Global Club Goods and Regimes For International Financial Crisis Management

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Abstract

There is a widespread consensus that when an international lender of last resort extends short-term credit to states in a financial crisis it is supplying a global public good. This study questions this consensus and the joint products model of global public goods provision on which it is largely grounded. Through the development of a formal global club goods model, this article shows that club governance structures emerge when politics brokers the allocation of a non-rival and excludable club good. By leveraging the excludability of the loans that constitute international last resort lending, the model finds that a regime for international last resort lending emerges with borrower states segmented into multilateral and bilateral arrangements, each with a unique structure and cost for borrowers. Brief case studies of the international last resort lending of International Monetary Fund, the Bank for International Settlements, and the Federal Reserve strongly support the model.

KEYWORDS

Global Financial Governance; Club Model; International Lender of Last Resort; International Monetary Fund; Bank for International Settlements; Federal Reserve.

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Introduction

Why do states manage financial crises beyond their borders? Such assistance is typically channelled through an international lender of last resort, one of the foremost non-regulatory institutions capable of supporting international financial stability.[2] Although there are currently multiple arrangements that serve an international last resort lending function, their existence is puzzling because, like domestic lenders of last resort, funding their activities suffers from a collective action problem.[3] Although various resolutions to this collective action problem have been proposed,[4] most highlighting various reasons why it is in the self-interest large financial powers to provision international financial stability, there remain two enduring puzzles on the political economy of international last resort lending. First, why are contemporary international last resort lenders all structured as *post-hoc* crisis managers and not forward-thinking institutions for crisis prevention? Given that both crisis management and crisis prevention are global public goods that serve the self-interest of large financial powers, why are contemporary international last resort lenders focused on the former but not the latter?[5] Second, why are there multiple, longstanding institutional arrangements for international last resort lending and why are their lending frameworks structured so differently from one another? This puzzle is especially difficult for the existing literature to explain given that a single state, the United States, dominates all contemporary forms of international last resort lending.

This article resolves these puzzles by formalizing a club model of international last resort lending. The model retains a core assumption from the existing public goods literature that

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[2]Fischer (1999); Frieden (2016).

[3]Sachs (1995); Broz (1998); Kaul et al. (1999); Eichengreen (1999).

[4]See Kindleberger (1986b); Broz and Hawes (2006); Norrlof (2010); McDowell (2012); Frieden (2012); Hale et al. (2013); Drezner (2014); McDowell (2016); Frieden (2016).

[5]A lender of last resort's capacity to prevent crises was one of the main justifications for the creation of modern central banks in the first place (Broz, 1997; Eichengreen, 2014). While a lender of last resort cannot prevent all financial crises, their crisis prevention capacity resembles the bank run prevention capacity of a deposit insurer (Diamond and Dybvig, 1983; Gorton, 1988).

large financial powers have a self-interest in provisioning stable financial markets, both at home and abroad. Where the model innovates over those in the literature is by showing that a self-interested international lender of last resort has strong incentives to construct an international financial crisis management regime that segments borrower states into non-overlapping clubs that access emergency liquidity assistance either multilaterally through an international institution or bilaterally with the international lender of last resort. This result follows from modelling international last resort lending as the political brokering of a non-rival and excludable global club good. A key theoretical implication of this approach is a recasting of this aspect of global financial crisis governance from overcoming collective action problems to the politics of international last resort lenders exploiting the excludability of loans to its advantage. The political salience of excludability is confirmed through numerous observable implications derived from the model, each of which are confirmed by brief case studies of the lending structures of the International Monetary Fund (IMF), the Federal Reserve, and the Bank for International Settlements (BIS).

This study contributes to many strands of the international relations literature. First, a regime-centred approach to global club governance has significant advantages over existing club-based approaches to global financial governance. For example, while existing club models can explain why club members might agree to incur an adjustment cost to obtain an exclusive benefit,[6] they cannot adequately explain the simultaneous existence of multilateral and bilateral clubs that accomplish essentially the same task. The second contribution is to the politics of global public goods and the foundations of collective action more generally. In much of the public goods literature, the collective action problem centers on collecting sufficient contributions to the public good because non-excludability renders the free-rider problem binding.[7] However, results from this study imply that the free-rider problem is a red herring when collective action dilemmas involve excludable goods. As will be discussed

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[6]Drezner (2008); Tsingou (2015).

[7]The joint products model, which is a popular model applied in the context of international last resort lending, emerges as a natural solution to this framing of the collective action problem.

further in the conclusion, when the status quo favors the provision of a club good the collective action problem disappears and re-emerges as a delegation problem centred on convincing those currently provisioning a club good to make it non-excludable.

I Managing Financial Crises: Public Goods vs. Club Goods

In much of the economics and political science literature, a public good is defined as being *non-rival* and *non-excludable*. A good is non-rival if one agent's consumption does not lower the consumption of others. A good is non-excludable if consumers cannot be prevented from consuming it.[8] Despite their capacity to deliver significant public benefits, public goods are generally under-produced by profit maximizing firms because the consumption of non-excludable goods is susceptible to free-riding. In short, the provision of public goods suffers from a collective action problem. For this reason, arguments in favor of the state provision of public goods are persuasive.

The case for an international lender of last resort is well established and is typically motivated in public good terms.[9] The case rests on the capacity of such a lender to contribute to international financial stability, which is a benefit that cannot be withheld from anyone (non-excludable) and does not vary with the size of the consuming population (non-rival).[10] Contemporary theoretical explanations for international last resort lending are overwhelmingly grounded in the joint products model of public good provision.[11] For example, Broz and

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[8]Cornes and Sandler (1996). Examples of non-rival goods include roads, intellectual property, and television programs. Natural resources held in common are examples of non-excludable goods.

[9]Fischer (1999); Obstfeld (2009).

[10]Joyce and Sandler (2008); Frieden (2016).

[11]In many respects, the joint products model shares a striking affiliation with the earlier hegemonic stability theory inspired by the work of Kindleberger (1986b). At the core of both theories is the claim that international finanial stability is in the interests of the large financial powers (Krasner, 1976; Gilpin, 1983; Webb and Krasner, 1989). The key innovation of the joint products approach is to put this calculus into a rational choice framework.

Hawes (2006) argue that the IMF owes its existence to its ability to produce joint products because its international financial rescues are conjoined with foreign policy benefits for its major creditor nations. McDowell (2012, 2016) likewise argues that the joint interests of its national financial system and major U.S. banks explain why the Federal Reserve extended swap-lines to peer states during the global financial crisis.[12]

Despite its apparent ability to explain some features of the provision of global public goods, the joint products model cannot explain two puzzles regarding contemporary international last resort lending. As stated briefly in the introduction, these include an inability to explain the general preference for a regime of international financial crisis management rather than crisis prevention and why there exist multiple and differently structured international lenders of last resort.

Resolving the first puzzle cannot be satisfactorily achieved by appealing to an inability of last resort lenders to prevent financial crises. While a consensus exists that contemporary central banks cannot prevent all financial crises, many argue that their actions can in fact prevent some types of financial crises, especially those that involve system wide liquidity hoarding.[13] This puzzle also cannot be resolved through appeals to moral hazard.[14] For example, domestic last resort lenders faces the same moral hazard problem, but central banks have developed many long-standing moral hazard mitigation techniques.[15] In this regard it is telling that few of the eight moral hazard mitigation principles for international last resort lending set out by Mishkin (2000) have been implemented to date. Resolving the second puzzle is equally difficult for public goods approaches to international last resort lending. While much has been written about the stabilizing role of the IMF and the Federal Reserve's

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[12]See especially McDowell (2016), p. 179.

[13]On the capacity of central banks to pevent financial crises, see Gorton (1988); Huang and Goodhart (1999); Freixas et al. (2000); Rochet and Vives (2004); Gorton and Metrick (2013); Gorton and Ordonez (2014); Calomiris et al. (2015); Jacobson and Tallman (2015).

[14]Moral hazard explanations for the absencec of a single, robust international lender of last resort include Spero (1980); Johnson (1983); Fischer (1999).

[15]One example is lending at a penalty interest rate.

swap-lines, few question why multiple institutional arrangements exist to preform the same liquidity provision function. After all, there are no examples of states with multiple domestic last resort lending arrangements. If the basic purpose of all international last resort lenders is to disburse foreign currency to states in crisis, it is puzzling why multiple, and differently structured, institutions exist to fulfill this function.

The theoretical potholes that trouble public goods approaches to international last resort lending are traceable to a misapprehension regarding what good international last resort lenders produce. To the best of my knowledge, in all applications of the joint products model financial stability is listed as one of the joint outputs produced by last resort lenders, both domestic and international.[16] However, while financial stability is clearly a good thing for the public, is not a *good* in an economic sense because stability is immaterial, and it cannot be produced, bought, or sold. Yet public goods are, first and foremost, *goods*. Ultimately, stability is an adjective describing a state of the world, not a noun describing an output of a production process. Yet the distinction between goods and the states of the world their allocation brings about is more than a matter of semantics. While financial stability is clearly an end to which the loans that constitute last resort lending are a means, governance pressures operate on goods and not on the ends to which those goods serve. Thus, altering our understanding of what global public good international last resort lenders may produce not only has implications for the joint products model, but serve as the basis upon which to build a new model of the politics of international last resort lending.

Outside of joint products models, many scholars assert that loans, and not stability, are the goods international last resort lenders provide. Mehrling makes this point explicitly when he states that the "...emergent [swap-line based] system [of international last resort lending] recognizes the essential fact that *liquidity* is a public good, indeed a global public good."[17] The distinction between stability and the loans that engender it is also clear in the work

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[16]Examples include Broz and Hawes (2006); McDowell (2012, 2016).

[17]Mehrling (2009), p. 114, *emphasis added.*

of Charles Kindleberger. In his landmark study of financial crises, Kindleberger famously asserts that "*money* is a public good..."[18] Moreover, the absence of this money, in the form of international liquidity, informs Kindleberger's well known explanation of the Great Depression.[19] For these authors and others, it is apparent that loans, and not stability per se, constitute the potential global public good that an international lender of last resort may provision.

The politics of international last resort lending turns on whether stability or loans are envisioned as the potential global public good. This is because each has different intrinsic properties that facilitate alternative governance arrangements. For present purposes, the most important such intrinsic property is that loans are excludable, while the benefits of stability are non-excludable. Consider the example of a banking crisis that begins in state A and spreads to state B. If neither state has ready access to private financial markets, both may seek recourse to an international source of finance to help manage the crisis. Unfortunately for these states, potential creditor nations face no enforceable obligation to do so. A potential creditor nation may offer liquidity support to state A, state B, both, or neither. It may also decide that its assistance is available but only at a price above what state A and state B are willing to pay. In this simple example, the power of creditors to selectively allocate their lending resources is clear. This power also implies that although international last resort lending is arguably non-rival, because it is excludable, the loans that underpin international last resort lending do not meet the definition of a global public good.[20] Instead, as a non-rival but excludable good, these loans meet the definition of a *global club good*.[21] Although recent political science studies have begun to identify many financial products as

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[18]Kindleberger and Aliber (2011), p. 19, *emphasis added*. See also Kindleberger (1986a).

[19]Kindleberger (1986b).

[20]Few goods are purely non-rival and international last resort lending is no exception. However, for all intents and purposes, international last resort lending is non-rival because lenders rarely, if ever, face substantive barriers to assisting a state because their resources are tied up elsewhere. This is especially true for lenders who can create their own liquidity such as central banks.

[21]See Olson (1971); Buchanan (1965); Cornes and Sandler (1996) for an introduction to the economic approach to club goods.

club goods,[22] to the best of my knowledge, this article is the first to characterize international last resort lending as a global club good.

Consumers benefit from club goods through two channels, a direct consumption channel and an exclusivity channel. A country club is a prototypical club good because club members enjoy not only access to the club's (non-rival) services but by having the exclusive right to do so. Possibilities for exclusion are therefore an intrinsic property of certain goods that consumers are willing to pay a premium for. Exclusion also explains why contributions to a club good can be rational and result in an efficient allocation of resources if exclusion is governed by a consumer's willingness to pay.[23] However, when a club good is not provisioned by the market mechanism but by a single institution, that institution will be subject to strong, and inherently political, incentives to thoughtfully set criteria by which potential club members are excluded. Therefore, while Mehrling, Kindleberger, and others may argue that the large financial powers have a self-interest in maintaining a stable international financial system, this view is incomplete because the same self-interest will motivate the large financial powers to capture additional benefits by exploiting the possibilities for exclusion that are intrinsic to international last resort lending.

Political models of club governance are gaining traction across a wide range of disciplines and the international political economy of finance is no exception. Club models of global financial governance are found primarily in the literature on the formation of international financial regulation. For example, Drezner (2008) argues that small states may voluntarily incur an adjustment cost to adopt the financial regulatory structures of the large financial powers if this cost buys them an international seal of approval. Likewise, Tsingou (2015) argues that models of club governance have an important social element whereby new members are socialized into adopting the financial standards of existing club members. In both models,

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[22]Cerny (2014); Selmier (2014, 2017).
[23]Cornes and Sandler (1996).

despite regulation being non-rival and non-excludable,[24] club structures emerge because large financial powers wield disproportionate influence in setting a global standard and smaller states can capture exclusivity benefits from adopting these regulations if they are willing to adjust (in real or social terms) and abide by the international standard.[25]

Despite recent advances in club models of global financial governance, these models remain under-explored. The remainder of this article extends the global club governance literature by showing how club structures emerge from the incentives states have when they govern access to a global club good. A key feature of the model is that excludability can lead to a club governance regime consisting of multiple, non-overlapping clubs that have unique structures and costs for club members.

II   A Club Good Theory of International Last Resort Lending

The model builds upon the basic structure of Thompson and Verdier (2014). In their model, the "founder" of an international public goods regime, which is assumed to be a large, hegemonic state, optimally provisions a public good by routing states through a multilateral institution or into a direct bilateral relationship.[26] However, the model extends their work in two ways. First, unlike in Thompson and Verdier (2014), where the division of the public goods regime into multilateral and bilateral segments is driven by differences in transactions costs between the two institutional arrangements, the division modelled here is by the founder exploiting the excludability property of club goods. Indeed, transactions costs play no role

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[24]Regulation is non-rival because one states adoption does not obstruct another from adopting the same set of regulations. Regulation is non-excludable because regulation is public knowledge and states cannot prevent another state from adopting the same regulations.
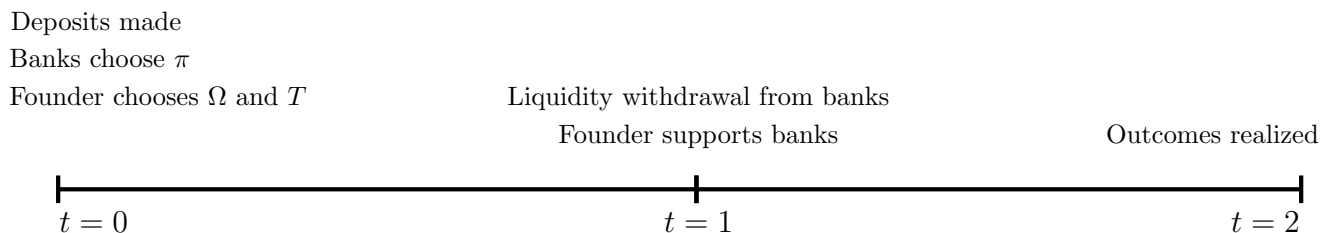
[25]A similar use of club models is evident in the literature on the international political economy of trade. Examples include Keohane and Nye (2002) and Gowa and Kim (2005).

[26]See also Aghion et al. (2007), whose insights inform the model and analysis of Thompson and Verdier (2014).

in the model and are assumed to be zero. Second, the model derives numerous implications for how this politics matters for borrower states. In particular, it is shown that borrowing from an international lender of last resort is less costly within a bilateral relationship.

The base model and its extensions are all full information three period sequential games consisting of interactions between a hegemonic state that holds a monopoly over the production of the global reserve currency and a continuum of borrower states. Given its position at the apex of global regimes of international financial crisis management, the hegemon's central bank is also the *de facto* international lender of last resort (ILLR). Although the ILLR takes the actions of borrower states into its own decision making, borrower states do not behave strategically in the model. Instead they act as conduits through which the ILLR channels liquidity to commercial banks in their states. Incorporating strategic behavior on their part may be added to the model, by, for instance, having them decide on an optimal level of foreign currency reserves, but these considerations are left to future research. An outline of the timing of the game is shown in Figure 1.

Figure 1: Game Timing

Deposits made
Banks choose π
Founder chooses Ω and T Liquidity withdrawal from banks
         Founder supports banks   Outcomes realized

$t = 0$ $t = 1$ $t = 2$

The possibility of commercial bank failures, and the loss of deposit claims by citizens of the ILLR, motivates the ILLR to found a regime of international last resort lending. The structure of this regime can take one of three forms: a single multilateral regime that devises a borrowing rule applicable to all borrower states equally, a series of individualized bilateral arrangements, or a mixture of the two. These regimes are referred to as multilateral, bilateral,

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and dual regimes, respectively. Irrespective of which regime borrower states are granted access to, borrower states have no input over the structure of the global regime of international last resort lending. Borrower states are therefore regime takers in the sense that when their commercial banks face a liquidity shortfall, borrower states must approach the ILLR as it is the monopoly supplier of emergency global reserve currency. If they do not do so, their commercial banks face an unsustainable liquidity shortfall and fail.

In period 0, commercial banks in borrower state i collect one unit of deposits, which are denominated in both local currency and the global reserve currency. For simplicity, assume the local and global reserve currencies have a fixed one-to-one exchange rate. The fraction of deposits held in the global reserve currency is α, which also measures the degree of banking system dollarization in borrower states. The fraction of deposits held in local currency is $1-\alpha$. While all local currency deposits are owned by residents of the borrower state, deposits in the global reserve currency are owned by domestic residents and foreigners who are citizens of the ILLR. In state i the fraction of global reserve currency deposits claimed by citizens of the ILLR is $\Omega_i \in [0,1]$. This implies that the total value of global reserve currency deposits in borrower states claimed by citizens of the ILLR equals $\alpha\Omega_i$. This term also represents the degree to which state i's banking system is internationally integrated. Total borrower state foreign exchange deposits claimed by local residents therefore equals $\alpha(1 - \Omega_i)$.

Following Thompson and Verdier (2014), the continuum of borrower states can be ordered according to Ω_i. When setting its international last resort lending regime, the ILLR utilizes this ordering since crises in states that are more internationally financially integrated (i.e., a higher Ω) are more costly for *its* citizens. Facing these varying costs, the ILLR seeks to design a regime for international last resort lending that maximizes the welfare of its citizens.

Governing International Last Resort Lending: Multilateral, Bilateral, and Dual Regimes

A multilateral regime consists of the ILLR devising a borrowing rule applicable to all states

equally. That rule says that states willing to incur cost τ may borrow, in principle, enough newly printed global reserve currency to arrest the liquidity shortfall facing their commercial banks.[27] A multilateral regime consists of the ILLR simultaneously deciding on the level of τ and a cut-point, Ω_i, that divides states into groups that can and cannot borrow from the ILLR. The ILLR faces a trade-off between increasing τ to receive a higher return on those that borrow from it, but at a cost of reducing the number of states willing to borrow. Therefore, borrower state i will borrow from the ILLR if $\tau \leq \alpha(1 - \Omega_i)$, which equals the value of lost global currency reserve deposits owned by citizens of borrower states.[28] Note that since $\tau \leq \alpha(1 - \Omega_i)$, the number of states willing to incur cost τ decreases at higher levels of Ω_i.

Under a multilateral regime, the ILLR chooses Ω_m^*, defined as the optimal equilibrium value of Ω_i, by solving the following optimization problem.

$$\int_0^{\Omega_m} \tau \, d\Omega \tag{1}$$

Given that in equilibrium $\tau_m^* = \alpha(1 - \Omega_m^*)$, it follows that the optimal solution to (1) is obtained at $\Omega_m^* = \frac{1}{2}$ and $\tau^* = \frac{\alpha}{2}$.[29] Borrower states with $\Omega_i \leq \frac{1}{2}$ borrow from the ILLR because their expected foreign currency losses exceed τ. Borrower states with $\Omega_i > \frac{1}{2}$ do not borrow, fall into crisis, and lead to losses for citizens of the ILLR and borrower state equal to the value of their global reserve currency deposit claims, valued at $\alpha\Omega_i$ and $\alpha(1 - \Omega_i)$ respectively.

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[27]Although the cost of borrowing is normalized to zero in the model, in practice these costs could limit the amount borrower states would seek to borrow from the ILLR. Also, τ is interpreted generally in the model and may include policy reforms and interest costs on loans from the ILLR.

[28]This result follows from two simplifying assumptions that are without loss of generality. First, the spiral into a liquidity crisis is assumed to be in foreign currency alone as the domestic central bank retains the ability to provision domestic currency liquidity. Second, once states borrow from the ILLR, a liquidity crisis is averted with certainty in the short-run. Solvency crises, which occur when commercial banks fail despite their state borrowing from the ILLR, are modelled in an extension to the baseline model below.

[29]Derivations of this solution and others are found in the supplementary appendix.

A diagrammatic depiction of the optimal multilateral regime is shown in Figure 2. By letting individual states decide whether to incur cost τ, the multilateral regime is accessed by states with $\Omega_i \leq \Omega_m^*$. However, these are states that are the least internationally integrated in the sense that citizens of the ILLR hold fewer claims on the foreign currency deposits in these states. The self-selection of states most important to the ILLR out of the multilateral regime therefore motivates the ILLR to explore other regime options such as a continuum of multiple bilateral arrangements.

Figure 2: Multilateral Regime
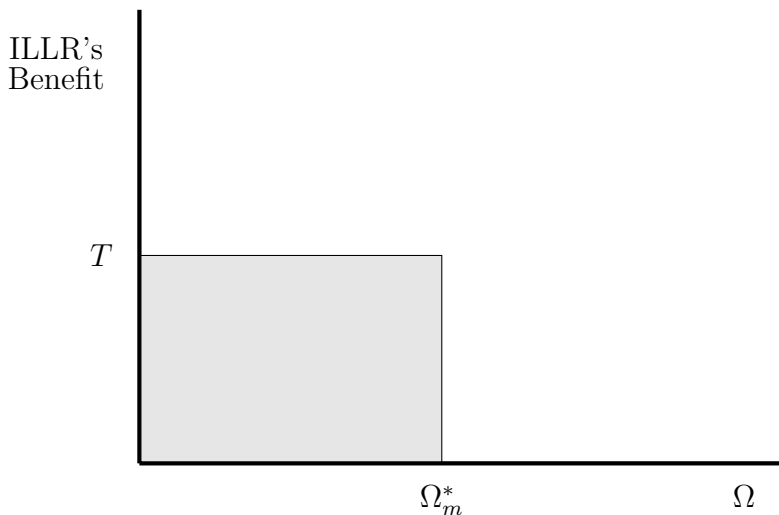
A second possible regime type is a bilateral regime where the ILLR negotiates individualized arrangements with each borrower state. In a bilateral regime, the ILLR foregoes a universal lending rule and bargains with each borrower state over the cost the latter will incur to access the ILLR's emergency liquidity assistance. Given that borrower states and the ILLR both incur losses when crises occur in borrower states, the model uses Nash bargaining to set the "price", ρ, paid by borrower states. In the bargaining game, the ideal price to be received by the ILLR is μ while the borrower has an ideal price of δ. For simplicity, μ and δ are assumed to be common in all bilateral bargains and are interpreted generally as ideal policy positions of the ILLR and borrower states respectively. The ILLR benefits when a borrower

state adjusts its policy position from δ to ρ. Specifically, the ILLR receives a utility gain of $\rho - \mu$, net of its original position, $\delta - \mu$, which results in a net utility gain of $\rho - \delta$. For borrower states, the same policy movement results in a net reduction in utility of $\delta - \rho$.[30] If a negotiated solution cannot be achieved, the unsupported liquidity shortfall sparks a banking crisis in the borrower state. This leads to losses for citizens of the ILLR and borrower state equal to the value of their global reserve currency deposit claims.

The Nash product of this bargaining game consists of the product of the utilities of the ILLR and the borrower state net of the costs each incurs if a crisis occurs in the borrower state.

$$[\rho - \delta - (-\alpha\Omega_i)][\delta - \rho - (-\alpha(1 - \Omega_i))] \tag{2}$$

The Nash solution to (2) is $\rho_i = \frac{2\delta - 2\alpha\Omega_i + \alpha}{2}$. Despite δ being common to all bilateral bargains, the ILLR receives a unique payoff from each borrower state because ρ is a decreasing function of Ω_i. This is shown in Figure 3 by the decreasing utility received by the ILLR at higher values of Ω_i. Intuitively, this result follows from citizens of the ILLR facing steeper losses and citizens of the borrower state facing smaller losses when crises occur in states with higher values of Ω_i. This redistribution of losses from borrower states to the ILLR at higher values of Ω_i shifts the bargaining solution in favor of the borrower state. Unlike in the multilateral regime, the cost to borrower states, ρ_i, is decreasing in α.[31]

Under a bilateral regime, the ILLR chooses Ω_b^* by solving the following optimization problem.

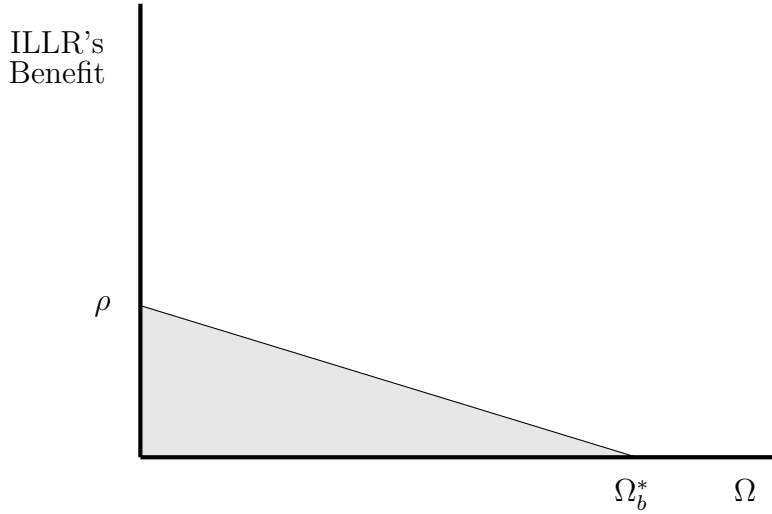$$\int_0^{\Omega_b} \rho_b \, d\Omega \tag{3}$$

With $\rho_{i,b} = \frac{2\delta - 2\alpha\Omega_i + \alpha}{2}$, it follows that the optimal solution to (3) is obtained at $\Omega_b^* = \frac{2\delta + \alpha}{2\alpha}$. The cut off point for inclusion in the bilateral regime is a decreasing function of α and an

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[30]These utilities are derived assuming $0 \leq \delta \leq \mu$.

[31]This result holds if $\Omega \geq \frac{1}{2}$, which is the result that holds in equilibrium.

Figure 3: Bilateral Regime

increasing function of δ, implying that an ILLR will lend to a larger fraction of states when dollarization increases or the policy distance between borrower states and the ILLR increases. However, irrespective of the specific values of these parameters, the bilateral regime covers more states relative to a multilateral regime because $\frac{2b+\alpha}{2\alpha} \geq \frac{1}{2}$ and δ is assumed to be non-negative.

A dual regime is the third possible regime type. In a dual regime, the ILLR segments borrower states into clubs that access its facilities on either a multilateral or bilateral basis. Moreover, the ILLR can choose which range of Ω_i's, either high or low, access the multilateral or bilateral regime segment. However, as shown in the supplementary appendix, the ILLR strictly prefers to limit its multilateral regime to borrower states with a low Ω_i and its bilateral regime to borrower states with a high Ω_i. Lastly, as shown below, the range of borrower states that are incorporated into the dual regime is the same as that covered by the bilateral regime because both regimes incrementally incorporate states with a higher Ω_i until $\rho = 0$. However, segmenting borrowers into multilateral and bilateral arrangements can produce a higher payoff for the ILLR because the exclusionary characteristic of international last resort lending allows the ILLR to target each regime segment more optimally.

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In a dual regime, the ILLR chooses Ω_d^* by solving the following optimization problem.[32]

$$\int_0^{\Omega_d} \tau_d \, d\Omega \quad + \quad \int_{\Omega_d}^{\frac{2b+\alpha}{2\alpha}} \rho_d \, d\Omega \tag{4}$$

With $\rho_{i,d}^* = \frac{2\delta - 2\Omega_i^* \alpha + \alpha}{2}$ and $\tau_d^* = \alpha(1 - \Omega_d^*)$, the optimal solution to (4) is obtained at $\Omega_d^* = \frac{\alpha - 2\delta}{2\alpha}$. Under a dual regime, borrower states with $0 \leq \Omega_i \leq \Omega_d^*$ access international last resort lending through a multilateral institution and borrower states with $\Omega_d^* < \Omega_i \leq \frac{2\delta + \alpha}{2\alpha}$ access it bilaterally with the ILLR. A diagrammatic depiction of the optimal dual regime is shown in Figure 4.

There are two effects of α in a dual regime. The first is that increases in α raise Ω_d^* and increase the fraction of borrower states granted access to international last resort lending through a multilateral arrangement. The second is to lower $\frac{2b+\alpha}{2\alpha}$, the threshold beyond which borrower states are denied access to the bilateral segment of the dual regime altogether. Thus, as dollarization increases, the bilateral segment of the dual regime is squeezed both from an expanded multilateral segment and a lower threshold for states included in the dual regime. Increases in δ likewise effect the division point and the last state to obtain access to the bilateral portion of the dual regime, albeit with the effects running in the opposite direction than that of α.

Choosing a Regime

For the ILLR the choice between a multilateral, bilateral, or dual regime to govern international last resort lending is decided by comparing the expected utilities it receives from each. These utilities are shown in Table 1. From these utilities three propositions are derived.

Proposition 1: *The dual regime is a dominant strategy for the international lender of last resort.*

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[32]Note that the bilateral regime excludes borrower states where $\Omega > \frac{2b+\alpha}{2\alpha}$ because the ILLR receives negative utility when lending to these states.
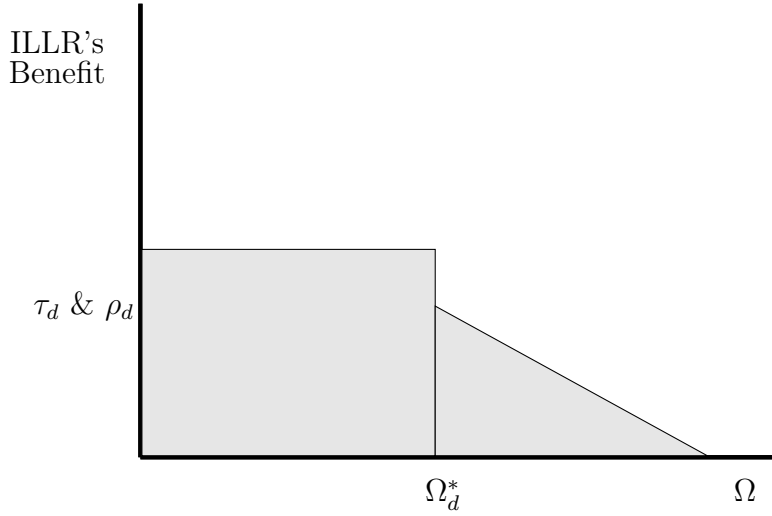
Figure 4: Dual Regime

Table 1: ILLR Utility from Each Regime Type

Multilateral	Bilateral	Dual
$U_m = \Omega_m^* \alpha(1 - \Omega_m^*)$	$U_b = \int_0^{\frac{2\delta+\alpha}{2\alpha}} \rho^* \, d\Omega$	$U_d = \Omega_d^* \alpha(1 - \Omega_d^*) + \int_{\frac{\alpha-2\delta}{2\alpha}}^{\frac{2\delta+\alpha}{2\alpha}} \rho^* \, d\Omega$
$U_m = \frac{\alpha}{4}$	$U_b = \frac{(\alpha+2\delta)^2}{8\alpha}$	$U_d = \frac{\alpha^2+4\delta^2}{4\alpha}$

It is straightforward to compare utilities to prove Proposition 1. First, comparing the utilities from the dual regime to the multilateral regime, it can be shown that $\frac{(\alpha^2+4\delta^2)}{4\alpha} \geq \frac{\alpha}{4} \; \forall \, \alpha \in [0,1]$, $\delta \in [0, \infty)$. Second, comparing the utilities from the dual regime to the bilateral regime, it can be shown that $\frac{(\alpha^2+4\delta^2)}{4\alpha} \geq \frac{(\alpha+2\delta)^2}{8\alpha} \; \forall \, \alpha \in [0,1]$, $\delta \in [0, \infty)$.[33]

The dominant strategy of choosing a dual regime to govern international last resort lending emerges because the dual regime permits the ILLR to best leverage the tradeoffs and relative benefits of multilateral and bilateral arrangements to its advantage. This outcome is in turn

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[33]Details for this proof are provided in the supplementary appendix.

derived from the excludability of the loans that constitute international last resort lending. The result of Proposition 1 has important consequences for many borrower states, two of which are formalized in Propositions 2 and 3.

Proposition 2: *In a dual regime, borrower states incur lower costs when borrowing through the bilateral segment than the multilateral segment.*

In the supplementary appendix it is proven that the cost to borrower states in the multilateral segment of a dual regime, τ_d^*, is greater than the cost incurred in the bilateral segment $\delta - \rho_d^*$. Moreover, Proposition 2 is proven to hold $\forall \alpha \in [0,1], \delta \in [0,\infty)$. This result follows from the greater leverage borrower states have in a bilateral negotiation where a failure to reach a bargaining outcome is costly for the ILLR. The relatively lower costs to borrower states in the bilateral segment of a dual regime is a key observable implication of the club model and is discussed in greater detail in the case studies.

Proposition 3: *Borrower states incur higher costs to access the multilateral segment of a dual regime than equivalent access within a pure multilateral regime.*

The proof of Proposition 3 is straightforward and follows from the existence of a bilateral option in the dual regime reducing the range of states accessing the multilateral segment. That is, because $\Omega_d^* > \Omega_m^*$, it immediately follows that $\tau_m^* > \tau_d^*$.

Modelling international last resort lending as the political brokering of a global club good achieves many of the same ends as earlier works that utilized a global public goods framework. The advantages of the club model advanced here is that no collective action problem needed to be overcome to bring an ILLR into existence. Instead, the excludability of loans and the potential for costly crises were sufficient to motivate the monopoly producer of the global reserve currency to found a regime of international last resort lending. Moreover, these results continue to hold under conditions of uncertainty and when the global club good takes on some of the features of a global public good in the form of joint products.

Joint Products and Uncertainty

Two extensions to the model, which are presented concurrently, are added to show that the model's overall results continue to hold in a more realistic and general setting. The first extension considers a joint products interpretation of international last resort lending. Recall the puzzle discussed above, that the joint products model cannot adequately explain the existence of multiple international last resort lenders. Results below show that not only is a joint products understanding of international last resort lending consistent with both multilateral and bilateral regimes, but that a dual regime continues to yield the highest utility for the ILLR. The second extension incorporates uncertainty into the regime design by allowing for commercial banks in borrower states to declare insolvency. Under uncertainty, there is a non-zero probability of the ILLR not being paid back as the commercial bank's investment fails and the bank declares insolvency.

In the simplest joint products model, a single input, in this case the loans that comprise international last resort lending, produces two outputs. The literature has understood these outputs to be private and public benefits in the form of enhanced domestic and global financial stability, respectively. The joint products approach modelled here has the ILLR obtaining additional benefits derived from the financial stability of borrower states over and above the private benefits modelled above. Formally, for each unit of crisis averting international last resort lending the ILLR captures the direct benefits of secured deposits for its citizens equal to $\alpha\Omega_i$ and the indirect benefits of secured foreign currency deposits owned by residents of borrower states equal to $\alpha(1-\Omega_i)$. These outputs are weighted by $(1-\theta)$ and θ, respectively. By assumption, $\theta <= \frac{1}{2}$ (i.e., the ILLR never weights the welfare of borrower states above its own).

To model uncertainty, commercial banks are assumed to invest their foreign currency deposits in an illiquid asset that earns foreign currency export revenues of $R(\pi)$, where π is the probability of success. With probability $1 - \pi$ the foreign currency investment fails, the

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bank is rendered insolvent and, by limited liability, receives a payoff of 0. Once invested, the foreign currency investment is sunk and has a liquidation value of 0. Interest on all deposits are normalized to zero. Following Repullo (2005), $R(\pi)$ is assumed to be decreasing and concave, with $R(1) \geq 1$ and $R(1) + R'(1) < 0$.[34] This assumption implies that the profit maximizing level of bank risk, $\hat{\pi}$, is maximized when $\hat{\pi} \in (0, 1)$. Following the same procedure as in the base model, results for the joint products model and the joint products model with uncertainty are shown in Table 2.

Table 2: Model Results Under Joint Products and Uncertainty

Regime	Component	Joint Products	Joint Products & Uncertainty
Multilateral	τ_m^*	$\alpha(1 - \Omega_{m,j}^*)$	$\alpha(1 - \Omega_{m,u}^*)$
	Ω_m^*	$\frac{1}{2}$	$\frac{1-\theta(1-\pi)}{2(1+(1-\pi)(1-2\theta))}$
Bilateral	ρ_b^*	$\frac{2\delta - \alpha\Omega_{b,j}^*(2-\theta) + \alpha}{2}$	$\frac{2\delta - \pi\alpha\Omega_{b,u}^*(2-\theta) + \theta\alpha}{2}$
	Ω_b^*	$\frac{2\delta + \alpha}{\alpha(2-\theta)}$	$\frac{2\delta + \pi\alpha}{\pi\alpha(2-\theta)}$
Dual	τ_d^*	$\alpha(1 - \Omega_{d,j}^*)$	$\alpha(1 - \Omega_{d,u}^*)$
	ρ_d^*	$\frac{2\delta - \alpha\Omega_{d,j}^*(2-\Theta) + \alpha}{2}$	$\frac{2\delta - \pi\alpha\Omega_{d,u}^*(2-\theta) + \pi\alpha}{2}$
	Ω_d^*	$\frac{\alpha - 2\delta}{\alpha(2+\theta)}$	$\frac{\alpha(2-\pi) - 2\alpha\theta(1-\pi) - 2\delta}{\alpha(8 - 6\pi + \theta(9\pi - 8))}$

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[34]This assumption says that safer foreign currency investments yield a lower expected return but that the return to even the safest investment covers the cost of funds and therefore yields a positive profit for the bank. However, the condition $R(1) + R'(1) < 0$ ensures that choosing the safest investment is not optimal for the bank, which maximises its expected profit when $R(\pi) + \pi R'(\pi) = 0$.

The effects of joint products and uncertainty on the structure of the dual regime are seen in Figure 5, which has been produced using Ω_d^* from Table 2 evaluated at parameter values of $\alpha = 0.2$ and $b = 0$.[35] Two implications are evident from Figure 5. First, as θ, the degree to which the ILLR considers its last resort lending a joint product, increases, $\Omega_{d,u}^*$ decreases and the ILLR shifts to more bilateral arrangements. Moreover, the number of borrower states that participate in the dual regime is also an increasing function of θ because the upper limit of the integral defining $\Omega_{d,u}^*$ equals $\frac{2\delta + \pi\alpha}{\pi\alpha(2-\theta)}$. Enhanced bilateralism in response to the opportunity to provision a global public good contrasts with standard interpretations of liberal internationalism which argue that joint product are likely to result in enhanced multilateral arrangements. As with all other results discussed above, this result is a consequence of international last resort lending being modelled as a global club good with opportunities for exclusion.

The second implication concerns the structure of the dual regime as international last resort lending becomes safer (i.e., $\pi \to 1$). As uncertainty decreases, $\Omega_{d,u}^*$ increases and the number of states that access the dual regime overall falls. The decreased scope for bilateral arrangements, both by expanded multilateralism and a reduction in the number of states that access the dual regime is initially counterintuitive as one might imagine that increased lending certainty would expand the scope of the dual regime. However, because states are in a bargaining situation, as lending becomes less risky the opposite occurs as greater certainty increases the opportunity cost of not achieving the equilibrium bargaining solution. This in turn pushes down the upper limit for states included in the dual regime.

Incorporating joint products and uncertainty into the international last resort lending regime does not alter the results of Propositions 1, 2, and 3 above. With respect to Proposition 1,

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[35]Bacha et al. (2008, p. 105) report the average level of dollarization, measured as the ratio of dollar deposits to total deposits in the banking system in emerging market economies, to be 18.6%. Furthermore, for $\Omega_i > 0$, δ must generally be low. This accords with intuition given that δ represents the ideal price paid by a borrower to obtain international last resort lending. Nevertheless, results from Figure 5 continue to hold for other plausible parameter values.

Figure 5: Equilibrium Regime Structure, Joint Products, and Uncertainty
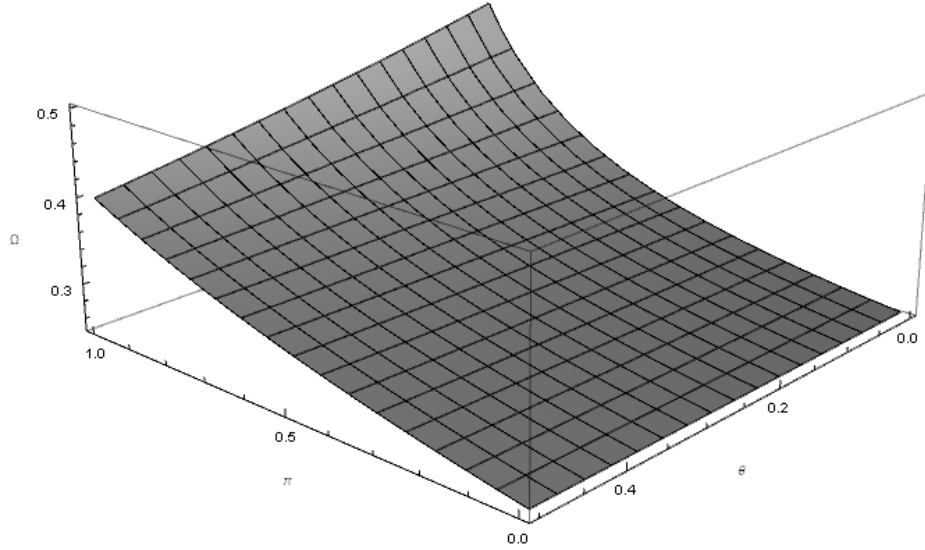
the dual regime continues to be a dominant strategy $\forall \alpha \in [0,1]$, $\pi \in [0, \frac{1}{2}]$, $\theta \in [0,1]$, $\delta \in [0, \frac{\alpha\pi(1-\theta)}{2}]$. The extra condition on δ simply ensures that Ω_i has an upper bound of 1. On Proposition 2, borrower states continue to incur lower costs when borrowing from the ILLR through a bilateral arrangement rather than a multilateral arrangement. That is, $\tau_{d,u}^* \geq \rho_{d,u}^* \ \forall \alpha \in [0,1], \theta \in [0,1], \pi \in [0, \frac{1}{2}], \delta \in [0, \infty)$. Lastly, for Propositions 3 it continues to be the case that $\Omega_{d,u}^* > \Omega_{m,u}^* \implies \tau_{m,u}^* > \tau_{d,u}^*$.

While Proposition 3 is of more theoretical importance since a multilateral regime and a dual regime cannot exist simultaneously, Propositions 1 and 2 contain important observable implications for how the regime of international last resort lending is governed in practice. These propositions permeate the discussion that follows regarding the international last resort lending of the IMF, the Federal Reserve, and the BIS.

Table 3: ILLR Utility Under Joint Products and Uncertainty

	Multilateral	Bilateral	Dual
Joint Products	$U_{m,j} = \Omega^*_{m,j}\alpha(1-\Omega^*_{m,j})$	$U_{b,j} = \int_0^{\frac{2b+\alpha}{\alpha(2-\theta)}} \rho^* d\Omega$	$U_{d,j} = \Omega^*_{d,j}T^*_{d,j} + \int_{\frac{\alpha-2b}{\alpha(2+\theta)}}^{\frac{2b+\alpha}{\alpha(2-\theta)}} \rho^* d\Omega$
	$U_{m,j} = \frac{\alpha}{4}$	$U_{b,j} = \frac{(\alpha+2b)^2}{4\alpha(2-\theta)}$	$U_{d,j} = \frac{(\alpha^2+4b^2+2\alpha b\pi)}{\alpha(4-\theta^2)}$
Joint Products & Uncertainty	$U_{m,u} = \Omega^*_{m,u}\alpha(1-\Omega^*_{m,u})$	$U_{b,u} = \int_0^{\frac{2b+\alpha\pi}{\alpha\pi(2-\theta)}} \rho^* d\Omega$	$U_{d,u} = \Omega^*_{d,u}T^*_{d,u} + \int_{\frac{\alpha(2-\pi)-2\alpha\theta(2-\pi)-2b}{\alpha(8-6\pi-\theta(9\pi-8))}}^{\frac{2b+\alpha\pi}{\alpha\pi(2-\theta)}} \rho^* d\Omega$
	$U_{m,u} = \frac{\alpha(1-\theta(1-\pi))^2}{8(1-\theta)+\pi(8\theta-4)}$	$U_{b,u} = \frac{(\alpha\pi+2b)^2}{4\alpha\pi(2-\theta)}$	$U_{d,u} = \frac{(\alpha(2(\pi-1)\theta-\pi+2)-2b)(\alpha(\pi(7\theta-5)-6\theta+6)+2b)}{\alpha(\pi(9\theta-6)-8\theta+8)^2}$ $- \frac{(\alpha\pi(-\pi(\theta+2)\theta+2\pi+\theta-2)+4b(-2\pi\theta+\pi+2\theta-2))^2}{\alpha(\pi(\theta-2))(\pi(9\theta-6)-8\theta+8)^2}$

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III International Last Resort Lenders as Club Good Providers

III.I The International Monetary Fund and Multilateral Lending

Memories of the Great Depression weighed heavily on the architects of the international monetary system following the Second World War. This led to widespread agreement on the necessity of an institutionalized mechanism to mitigate the destabilizing spillover effects of domestic economic policies.[36] While the main delegations at the Bretton Woods conference agreed that a system of fixed, but adjustable exchange rates was the most appropriate system to support the restoration of international trade and finance after the war, they disagreed over the most appropriate non-exchange rate based adjustment mechanism that would be used to manage inevitable international payments imbalances. The plan that emerged from Bretton Woods was the creation of the International Stabilization Fund (later renamed the International Monetary Fund) that would disburse loans to finance international payments imbalances in exchange for subscribed capital. The IMF was the centerpiece of the proposal laid out by the American delegation led by Henry Dexter White. One of the key factors leading to this outcome was the status of the United States as the world's premier creditor nation. The United States used this position to disparage proposals that required symmetrical adjustments by surplus countries and those that did not permit some degree of policy leverage over deficit countries.[37]

From this beginning the lending structure of the IMF evolved into a multilateral segment of a dual regime. Most tellingly, the IMF is structured as a high membership, high cost of borrowing institution. For example, from the beginning, despite not appearing in the Articles of Agreement, members implicitly understood that terms and conditions would be attached

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[36]Helleiner (1994).
[37]Bordo (1993).

to IMF loans if their borrowing exceeded their reserve tranche.[38] This quid pro quo remained in place after the breakdown of the Bretton Woods system and the IMF shifted away from financing international payments imbalances and towards assisting states in crisis.[39] Typical loan conditions include restrictions on new domestic and foreign credit, the privatization of state-owned assets, tax reforms, the setting of public spending targets, and setting a target for foreign currency reserves.[40] Given that states in crisis typically find these terms and conditions demanding, they are highly unpopular.[41]

Relatively onerous conditions have also been maintained following the creation of the Flexible Credit Line (FCL) and the Precautionary and Liquidity Line (PLL). While these facilities were designed to give qualified states access to a pre-approved revolving line of credit, to date only Mexico, Columbia, and Poland have accessed the FCL while only Macedonia and Morocco have accessed the PLL.[42] Yet despite efforts by IMF officials to lessen the stigma attached to IMF lending, the setting of relatively challenging terms and conditions on both the FCL and PLL remains a core priority. For example, qualification requires that states meet fairly stringent macroeconomic criteria that are subject to regular review.[43] Conditionality was therefore not eliminated with these facilities, but front-loaded.

The experience of Macedonia, to date the only state to draw on either the FCL or the PLL, is illustrative of the hurdles and pitfalls states face when accessing these credit facilities. Macedonia was granted a PLL in January 2011 and drew on it shortly after. But when undergoing a periodic review one year later IMF officials concluded that Macedonia was no

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[38]Diz (1984); Pauly (1997). States "borrow" (i.e. purchase foreign currency with their own currency with an agreement to repurchase it at a future date) from the IMF unconditionally up to their reserve tranche, which is typically no more than 25% of their quota. A state's reserve trance represents that state's contribution of foreign currency to the IMF's resource pool. Conditions are applied on loans greater than a state's reserve tranche. At this stage loans are disbursed from a state's credit tranche.

[39]Boughton (2001).

[40]Stone (2008).

[41]Stiglitz (2002); Sachs (2004).

[42]Presbitero and Zazzaro (2012).

[43]The PLL is designed for less developed economies and qualifications are less stringent relative to the FCL. However, the amount states may borrow under a PLL are correspondingly lower.

longer meeting its benchmark regarding the sustainability of government spending. IMF officials also noted that Macedonia drew on its PLL in response to an internal shock rather than an external shock as required.[44] In short, IMF officials deemed Macedonia to be in violation of the terms and conditions of its PLL. These violations led IMF officials to recommend Macedonia be denied a renewal of their PLL, a stance which led Macedonian officials to let their PLL expire in January 2013.[45]

By attaching relatively onerous conditions to its borrowing and leaving it to individual states to decide for themselves whether abiding by these conditions is worth the price, the IMF has structured its lending according to a global club goods model. While this governance structure poses relatively high costs on borrower states, borrower states with few alternatives may nevertheless be better off for having the option. However, states with access to a multilateral segment of a dual regime nevertheless find themselves in a disadvantageous position relative to states who can access an international last resort lender on a bilateral basis.

III.II The Federal Reserve, The BIS, and Bilateral Lending

The Federal Reserve's active use of its swap-line network during the global financial crisis has been held up by many as an exemplary instance of an international lender of last resort providing a global public good.[46] The elements of the swap-line network consisted of individual currency exchange agreements between the Federal Reserve and foreign central banks. At the initiation of a swap, the Federal Reserve would exchange dollars for a set amount of currency from the foreign central bank. Once in possession of dollars, the foreign central bank would be able to supply dollar liquidity to firms in its jurisdiction. At a predetermined date, the swap would be unwound with a final transaction consisting of the foreign central bank remit-

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[44]International Monetary Fund (2014).

[45]Birdsall et al. (2017).

[46]Goldberg et al. (2011); Baker (2013); Helleiner (2014); McDowell (2012, 2016).

ting its borrowed dollars back to the Federal Reserve in exchange for its own currency. The Federal Reserve first arranged swap-lines with the European Central Bank (ECB) and the Swiss National Bank in December 2007. By the end of 2008 swap-lines would be extended to central banks in Japan, the United Kingdom, Canada, Australia, Sweden, Norway, Denmark, New Zealand, Mexico, Brazil, South Korea, and Singapore. There is a widespread consensus that swap-line operations were crucial in containing the crisis by minimizing disruptions to global dollar funding markets.

Despite the many claims that the Federal Reserve's use of swap-lines constituted the provision of a global public good, the analysis of this article suggests that the Federal Reserve disbursed club goods in accordance with the bilateral segment of a dual regime. Indeed, the simultaneous existence of the Fed's swap-lines and institutions such as the IMF is difficult to explain within existing public goods models. Further evidence in favor of the dual regime club goods model comes from how the Federal Reserve operated its swap-line network, such as favoring states hosting large American financial institutions.[47] Favoring high Ω states was also evident given the list of states who approached the Federal Reserve for a swap-line but were subsequently denied[48] and by the fact that after the immediate crisis phase was over only the swap-line arrangements with the ECB, the Bank of Canada, the Bank of England, the Swiss National Bank, and the Bank of Japan were made permanent.

A second feature of the swap-lines consistent with the bilateral segment of a dual regime was their minimal costs and conditions. However, this is not to say that the Federal Reserve attached no conditions to its swap-lines. As the agent controlling access to the club good, the Federal Reserve stipulated that borrowing central banks bear many of the costs and risks associated with their swap-line. This occurred in three ways. First, the borrowing central bank bore the credit risk for the dollars it lent. When a foreign central bank drew

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[47]Aizenman and Pasricha (2010); Broz (2015); Prasad (2015).

[48]There is evidence that policymakers from Peru, Chile, Indonesia, the Dominican Republic, India, and Turkey are on such a list (Steil, 2014; Harris, 2015).

on its swap-line, the dollars it acquired were lent on to its domestic institutions however it saw fit. But a stipulation of the swap arrangement meant that the borrowing central bank was made liable for the repayment of its swap-line irrespective of the solvency of the ultimate borrowing institutions. Second, the borrowing central bank forfeited any interest it earned on its dollar lending as this was to be handed over to the Federal Reserve. In addition, the Federal Reserve did not pay interest on the foreign currency it acquired. Third, when swap transactions were initiated, the borrowing central bank agreed to close out the swap at the same exchange rate. Although exchange rates would fluctuate in the interim, this proviso ensured that the foreign exchange rate risk would be borne by the borrowing central bank and not the Federal Reserve.[49] Together these terms and conditions meant that the Federal Reserve earned interest on its swap-lines without having to incur any credit or foreign exchange rate risk. While the interest income earned by the Federal Reserve was in all likelihood economically immaterial, for the purposes of the club theory developed here the relevant fact is that although the Federal Reserve was in a position to impose stringent terms and conditions on its swap-lines, it nevertheless chose a relatively benign set, especially relative to the typical bundle of conditions mandated by the IMF.

A third institution with a history of international last resort lending, and the one least studied, is the BIS. Based in Basel, Switzerland, the BIS was originally created to facilitate German reparations from World War One. Today the BIS is better known for housing the secretariat of the Basel Committee on Banking Supervision, a committee of banking supervisors from advanced and major emerging market states that seeks to devise international financial regulation. The regulatory aims of the BIS align with its broader mandate to assist member states in their pursuit of monetary and financial stability. But its ability to accept deposits and make loans has also made the BIS, on occasion, a prominent international lender of last resort.

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[49]Fleming and Klagge (2010).

The BIS has a history of lending internationally when a multilateral response is deemed necessary and the borrower states are geopolitically important to the world's leading financial powers. However, its lending structure strongly resembles the bilateralism of the Federal Reserve's swap lines rather than the multilateralism of the IMF. The earliest example of the BIS engaging in international last resort lending came in 1966 with a loan to Britain. Credit from the BIS was structured as a bridge loan[50] and was a key pillar of an international rescue package designed to assist Britain with the management of its problematic sterling balances.[51] Britain's BIS loan set a precedent for further lending in the 1970s, with Portugal and Turkey receiving loans in 1976 and 1978, respectively.[52]

International last resort lending by the BIS greatly expanded in the early 1980s. Hungary was the first to borrow when it was caught up in a general withdrawal of creditors from Eastern Europe reacting to the political and economic turmoil in Poland.[53] For Hungary the BIS was the most promising source of international credit given that negotiations for Hungary's entry into the IMF were not yet complete. The Bundesbank, the Banque de France, and the Bank of England were receptive to Hungary's request and agreed to act as a guarantor for Hungary's loan. This meant that if Hungary defaulted, these central banks would guarantee repayment to the BIS. The leadership of these central banks was no coincidence since financial institutions in these states were Hungary's major international creditors.[54] Hungary would go on to secure two more credits from the BIS in 1982, the latter of which was guaranteed

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[50]A bridge loan is a short-term loan used to "bridge" over a period of illiquidity. For example, a bridge loan could be used when an agent expects to receive funds in period $t + 1$ but has obligations to meet in period t. In this case the agent could use a bridge loan to meet their period t obligations and use their funds acquired in $t + 1$ to repay the bridge loan. In a very general sense, all last resort lending can be thought of as bridge financing.

[51]Britain's "sterling balances" were deposits held in London and the Bank of England by foreign governments and private agents. These liabilities were essentially deferred payments by Britain for imports during the Second World War. The large overhang of sterling balances following the war represented a significant risk to the value of the pound.

[52]Wicks (1978); Bederman (1988).

[53]Fallon and Shirreff (1982).

[54]Bartel (2017).

by a consortium of thirteen central banks.[55]

The BIS was drawn further into international last resort lending with the onset of the Latin American debt crisis. Mexican officials were the first to approach the BIS in the summer of 1982 and succeeded in obtaining a short-term credit of $925 million. As was the case in the loan for Britain, the BIS required that its credit be repaid using proceeds from the IMF Stand-By Arrangement Mexico was negotiating. On top of this the BIS also secured repayment guarantees from all G-10 central banks, the Banco de Españia, and the Swiss National Bank. The distribution of these guarantees was set according to how exposed each state's financial system was to a Mexican default.[56]

The bridging operations of the BIS sparked significant debate on whether it would soon institutionalize its new role as an international lender of last resort. Given that the BIS is referred to as the central bank for central banks, many wondered whether this was not a natural step for the BIS in a world of increasingly globalized finance.[57] Commentators could be forgiven for speculating that the BIS would evolve this way given that, in addition to the aforementioned loans to Britain, Portugal, Turkey, Hungary, and Mexico, the BIS would go on to provide similar bridging facilities to Argentina, Brazil, Guyana, Nigeria, Poland, Romania, and Venezuela throughout the 1980s and early 1990s.[58] Yet despite the fact that in many of these cases multiple rounds of support were provided,[59] the BIS consistently rejected the notion that they were evolving into an international lender of last resort. Indeed, BIS bridge loans became increasingly rare as the 1990s wore on and its loan to Brazil in 1998 would be its last. During its time as a prominent international lender of last resort, the BIS remained little more than a conduit for large financial powers to channel bilateral lending to

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[55]Bank For International Settlements (1982).

[56]Boughton (2001).

[57]Montagnon (1982).

[58]Bederman (1988); Toniolo (2005).

[59]Throughout the 1970s, 1980s, and 1990s, the BIS participated in four loans each to Argentina and Mexico, three for Brazil, two each for Hungary, Romania, and Yugoslavia, and one each for Guyana, Nigeria, Poland, Portugal, Turkey, and Venezuela.

states of their choosing.

The bridging operations of the BIS offer a unique vantage point from which to view the club goods model outlined above. While the BIS is a key international financial institution, it is remarkable that its bridging operations followed the pattern of the Federal Reserve during the global financial crisis. For example, lending from the BIS used financial exposure to filter out potential borrowers. The BIS also imposed minimal costs and conditions on borrower states. For each loan, the highest priority for the BIS was to ensure it was paid back in full. This led the BIS to require the posting of solid collateral, a condition more stringent than the absorption of risk as with the swap-lines of the Federal Reserve, but less so than the policy conditionalities of the IMF. In most cases, the BIS accepted a future IMF payout or guarantees from western central banks as sufficient collateral. This was the case for all Latin American borrowers as well as Hungary, Yugoslavia, and Nigeria.[60] When states were unable or unwilling to pursue a Stand-by Arrangement, alternative sources of collateral were sought. Loans to Portugal and Yugoslavia were collateralized by each state's gold reserves.[61] For its first loan to Argentina the BIS also requested gold as collateral, but Argentinian policymakers objected, and their loan was delayed as a result. In the end an IMF agreement proved sufficient for the BIS to release its credit.[62]

IV   Conclusion

Much existing scholarship argues that, while less than ideal, current arrangements for international last resort lending fulfill at least some of the criteria for a global public good. In contrast, this study argues that existing international last resort lending arrangements are

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[60]Note that the content of the Stand-by Arrangement's conditionalities were of no concern to the BIS. The only requirement was that a future disbursement from the IMF would be allocated directly to the repayment of the BIS loan.

[61]Bederman (1988); Prickett and Adamović (1990).

[62]Montagnon (1983).

not best understood as genuine global public goods simply not living up to their potential, but the outcome of self-interested states exploiting the excludability of loans to their own advantage. From the insight that international last resort lenders supply global club goods, and not global public goods, this article has argued that a regime of international last resort lending exists, and it consists of non-overlapping multilateral and bilateral segments.

The analysis of this article suggests that if international last resort lending is to be provided as a global public good, attention should be paid to making current last resort lending resources non-excludable. This framing of the problem differs from many analyses found in the literature where the focus tends to be on how public goods can be created *ex nihilo*. If the goal is to create a public good when none currently exists, the political problem to overcome is that of free-riding.[63] However, in cases where there are existing motivations to supply excludable club goods, the free-rider problem is a red herring. Indeed, as demonstrated in the case studies policymakers in the world's leading financial powers have been more than willing to contribute resources to the financial stability of other states. What they have been unwilling to do is relinquish control over which states have access to these resources and at what cost.

Reducing incentives to exclude borrowers from accessing an international lender of last resort is challenging and is a topic appropriate for future research. The analysis of this paper suggests two mutually reinforcing reforms may reduce the excludability of international last resort lending. First, the institution operating as an international lender of last resort should be granted political autonomy.[64] Second, this institution's independence should be underwritten by the power to create, in principle, unlimited quantities of its own liquidity. Technocratic discussions of the requisites of an international lender of last resort downplay the necessity of liquidity creation, arguing that deep pockets are all that should be required.[65]

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[63]Keohane (1984); Broz (1998); Stone et al. (2008).
[64]Eichengreen (1999).
[65]Fischer (1999).

While this may be true in a strictly economic sense, it may be insufficient to overcome the political incentives for exclusion. The reason is because an agent with access to deep pockets is not necessarily insulated from the preferences of their principal if the pockets belong to the principal. Without political autonomy, coupled with the ability to create liquidity, international last resort lending is likely to remain a global club good into the foreseeable future.

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