF does not only support debtor states by providing liquidity. The organization also attempts to minimize moral hazard concerns by imposing conditions that the debtor must implement. Similar to the IMF, bilateral and multilateral official creditors (i.e. states, international organizations such as the World Bank) provide loans to debtor states to help close the financing gap. Aside from loans, debt restructuring provides another important tool in addressing financial crises. Debt restructuring can occur either through the Paris Club or the London Club. The Paris Club members are the governments 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.<sup>21</sup>

Creditor coordination during times of financial crisis is often informal, and sometimes implicit. Decision-makers have strategically refrained from developing any rigid rules around the participation and responsibilities of these various actors. The ambiguity serves to reduce expectations of large-scale bailouts for systemically important countries, which could possibly increase incentives for moral hazard.<sup>22</sup> These considerations are driven by the long-standing debate about how to minimize a financial panic (usually by providing at least enough liquidity to allow the country in crisis to serve the debt which is maturing in the near term) without increasing moral hazard on the side of the debtor country and other financial market participants (usually by minimizing financial support or by conditioning it on macroeconomic reforms that ensure fiscal consolidation in the medium term).

When considering to offer loans (or negotiate haircuts or other measures to grant the debtor states financial reprieve), creditors face a dilemma. On one hand, they have incentives to offer liquidity to help the crisis state serve its short-term debt because they are exposed to the country and fear the potential negative externalities in the case of default. On the other hand, they do not want to offer additional liquidity if they expect that this influx of resource would have no calming effect on financial markets. If they were to provide loans, or offer significant haircuts, but the country in crisis were to default anyway, their losses would loom even larger. Unless massive liquidity is committed, there is a great deal of uncertainty around the effectiveness of crisis resolution. Further,

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<sup>21</sup>These *ad hoc* clubs have proven remarkably effective, at least as far as creditors are concerned. Club arrangements isolate debtors while facilitating collective action by creditors. They have resisted efforts to change their procedures, including the Group of 77's proposal at UNCTAD V to establish a permanent International Debt Commission.

<sup>22</sup>For example, Lipson (1981, 608) discusses reciprocal signals between private lenders and the IMF, thereby leading to a "development of a coherent and distinctive regime for Third World debt."

at least since the 1980s, none of the creditors has been able to provide the necessary liquidity alone. To make crisis lending successful, creditors need to rely on other creditors to participate in the crisis resolution efforts. They need to coordinate to provide enough liquidity to make the rescue effort worth it. If they do not expect enough liquidity to be forthcoming, they would rather not commit any money in the first place.

Coordination is the key to reducing risks because it allows individual creditors to gather information about the likelihood that other funds are forthcoming. It also allows them to protect themselves against losses by conditioning their own funds on other creditors' commitments to provide loans.<sup>23</sup> As a consequence, the strategies and decisions of different actors should be mutually contingent on each other. In fact, many official and private creditors and creditor groups, such as the Paris Club, condition their support on the existence of an IMF program. The London Club, composed of the largest commercial bank creditors, often refuses to even meet unless the crisis state has reached or made significant progress toward an agreement with the IMF. For example, 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 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).

Though clearly central in these coordination efforts, the IMF also observes other creditors' efforts when making lending decisions. Similar to private and official creditors relying on IMF loans as an anchor, the IMF 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). In 1999, it 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 (Boughton, 2012, 612). 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 very nicely:

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.”

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<sup>23</sup>Coordination must remain informal to stem the potential for riskier behavior on the part of debtor countries.

Creditors rely on each other to minimize the risks of crisis lending. Importantly, 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 one-directional but works in all directions.

Creditor coordination efforts during the Mexico crisis in the 1990s illustrate this very well. Mexican officials initially 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).<sup>24</sup> 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 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).<sup>25</sup> For Indonesia, the “first line of defense” included commitments from the IMF, the World Bank and the Asian Development Bank.<sup>26</sup>

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<sup>24</sup>In fact, even U.S. officials initially thought a bilateral bailout without IMF participation would be sufficient (Boughton, 2012, 467).

<sup>25</sup>The U.S. government was unable to help in this case because U.S. Congress had imposed restrictions on the use of the Treasury’s own funds after the Mexico episode.

<sup>26</sup>Several countries (including Australia, China, Hongkon, Japan, Malaysia, Singapore, and the United States) agreed to serve as potential “second line of defense.” (Boughton, 2012,

What the IMF lacks in liquidity it makes up by 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 credibility in imposing, monitoring, and enforcing austerity and other policy reforms. 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, the decisions of the Paris Club members on the level of debt relief granted in Paris Club restructuring agreements is often based on the financing gap identified in the related IMF program. At the same time, the Paris Club requires the debtor state to accept IMF conditionality as a precondition to any deal. 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, the Paris Club members (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).

Whereas the IMF has taken a key role in coordinating financial rescues, much also depends on the coordination across other creditor groups. For example, the Paris Club incorporates the “comparability of treatment” clause into all of its agreements. The clause assumes equal burden sharing across all creditor groups, which implies that the scope of debt relief granted by the Paris Club creditors will determine the scope of debt relief by other creditors as well. Oftentimes, the rescheduling of official debt is made contingent on the rescheduling of private debt, and vice versa. This explains why Paris Club support for Ecuador in the 1990s was contingent on London Club support. For 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).

In short: the IMF depends on supplementary financiers to help ensure the success of its loan programs and its future bargaining leverage with borrowers. In turn, supplementary financiers depend on the IMF to help facilitate their financing transactions and make borrowers’ commitments more credible.

That is, instead of free-riding on the efforts of other creditors, creditors’ lending strategies supplements each other. Rather than a scenario where creditors hope that others will provide the public good (the loan), and minimize their efforts when others cooperate, our argument stipulates that coordination arises because public good provision would fail in the absence of coordination and cooperation (with serious economic repercussions for all creditors). The IMF has to rely on the cooperation of other lenders and creditors for its loan programs to be effective, while other official and private creditors rely on the

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IMF conditionality to minimize their risks of lending and restructuring. This interdependence across creditors does not only owe to the generally accepted norm of burden-sharing. The more other creditors are willing to lend or restructure, the lower the perceived risk of other creditors, which increases their own willingness to lend and restructure. Observing agreements with other creditor and creditor groups can therefore serve as a catalyst for more funding from other actors as well.

**Hypothesis 1** *Financial rescues are positively reinforcing across creditor groups. If one group of creditors increases its financial support for a debtor state then this increases the likelihood that other creditor groups also unlock more support.*<sup>27</sup>

The success of coordinated financial rescues depends on all creditor groups, but as already noted the IMF has a central role because its willingness to lend can decrease expected risks of debtor default and moral hazard, allowing other actors to unlock their financing. The conditions imposed by the IMF, and the expectations about the ability of the IMF to monitor and enforce those conditions, provide crucial information to other actors about the risks of lending in any given situation.

The importance of IMF conditionality may be 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).

Thus, although the IMF has been criticized for the terms of its conditionality, and despite the political and strategic nature of some of its decisions, it is in a more credible position—as compared to bilateral private and official creditors—to impose and enforce policy reforms that minimize moral hazard within debtor countries. The stringency of the conditionality can serve as an important signal to other creditor groups that their investments are safe in the medium run

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<sup>27</sup>Schneider and Tobin (2020) demonstrate a similar dynamic within the group of bilateral official creditors where individual creditors are more likely to bail out a crisis country if other creditor countries are willing to offer bailouts themselves.

because it forces the debtor country to make the necessary adjustments to minimize the likelihood of future crises. During the Asian financial crisis in 1997, for example, the Korean government (unsuccessfully) sought bilateral bailouts from the United States and Japan before accepting an IMF loan (Boughton, 2012, 546). However, official creditors also refused to act as a first or even second line of defense or include the private sector until after an IMF loan had been agreed upon.

**Hypothesis 2** *The stricter IMF conditionality, the more willing are other creditor groups to lend to the debtor state.*

## Research Design

We seek to understand how lending decisions during financial crises are dependently determined across and within multiple groups of creditors. To test our argument, we analyze the three most prominent official creditor groups and their lending strategies over the post-Cold-War period 1991–2010: IMF loans, official bilateral bailouts,<sup>28</sup> and sovereign debt relief from the Paris Club.<sup>29</sup>

The decisions within each of these creditor groups depend on a set of specific considerations within this group of creditors. In the case of bilateral bailouts, for example, a creditor country’s decision whether or not to bail out a country in crisis depends on features such as the creditor’s financial exposure to the debtor country, economic factors in the debtor country, and whether the debtor country is receiving bailouts from other creditors, among others. Our argument suggests that this decision also depends on decisions made by other creditor groups, notably whether the IMF also offers a loan to this debtor, or whether the debtor is receiving sovereign debt relief. 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) developed by Van De Bunt, Van Duijn and Snijders (1999), and later refined by Snijders (2001, 2005) and Snijders, Lomi and Torló (2013). The SAOM has been applied in several international relations studies to model systems with multiple networks (Kinne and Bunte, 2018; Warren, 2010, 2016; Kinne, 2013, 2016; Chyzh, 2016).

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<sup>28</sup>Data from Schneider and Tobin (2020).

<sup>29</sup>Data from Das, Papaioannou and Trebesch (2012).

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 bailout network, the IMF loan network, and the network of sovereign debt relief through the Paris Club.<sup>30</sup> The actors are either creditors—such as a bailout-extending country, the IMF, sovereign debt holders represented by the Paris Club—or debtors who receive financial support. A tie exists if financial support is extended between two actors.<sup>31</sup>

To test our two hypotheses, we assess two sets of three-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

$$\begin{aligned} f_i^Y(w, x, y) &= \sum_k \beta_k^Y s_{ki}^Y(w, x, y) \\ f_i^X(w, x, y) &= \sum_k \beta_k^X s_{ki}^X(w, x, y) \\ f_i^W(w, x, y) &= \sum_k \beta_k^W s_{ki}^W(w, x, y) \end{aligned}$$

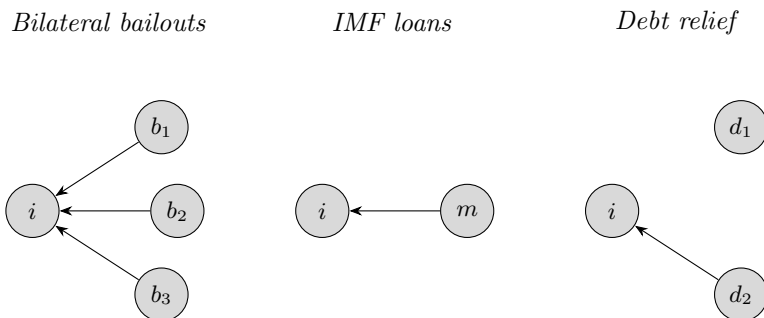
where each utility function corresponds to one of the three layers in the network:  $f_i^Y(w, x, y)$  is a utility function for actors  $i$  in the bailouts ( $Y$ ) network,  $f_i^X(w, x, y)$  is the utility function for actors  $i$  in the IMF loans or conditional loans ( $X$ ) network, and  $f_i^W(w, x, y)$  is the utility function for actors  $i$  in the sovereign debt relief ( $W$ ) network. The right-hand side variables are captured by  $s_{ki}^Y(x, y)$ ,  $s_{ki}^X(x, y)$ , and  $s_{ki}^W(x, y)$ , which describe the personal network of each actor  $i$  for each layer of the network  $Y$ ,  $X$ , and  $W$ , respectively. These variables are one of three types: (1) node-level or dyad-level covariates, such as debtor financial crisis, creditor economic development, or trade 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  $\beta$  vectors are the parameters that indicate how strongly each component affects the evolution of each layer in the multiplex network.

Our network structure noticeably differs from prior uses of the SAOM framework in international relations in one important aspect. Creditors can only form

<sup>30</sup>We currently consider the private debt restructuring through the London Club separately, as both networks effectively measure the same concept. Results in Appendix Figures 5 and 6 show no substantive difference using either the Paris Club or London Club indicators as measures of receiving debt relief. Future iterations of the paper will incorporate both networks together.

<sup>31</sup>At the moment, we are using binary ties to signify whether or not financial support exists; in later versions, we aim to use a continuous measure of ties to capture the nominal value of support. For example, in the IMF loans network, a tie would reflect the value of the loan extended rather than whether the loan was offered.

**Figure 1**



ties with debtors in one of the three networks: for example, the IMF can only form a tie in the IMF loan network, since it cannot extend a bilateral bailout nor can it offer sovereign debt relief through the London or Paris Club deliberations. Likewise, a country offering a bailout cannot extend an IMF loan or individually offer sovereign debt relief. 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 three networks (Ripley et al., 2019).

Figure 1 provides an illustration of this structure for a hypothetical debtor country across all three networks. In the left panel, country  $i$  is the recipient of bilateral bailouts 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 sovereign debt relief from the Paris Club ( $d_2$ ) but not the London Club ( $d_1$ ). Of note is that the IMF ( $m$ ) cannot extend a bailout in the bilateral bailout network, nor can a single creditor country offer a loan in the IMF loans network. Likewise, neither actor can offer haircuts in the debt relief network, nor can the London and Paris Clubs offer bilateral bailouts or IMF loans.

With this in mind, we test Hypothesis 1 with the cross-network effect *in-degree popularity* $_i$ , which captures states’ overall financial support activity in another network.<sup>32</sup> With three layers in our multiplex network, we have six different *in-degree popularity* $_i$  cross-network effects:

- *Bailout: IMF in-degree popularity* $_i$ . Tendency for countries receiving an IMF loan to receive a bailout.
- *Bailout: debt-relief in-degree popularity* $_i$ . Tendency for countries receiving debt relief to receive a bailout.
- *IMF: bailout in-degree popularity* $_i$ . Tendency for countries receiving a bailout to receive an IMF loan.

<sup>32</sup>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.



- *IMF: debt-relief in-degree popularity<sub>i</sub>*. Tendency for countries receiving debt relief to receive an IMF loan.
- *Debt-relief: bailout in-degree popularity<sub>i</sub>*. Tendency for countries receiving a bailout to receive debt relief.
- *Debt-relief: IMF in-degree popularity<sub>i</sub>*. Tendency for countries receiving an IMF loan to receive debt relief.

As ties cannot exist within debtor countries or within creditor countries—there are no bilateral loans between crisis countries, nor are there instances of debt relief or IMF loans between countries—we do not include any typical endogenous network terms such as transitivity or similar cross-network terms such as tie closure that are common in other multiplex network studies.

To account for non-network influences on receiving financial support, we include monad- and dyad-level covariates. In the bailout equation, we follow the literature on bilateral bailouts<sup>33</sup> and include the following covariates:

*Bank Exposure (i,j)*: Logged amount of crisis country debt held by creditor country banks in millions of constant US dollars. Data are from the BIS.

*Preference Similarity (i,j)*: Difference in UN General Assembly ideal points from Strezhnev and Voeten (2012). We use the negative absolute difference in the ideal points of both sides of each dyad where lower values indicate greater preference similarity.

*Alliance (i,j)*: Dummy variable equal to one if the dyad has a defense pact. Data are from the Correlates of War Alliances data set.

*Distance (i,j)*: Logged distance (in miles) between the creditor and crisis country (Distance). Data are from Gleditsch and Ward (2001).

*Election Timing (i)*: Dummy variable equal to 1 if a legislative election was held in the creditor country in the same year as the financial crisis. Data are from the Database of Political Institutions.

*Unemployment (i)*: Unemployment rate of the creditor country. Data from the World Bank.

*GDP Growth (i)*: Economic growth rate of the creditor country. Data from the World Bank.

*GDP per capita (i)*: Income per capita of the creditor country. Data from the World Bank.

*Current Account (j)*: Crisis country's current account as percentage of GDP. Data are from the World Bank.

*GDP (j)*: GDP of the crisis country. Data from the World Bank.

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<sup>33</sup>Schneider and Tobin (2020)

*GDP per capita (j)*: Income per capita of the crisis country. Data from the World Bank.

*Democratic Dyad*: Dummy variable equal to one if both countries are democracies. Data are from Boix Miller, and Rosato.

*Short-term Debt/Reserves (j)*: The ratio of short-term debt to reserves. Data are from the World Bank.

*External Debt/Exports (j)*: The external debt to GDP ratio. Data are from the World Bank.

*Currency Crises*: A dummy variable equal to one if the crisis country is experiencing a currency crisis.

*Currency Crises (sum)*: A count of the number of currency crises occurring in the same year. Data are from Reinhart and Rogoff 2009.

In the IMF equation, we include the following covariates based on the standard IMF literature <sup>34</sup>:

*Bank Exposure (i,j)*: Logged amount of crisis country debt held by banks in the G5, in millions of constant US dollars. Data are from the BIS.

*Preference Similarity (i,j)*: Average difference in UN General Assembly ideal points between crisis country and G5, from Strezhnev and Voeten (2012).

*IMF Quota Review (i)*: A dummy variable equal to 1 in any year that an IMF quota review took place. Data from the IMF.

*IMF Liquidity (i)*: The natural logarithm of the IMF's liquidity ratio (the amount of liquid resources divided by its liabilities). Data from the IMF.

*Past IMF Loan (j)*: A dummy variable equal to 1 if the crisis country had ever received a past IMF loan. Data from the IMF.

*Years since last Loan (j)*: A count of the number of years since the crisis country had received a prior IMF loan.

*GDP Growth (j)*: Economic growth rate of the crisis country.

*GDP (j)*: GDP of the crisis country. Data from the World Bank.

*GDP per capita (j)*: Income per capita of the crisis country. Data from the World Bank.

*Current Account (j)*: Crisis country's current account as percentage of GDP. Data are from the World Bank.

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<sup>34</sup>See, for example, Vreeland (1999); Stone (2008, 2011); Dreher, Sturm and Vreeland (2009); Copelovitch (2010a,b)

*Short-term Debt/Reserves (j)*: The ratio of short-term debt to reserves. Data are from the World Bank.

*External Debt/Exports (j)*: The external debt to GDP ratio. Data are from the World Bank.

*Currency Crises*: A dummy variable equal to one if the crisis country is experiencing a currency crisis.

*Currency Crises (sum)*: A count of the number of currency crises occurring in the same year. Data are from Reinhart and Rogoff 2009.

As there is no standard literature on Paris Club loan restructuring, we mirror the IMF covariates as closely as possible:

*Bank Exposure (i,j)*: Logged amount of crisis country debt held by banks in the G5, in millions of constant US dollars. Data are from the BIS.

*Preference Similarity (i,j)*: Average difference in UN General Assembly ideal points between crisis country and G5, from Strezhnev and Voeten (2012).

*GDP Growth (j)*: Economic growth rate of the crisis country.

*GDP (j)*: GDP of the crisis country. Data from the World Bank.

*GDP per capita (j)*: Income per capita of the crisis country. Data from the World Bank.

*Current Account (j)*: Crisis country's current account as percentage of GDP. Data are from the World Bank.

*Short-term Debt/Reserves (j)*: The ratio of short-term debt to reserves. Data are from the World Bank.

*External Debt/Exports (j)*: The external debt to GDP ratio. Data are from the World Bank.

*Currency Crises*: A dummy variable equal to one if the crisis country is experiencing a currency crisis.

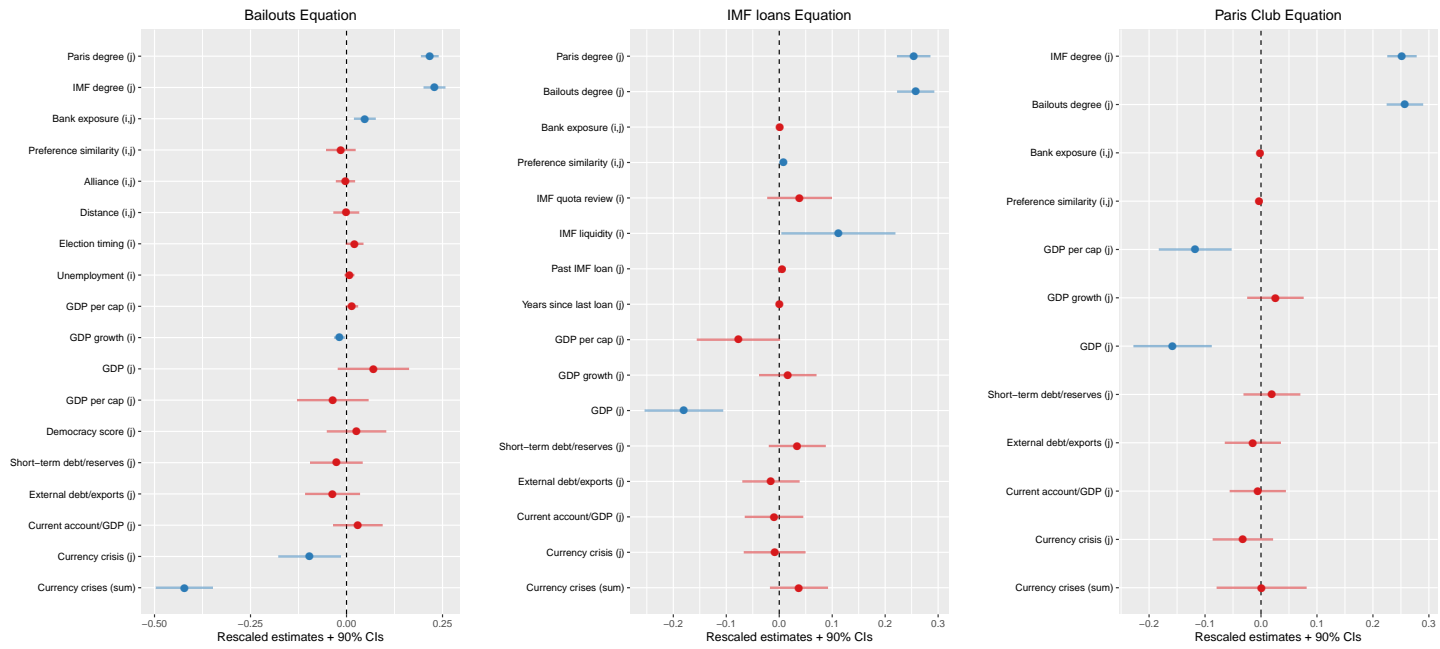
*Currency Crises (sum)*: A count of the number of currency crises occurring in the same year. Data are from Reinhart and Rogoff 2009.

## Empirical Results

Across all three 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. We begin by describing the results for

cross-network effects across two sets of networks corresponding to our two hypotheses regarding IMF loans and conditionality, respectively. We then discuss the coefficient estimates for the control variables in each set of models, which differ noticeably from estimates in prior studies of financial rescues.

Figure 2 presents our estimates for network influence effects for the three networks in the model in which IMF loans are measured broadly as any loan received from the IMF, with or without conditions. These estimates are best interpreted using the log-odds framework. Beginning with the bailout network, we find that receiving an IMF loan increases the probability of receiving a bailout by 49 per cent ( $\exp 0.400 = 1.492$ ). A creditor country would be 49 per cent more likely to extend a bilateral bailout 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 half the size of the sovereign debt relief cross-network effect, where we find that receiving sovereign debt relief increases the probability of receiving a bilateral bailout by 118 per cent, a roughly two-fold increase. Overall, these findings strongly suggest that bilateral bailout decisions are highly contingent on the lending decisions of other creditor groups.



**Figure 2:** Coefficient plot for stochastic actor-oriented model for multiplex network of bilateral bailouts, IMF loans (*under IMF program = 1, 0 otherwise*), and Paris Club haircuts.

Turning to the IMF loans network, we find that receiving a bilateral bailout increases the probability of receiving an IMF loan 21-fold. The extremely large magnitude of this cross-network effect is likely due to the high overlap in the two networks: of the 69 bilateral bailouts in our sample, 35 (or, 51 per cent) of the debtor countries were also recipients of an IMF loan in that same year.<sup>35</sup> The cross-network effects for IMF loans of sovereign debt relief are similar to the bailout network: recipients of debt relief correspond to a 149 per cent increase in the probability of getting an IMF loan. That is, the likelihood that the IMF is willing to lend to crisis 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 1.5 times more likely to receive an IMF loan than country  $j$ . With a baseline of 940 loans out of 2,774 IMF–crisis-country dyads in our data, this is quite a large effect—enough to shift the average country from not likely ( $\approx 34\%$ ) to receive a loan to being more likely than not ( $\approx 51\%$ ) to receive an IMF loan.

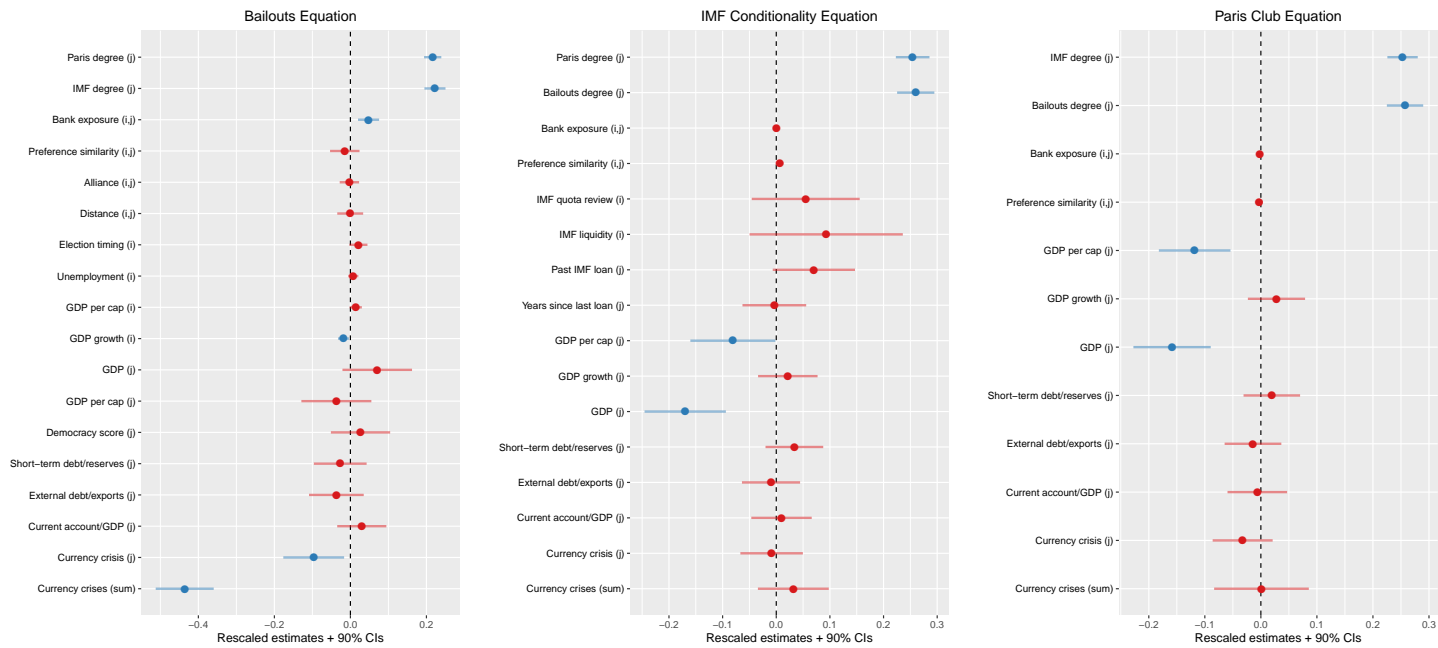
The cross-network effects in the sovereign debt relief network largely track those of the bailout and IMF loans networks. The more bailouts a debtor country receives, the greater its probability of also receiving a haircut through the Paris Club: debtors receiving bailouts are 21 times more likely to receive debt relief when compared to debtors not bailed out by bilateral creditors. At the same time, recipients of IMF loans are 55 per cent more likely to receive a haircut compared to non-IMF-loan recipients.

In sum, the results in Figure 2 are highly suggestive of the coordination between creditor groups during financial crisis, with mutually reinforcing lending strategies that suggest that creditors want to offer liquidity but aim to minimize risk, rather than free-riding incentives.

So far, we have focused on the IMF’s role of providing liquidity in times of crisis. As argued above, however, the IMF might play a larger role in reducing perceived risk through its enforcement of conditionality (Hypothesis 2). Rather than analyzing whether a debtor country received an IMF loan, we now turn to understanding the role of IMF conditionality in the financial rescue network. Figure 3 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. We also analyzed the influence of hard versus soft conditions, but found no substantial difference in results.

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<sup>35</sup>The number increases to 64 per cent if we include countries who received an IMF loan in the year prior to a bailout. Note that the large coefficient magnitude is not symmetric for the bailout network, given the high number of countries receiving IMF loans (96 per cent,  $n = 905$ ) that did not receive bailouts.



**Figure 3:** Coefficient plot for stochastic actor-oriented model for multiplex network of bilateral bailouts, IMF conditionality (*under IMF program with conditions = 1, 0 otherwise*), and Paris Club haircuts.

The results for the cross-network effects are similar in magnitude and direction. Most importantly, we find that IMF conditionality has a positive and significant impact of lending decisions in other networks. We find that receiving IMF conditionality or debt relief increases the probability of receiving a bilateral bailout by 43 per cent and 118 per cent, respectively. For the debt relief network, we find that receiving a bailout or IMF conditionality increases the probability of sovereign debt relief by 20-fold and 50 percent, respectively. At the same time, IMF conditionality is influenced by the other creditors' decisions. For the IMF conditionality network, we find that receiving a bailout or debt relief increases the probability of an IMF loan with conditions by 21-fold and 149 percent, respectively. Lastly,

The differences across the two sets of multiplex networks arise in our estimates for the control variables. In the set of networks with IMF loans (with or without conditions) as an outcome variable, we find that preference similarity and IMF liquidity are positively correlated with receiving an IMF loan, while the GDP of the crisis country is negatively correlated with receiving a loan. In substantive terms, a one-unit increase in preference similarity between the IMF and a crisis country corresponds to a 59 percent increase in the odds of receiving a loan, while every percentage point increase in IMF liquidity corresponds to a roughly 6-fold increase (587%) in the probability of receiving an IMF loan. In terms of economic exposure to a country in crisis, every logged unit decrease in a crisis country's GDP levels corresponds to a roughly 7 percent increase in the odds of receiving a loan. By contrast, in the set of networks with IMF conditionality as an outcome variable, only the economic exposure controls of GDP per capita and GDP levels remain statistically significant.<sup>36</sup>

## Discussion

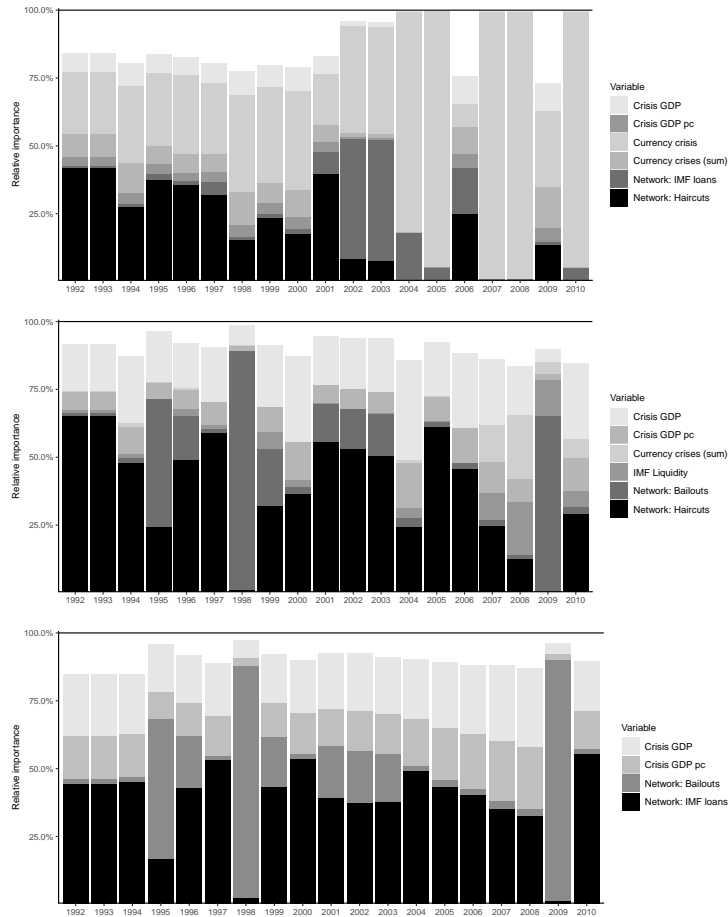
While still preliminary, these results support our expectations that financial rescue decisions display strong interdependencies. The provision of financial support in one network unlocks greater support from both other networks. Specifically, debtors receiving rescues in any given network have a significantly increased probability of receiving rescues from other creditor groups.

To scholars of financial rescues, the paucity of statistically significant estimates for the control variables in each model 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 bailout or debt relief, 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. For example, higher levels of

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<sup>36</sup>Note that in the IMF loans equation, GDP per capita of the crisis country is marginally not statistically significant at conventional levels; its coefficient has a  $p$ -value of 0.109.





**Figure 4:** Relative importance of network and non-network variables in predicting financial rescues: bilateral bailouts (*top panel*), IMF loans (*middle panel*), and Paris Club debt relief (*bottom panel*). 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.

debt within the crisis country is almost certainly a determinant of whether or not the country receives any type of financial rescue. But when including the receipt of IMF loans and haircuts alongside debt in the bailouts model, for instance, there is little remaining covariation between debt and the probability of a bilateral bailout.

With this in mind, it is important to state that our findings do *not* suggest that such non-network factors are irrelevant for understanding financial rescues. 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 bailouts, loans, and debt relief. Looking at the middle panel of Figure 4, for instance, we see that bilateral bailouts and Paris Club debt relief together account for 50% RI for most years in the sample; this can be interpreted as a roughly 50% expected impact on predicted loans, with the remaining 50% coming from non-network covariates. Debtor country conditions such as total GDP and GDP per capita levels still play an important role in predicting loans: in 2000, for example, these two covariates account have a 45% RI. Creditor conditions such as IMF liquidity similarly plays a non-trivial role in predicting loans, especially during the global financial crisis years of 2008 and 2009.

We see the same pattern if we run conventional models that include pseudo-network covariates. Table 1 in the Appendix shows the results from a logit model with all of our non-network covariates plus the count of the number of bailouts, loans, or debt relief in each year.<sup>37</sup> 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. In the bailout network, for example, we estimate that the likelihood of bailouts increases with increased economic exposure (namely, dyadic financial exposure and crisis-country short-term debt levels) and decreases with creditor unemployment (Schneider and Tobin, 2020). Similarly, in the IMF loan model, we see that the loan likelihood increases with preference similarity (note that we use the negative absolute value here; lower values correspond to greater similarity), crisis-country external debt, years since last IMF loan, and years in which an IMF quota review took place.

## 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. In fact, the more one creditor is willing to lend or forgive, the greater the probability that other lenders will follow suit. In a world where coordination over global public goods often fails, the informal coordination evident during global financial crises may

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<sup>37</sup>Table 2 shows the results of these models without network covariates; note that here we also present a model with a continuous dependent variable for IMF loans, which we cannot yet include in our SAOMs specifications given its limitations for non-discrete outcomes (Ripley et al., 2019).

be able to serve as a model of success.

Our findings shed light on a number of important questions about financial crises and the coordinated networks that surround these crises. We show that when the IMF places conditions on countries in crisis, other creditors are more willing to join in the financial crisis resolution. Yet, questions remain about the types of conditions and whether they could have a deleterious effect beyond a given level of stringency.

While we show that the informal coordination amongst creditors leads to greater willingness to lend and forgive, we do not yet understand the implications of this coordination. That is, do they lead countries to recover faster? Do they have any effect on government survival? And perhaps most important, are there moral hazard implications for this coordinated lending?

Finally, networks exist beyond the bilateral, multilateral, sovereign and private creditors that we include here. One might ask how these additional creditors and rescue efforts further interact to determine the fate of countries facing financial crises.

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# Appendix

**Table 1:** Logit models with network covariates.

	<i>Dependent variable:</i>		
	Bilateral bailout dummy	IMF loan dummy	Paris club dummy
	(1)	(2)	(3)
Constant	17.11 (20.92)	-2.19* (0.87)	-3.46*** (0.95)
Bank exposure (i,j)	0.73** (0.28)	0.00 (0.00)	-0.00 (0.00)
Preference similarity (i,j)	0.37 (0.48)	-0.32*** (0.09)	0.13 (0.18)
Alliance (i,j)	1.00 (1.08)		
Distance (i,j)	-0.45 (0.61)		
Election timing (i)	-0.79 (0.77)		
Unemployment (i)	-0.48** (0.16)		
GDP per cap (i)	-2.87 (1.90)		
GDP growth (i)	-0.00 (0.20)		
GDP (j)	1.10* (0.56)	-0.08* (0.04)	-0.09 (0.07)
GDP per cap (j)	-0.65 (0.56)	-0.11 (0.06)	-0.33** (0.10)
Democracy score (j)	0.22 (0.96)		
Short-term debt/reserves (j)	1.79*** (0.50)	-0.02 (0.03)	0.17** (0.06)
External debt/exports (j)	-1.47* (0.62)	0.29*** (0.08)	0.29* (0.13)
Current account/GDP (j)	-0.08 (0.12)	0.00 (0.01)	-0.00 (0.01)
Currency crisis (j)	2.73** (0.95)	-0.05 (0.19)	0.47 (0.32)
Currency crises (sum)	0.02 (0.07)	-0.00 (0.01)	0.00 (0.01)
IMF quota review (i)		0.23* (0.11)	
IMF liquidity (i)		-0.03 (0.08)	
Years since last loan (j)		2.71*** (0.40)	
Past IMF loan (j)		-0.18*** (0.02)	
GDP growth (j)		-0.01 (0.01)	0.00 (0.02)
IMF degree (j)	1.11 (0.72)		2.03*** (0.24)
Paris degree (j)	-16.45 (1648.69)	0.84*** (0.14)	
Bailouts degree (j)		0.78** (0.29)	-13.34 (512.99)
Num. obs.	11741	2970	2970

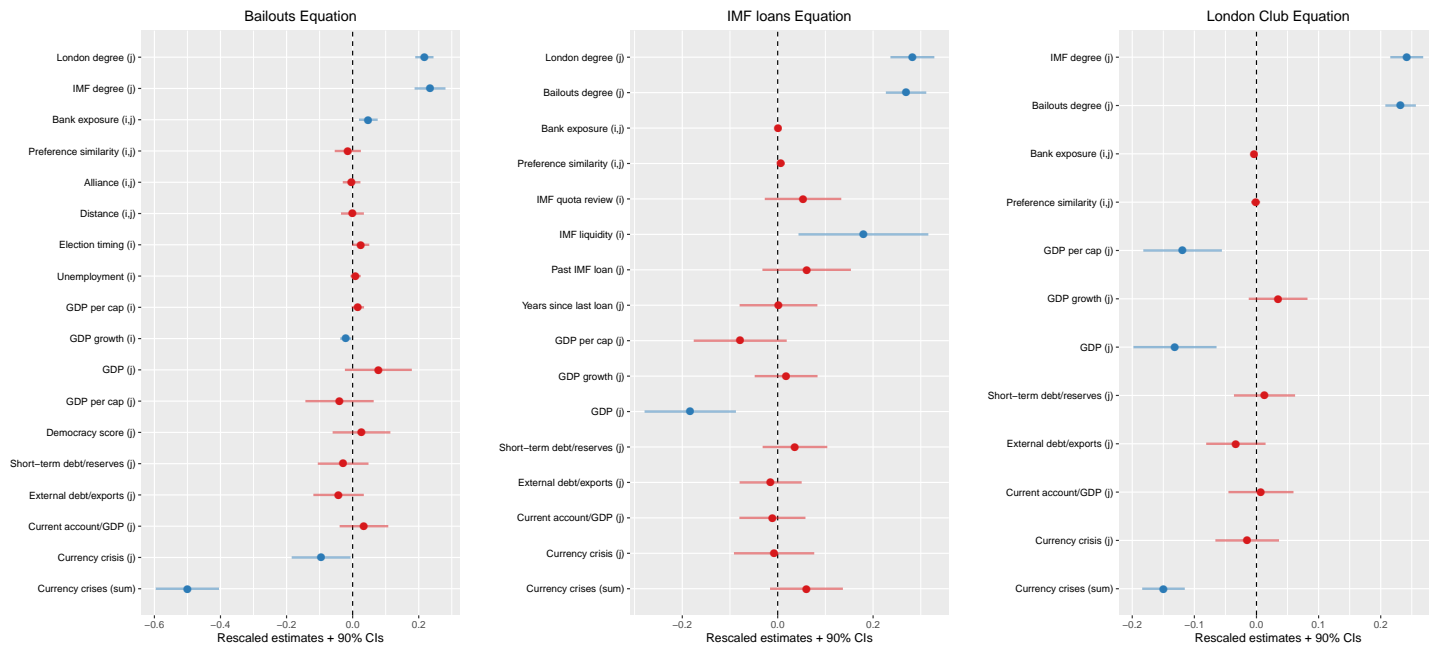
\*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$



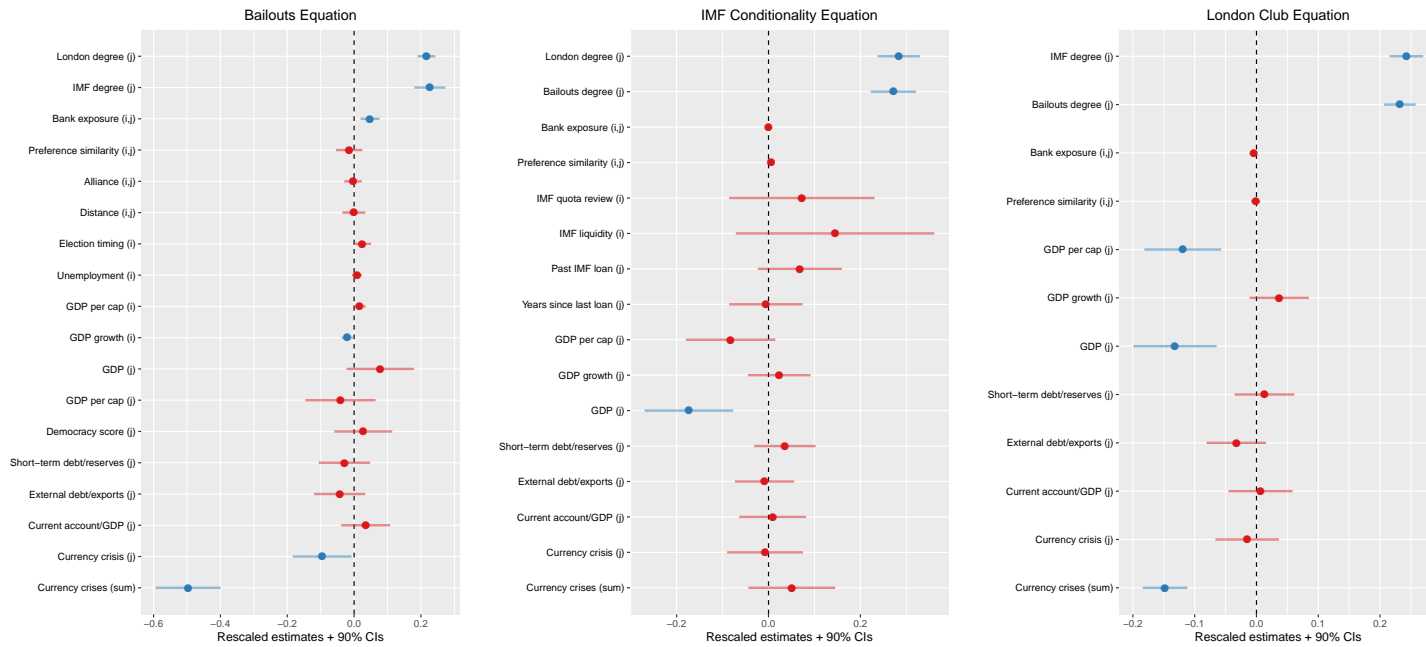
**Table 2:** Convention models without network covariates. AR(1) standard errors clustered by dyad.

	<i>Dependent variable:</i>			
	Bilateral bailout <i>Logit</i>	IMF loans dummy <i>Logit</i>	IMF loans (logged) <i>OLS</i>	Paris club dummy <i>Logit</i>
Constant	18.91 (11.45)	-1.34 (2.20)	1.54** (0.57)	-1.06 (1.39)
Bank exposure (i,j)	0.79** (0.26)	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)
Preference similarity (i,j)	0.38 (0.41)	-0.31 (0.23)	-0.35*** (0.07)	-0.19 (0.27)
Alliance (i,j)	1.02 (1.16)			
Distance (i,j)	-0.50 (0.70)			
Election timing (i)	-1.02 (0.74)			
Unemployment (i)	-0.47*** (0.14)			
GDP per cap (i)	-2.95** (1.09)			
GDP growth (i)	0.08 (0.20)			
GDP (j)	0.94* (0.44)	-0.14 (0.07)	0.10*** (0.03)	-0.09 (0.07)
GDP per cap (j)	-0.69 (0.44)	-0.01 (0.15)	-0.08 (0.04)	-0.44** (0.15)
Democracy score (j)	0.30 (0.99)			
Short-term debt/reserves (j)	1.75*** (0.39)	-0.12** (0.05)	0.02 (0.02)	0.13 (0.08)
External debt/exports (j)	-1.38** (0.50)	0.22* (0.09)	0.23*** (0.05)	0.48*** (0.12)
Current account/GDP (j)	-0.12 (0.11)	0.00 (0.01)	0.00 (0.01)	-0.00 (0.02)
Currency crisis (j)	2.93** (1.01)	-0.17 (0.16)	0.10 (0.13)	0.26 (0.38)
Currency crises (sum)	0.02 (0.06)	-0.00 (0.01)	0.00 (0.01)	0.01 (0.01)
IMF quota review (i)		0.05 (0.07)	0.11 (0.08)	
IMF liquidity (i)		-0.23* (0.10)	-0.14* (0.06)	
Years since last loan (j)		2.46 (1.44)	0.99*** (0.15)	
Past IMF loan (j)		0.00 (0.01)	-0.08*** (0.01)	
GDP growth (j)		-0.00 (0.01)	-0.03*** (0.01)	0.01 (0.02)
Num. obs.	11741	2970	2970	2970
Num. clust.	1085	186		186

\*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$



**Figure 5:** Coefficient plot for stochastic actor-oriented model for multiplex network of bilateral bailouts, IMF loans (*under IMF program = 1, 0 otherwise*), and London Club haircuts. Compare to results in Figure 2.



**Figure 6:** Coefficient plot for stochastic actor-oriented model for multiplex network of bilateral bailouts, IMF conditionality (*under IMF program with conditions = 1, 0 otherwise*), and London Club haircuts. Compare to results in Figure 3.