The social management of complex uncertainty: Central Bank similarity and crisis liquidity swaps at the Federal Reserve

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Abstract

During the global financial crisis, the Federal Reserve issued billions of dollars in liquidity swap agreements with foreign central banks, serving as a global lender of last resorts. Most studies of this event have analyzed the distribution of these swap lines using materially rational frameworks, which is logical under normal lending conditions. However, this approach does not account for the extensive evidence on social influences over decisions made under uncertainty. Meeting minutes from the Federal Reserve exhibit significant flexibility in recipient selection, and the content of these discussions suggest that social dynamics were important in members' decision-making. This paper tests the effect of social similarity between foreign central banks and the Federal Reserve on the likelihood of receiving a swap line during the crisis. I introduce new measures of social similarity among central banks with data on employees' professional ties and public speeches in the years preceding the global financial crisis. Statistical results show a positive, significant effect for social similarity on swap line receipt, even when tested alongside material predictors, and this social rationality appears to have been a deciding feature in some cases of swap distribution. I conclude with implications for future crises, and potential regulatory consequences.

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1 The Fed during crisis: Uncertainty and risk in lending programs

> '[T]he current situation is so extraordinary, in terms of both the financial disruptions and the policy responses to those disruptions, that an extremely wide band of uncertainty surrounds this assumption: Matters could easily turn out much worse or much better.'
> – *Norman Morin* (US Federal Reserve 2008a, p. 50).

No one was fully prepared to handle the rapid emergence of the global financial crisis. Although the global financial system avoided disastrous and total collapse, regulators and central bankers navigated this complex uncertainty with untested, stop-gap policy solutions (Drezner 2014). The U.S. Federal Reserve (Fed) took unprecedented actions to mitigate financial contagion, largely via new means of domestic and international liquidity provision. The publicly contentious bailouts for failing domestic banks are generally well-known, but the international response has received much less publicity; the Fed distributed over $500 billion in bilateral currency swaps with foreign central banks, acting as a lender of last resort for entire economies. The magnitude of this swap program outweighed both the 2008 US defense spending proposal, and paralleled the domestic bailouts which triggered mass protests (US Government 2008).

An extensive body of academic research has addressed these swaps.[1] While these accounts vary in the degree to which they explain some or all recipients, virtually all of them assume that the Fed operated under the logic of material risk in their crisis-time decision-making. This assumption guides principally material, rational expectations of swap line distribution during the crisis, which may not be fully justifiable under conditions of complex uncertainty. As such, and in contrast with a rich body of psychological evidence on human rationality under uncertainty, this approach omits what may be called *social* factors in the Fed's swap line decision process.

I offer an expanded explanation of swap line receipt premised in the logic that the crisis was characterized by complex uncertainty, and not only risk (Nelson and Katzenstein 2014). Drawing on theories of decision-making under uncertainty, I assert that social similarity of foreign central banks to the Fed helps to better explain swap decisions. While a number of recipients are well-explained with material factors, social rationality appears to have supplemented material rationality in many other cases, and played a deciding role in some cases with high material uncertainty. This is exhibited in discussions on New Zealand and Chile; material factors analyzed in prior studies were nearly identical for these states, and members could not distinguish a choice between the two on these grounds alone. Instead, discussions centered on the implications of swaps with a state "like Chile," relying heavily on social rationality. Thus, recipient selection did not meet strictly materially rational expectations; some states received a line and never used it, and others in need did not receive one. As I argue here, material factors alone do not account for this.

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[1] See: Aizenman and Pasricha 2010; Broz 2015; McDowell 2012; Morelli et al. 2015, among a number of others.

Salient events such as the liquidity swap program during the global financial crisis afford rare opportunities to investigate the power dynamics of governing institutions operating under conditions of complex uncertainty. These allow researchers to study elite actions when rulebooks fail, and function as uncommonly revealing cases for understanding intra-elite power dynamics. This lending program at the Fed constitutes an example of a critical juncture for regulatory elites in the financial epicenter of the world system. It further offers insight into the international governance strategies of institutions which are typically more difficult to study in the field of IPE: central banks. The argument proposed here, premised in the logic of social similarity among central banks and bankers, is not isolated to financial anomalies such as crises of this scale. Rather, its logic is similarly applicable to a broad number of decision-making processes in which financial regulatory elites wield positions of distributional power in conditions of uncertainty.

This article introduces novelty in the empirical analysis of elite decision processes under uncertainty. I offer new means for measuring social similarity among central banks and bankers. These range from large-scale social network analysis for measuring professional background similarities across central banks, to corpus comparison techniques for measuring the similarity of central bankers' speeches. Furthermore, in employing these social similarity measures for predicting swap line receipt among foreign central banks, I offer a framework for exploring the degree to which social similarity improves on standard material models of this process, and for exploring case-level implications. Regression results show that all measures of social similarity positively and significantly predict the receipt of a Fed swap line during the crisis.

The paper proceeds in the following sections. I first review the literature on Fed swap lines during the crisis, highlighting the insufficiency of existing approaches, their assumption of material risk, and their failure to engage with material uncertainty in these decisions. I buttress this critique with a review of literature within IPE that considers uncertainty and its social management in financial governance, to demonstrate the utility of its application in this case. Second, I review social psychological theories of decision-making, primarily drawn from work in behavioral economics and political psychology. I use these to inform empirically falsifiable hypotheses regarding the expected influence of social similarity on the probability of swap line receipt. The third section describes the data collection process, beginning with material predictors from other studies and continuing into the variable construction for each theoretically-informed dimension of social similarity. Fourth, I offer results from logistic regression models in aggregate, and demonstrate the utility of the theory with two illustrative cases: New Zealand and Chile. I conclude with a discussion on the implications of these findings for future crises, and possible regulatory mechanisms to address this tendency toward homophily among financial regulatory elites.

2 Existing explanations for swap recipient selection

The Federal Reserve's decision to extend currency swap lines to foreign central banks during the global financial crisis has been the focus of extensive research over the last decade. For a single case, this has drawn ample attention within IPE, and for good reason. The global financial crisis was a critical juncture for central banks around the

world, and for none more than the Fed. This unprecedented swap line program was a key mechanism by which the US central bank alone served as a lender of last resort for a number of entire foreign debt markets, especially at a time when traditional backstops such as the IMF were unable to fill this role (McDowell 2012). This event offers a rare opportunity to understand central bank decision-making under extraordinary circumstances, and sheds light on how these institutions operate under high risk and uncertainty.

Existing analyses of this program have focused on the rationale for distributing these swap lines, and on explaining which central banks received such a lifeline. While not all of these swap lines were eventually drawn on, with salient examples such as Canada and New Zealand, the simple difference of their availability had a major effect for foreign debt market recovery. These swaps significantly reduced dollar funding pressure among recipients, especially the emerging markets which received them (Goldberg et al. 2010). This was even true for the more developed economies that received these lines from the Fed, which had significantly higher capacity for domestic intervention measures on their own (Fleming and Klagge 2010, p. 6). Even the independent role of *re-announcing* these swap lines had a significant effect in reducing spread tensions during the subsequent EU crisis (Moessner and Allen 2013). Given the severe pressures on reserves during this crisis, and the substitution these swap lines offered for them (Dominguez et al. 2012), many non-recipients in the world experienced significant liquidity squeezes and subsequent economic downturns which recipients did not (Aizenman and Pasricha 2012).

Lenders of last resort are commonly analyzed within IPE using assumptions of material rationality. This logic of risk comports with neoclassical economic heterodoxy: hazards can be quantified, and responses can have foreseeable consequences for the measurable economy. Response speed at the IMF has been understood as a function of G5 bank exposure (McDowell 2017a), European Central Bank last-resort lending has been tested against the strength of bank capitalization (Drechsler et al. 2016), and bilateral currency swaps with the People's Bank of China have been modeled as a function of liquidity shock insulation and transaction cost reduction (Liao and McDowell 2015). These analyses rely principally on the assumption that lenders of last resort have ample, readily available information on debtors, and use this in short-term decision processes. Under normal conditions, these assumptions are reasonable and explain distributional choices well.

Virtually all analyses of the Fed's currency swap line program have followed this logic of material rationality. Existing studies of this process take one of two primary explanatory models: *need* versus *exposure*. Where need-based models assume that these swap lines were distributed to economies which most badly needed dollar liquidity, exposure-based models assume that the Fed acted to protect US interests in its allocation of these lines to specific economies.

The need-based model has offered compelling explanations for the distribution of these swap lines across a number of studies (Allen and Allen 2013; Allen and Moessner 2010; Morelli et al. 2015; Obstfeld et al. 2009). These vary marginally with regard to their mechanistic frameworks; some understand this as a static dollar demand, where others focus on the competing demand for distinct currencies in the establishment of bilateral swap networks (Allen and Allen 2013, p. Ch. 7; Allen and Moessner 2010, pp. 26–32; Morelli et al. 2015, pp. 98–102). These need-based models test intuitive

expectations of the Fed under standard, material models of lenders of last resort as meeting liquidity demand where it cannot otherwise be met (Drechsler et al. 2016).

The remaining analyses of these swap lines focus on distribution as a feature of protecting US interests, specifically. These vary much more significantly in their underlying assumptions, namely as a function of which interests were assumed to be protected. Some research has shown that US bank exposure was the most critical factor in explaining the unprecedented introduction of four emerging market economies into the Fed swap line regime (Aizenman and Pasricha 2010, pp. 354–358). Others have applied this perspective to the entire population of swap line recipients, arguing the Fed functionally protected large US banks from failing foreign debt markets (Broz 2015, pp. 339–345). Conversely, yet others use the same indicator to argue that the Fed acted to protect the US' national economic interests, supported by detailed transcript analysis of Fed decisions (McDowell 2017b, p. Ch. 7). Finally, some have proposed that the distribution of swap lines was in fact a strategic protection of US hegemony, not strictly its banks (Helleiner 2014). As compared to need models, exposure arguments offer a more political explanation for these swaps.

There are, however, good reasons to consider this process from a third perspective. This relates to a broader nuance of this critical juncture: the decision by the Fed to establish swap lines with foreign central banks was made under significant uncertainty, not only risk (Nelson and Katzenstein 2014, pp. 379–384). Where risk can be quantified to estimate outcomes of decisions, uncertainty precludes the type of foresight assumed under material rationality. As materially rational factors become increasingly unreliable, humans rely more and more on cues and heuristics in their environment to make their choices (Tversky and Kahneman 1974). These heuristic assessments, for better or worse, are generalized tools by which human cognition operates, especially in conditions of significant uncertainty (Neth and Gigerenzer 2015). This would suggest that material factors may not explain all crisis swap decisions at the Fed; this is supported by recent research showing that shared policy preferences also affected swap choices (Sahasrabuddhe 2019).

We can understand this non-material decision process as following a logic of 'social rationality', as distinct from materially rational choice models. This type of decision-making relies on considerations of social identity and behavior in assessments of other actors in a larger system. There has been a growing literature employing this focus in the field of international political economy, generally falling under a constructivist purview (Abdelal et al. 2015; Chwieroth 2009; Hacking and Hacking 1999; Nelson and Katzenstein 2014; Wendt 1999). Extensive work has focused on how constructs, such as social identity, operate to produce behaviors which cannot be explained by materially rationalist factors alone (Abdelal et al. 2015, pp. 10–11). This mechanism serves as a useful intersection with other findings from psychology for understanding decision contexts similar to the Fed's during their selection of swap line recipients, specifically the logic of identity as a heuristic for in- and out-group membership in distributional choices.

In decision processes, the social cue of identity can produce patterns of homophily, where similar actors express latent preferences toward their in-group over the out-group (Turner 2010). This basic human tendency has been repeatedly replicated over decades of research in psychology (for detailed review see Kahneman 2003), and especially affects decisions with distributional consequences (Brewer and Caporael 2016). Within

political economy, this simple mechanism of in-group preference has carried heavy analytical weight. In the US context this has helped to explain processes of regulatory capture leading to the financial crisis (Baker 2010; Engelen et al. 2012), patterns of lobbying at the SEC (Young et al. 2017), and contact with regulators both before and after the crisis (Carpenter et al. 2013). Social factors influence financial regulation in many other domestic contexts as well (Grant and Sargent 1993; McPhilemy 2013; Selmier II 2013; Van Der Pijl and Yurchenko 2015). Even in less salient conditions of status quo governance, homophily has significant effects on the construction of rules and allocation of resources within economies.

Homophily as a form of social rationality has also been frequently applied in the international context, as well. Club structures formed around shared in-group identities in public-private dynamics have had significant influence on the contours of transnational financial governance (Tsingou 2014, p. 418), and have produced in-group socialization pressures that have guided important regulatory processes like the Basel II banking accords (Baker 2010, p. 653). Such in-group cohesion has long been studied for its impact on efforts to improve global financial governance in myriad contexts (Abdelal 2007; Baker 2006; Chwieroth 2009; Mügge 2006; Porter 2016; Slaughter 2004). This tendency of 'club-like' behavior is in part expected, given the well-known fuzziness of boundaries between public and private actors in financial governance, both within the US (Johnson 2009; Johnson and Kwak 2011; Tett 2009), and internationally (Pagliari and Young 2015; Seabrooke and Tsingou 2009). Broadly, in- and out-group lines drawn by social identities are important features of decision-making in international political economy.

There is very good reason to expect that this logic of social rationality matters in studying the Fed swap line program during the crisis specifically. There is extensive evidence suggesting that such social factors play a meaningful role in international lending, ranging from immaterial drivers of sovereign debt repayment rules (Eichengreen et al. 2002) to the social determinants of IMF lending decisions (Chwieroth 2015; Nelson 2014, 2017). At more granular levels, social rationality influences a broad array of credit agency decisions (Partnoy 2002), their capacity to translate uncertainty into risk via social considerations (Carruthers 2013), and even how these processes affected the global financial crisis specifically (Sinclair 2010). While social factors have had a strong role in similar Western banking contexts like the ECB (Howarth 2007) and the Swiss National Bank (Moschella 2015), it is also known that the Fed defied material rationality in decisions both leading up to (Golub et al. 2015) and after (Goodhart 2015) the crisis.

Furthermore, there is evidence that social similarity among central bankers was in some ways explicitly constructed by Western central banks in the decades before this crisis. For example, more recent work has shown the ways in which post-Soviet states were intentionally influenced to adopt regulatory ideologies and central banking identities which more closely aligned with Western states' models (Johnson 2016). The consensus forged among central banks, not only in the post-Soviet context, has affected these organizations' broader epistemic communities (Cetina 2007). This has produced strong patterns of similarities across features like political independence (Mabbett and Schelkle 2019) and central banks' abilities to credibly convey unorthodox decisions to markets and other central banks in the global economy (Braun 2016). The demonstrated effects of intentionally constructed similarity across this body of

research suggests even more strongly that social factors should be considered in distributional decisions among central banks, as with the Fed's currency swap line program during the global financial crisis.

This third perspective of social rationality can help to fill in a number of gaps still left by material explanations of Fed swap decisions. For example, as discussed earlier, several swap recipients did not draw on their swap lines at all, including: Canada, Singapore, Brazil, and New Zealand. Many others drew far below their swap allowance, as well. Similarly, a number of states which the Fed explicitly discussed as swap candidates (Chile, India, South Africa, and others) did not receive a swap line, despite exhibiting nearly identical material need as some other final recipients. As explored more rigorously in the empirical section of this paper, these material models of recipient selection thus leave a good deal unexplained both among the recipient and non-recipient central banks across the world. Material rationality would identify both of these dynamics as costly choices on the part of the Fed. As such, it remains a salient, unanswered puzzle why several recipients who did not materially need these lines were chosen over others who did.

3 Theory and hypotheses

In what follows, I evaluate the effect of foreign central banks' social similarity to the Federal Reserve on their likelihood of swap line receipt. I draw on literature from behavioral economics and political psychology to offer a theory of social rationality behind the Fed's decision process. Importantly, neither this extant work nor my current proposed theory argues that these mechanisms operate consciously among decision-makers; cognitive heuristics are subtle, typically unconscious processes. Furthermore, this logic is neither incompatible with, nor more important than the materially rational models tested in existing work on this case. Rather, this form of social rationality is widely understood as a supplement, not a replacement, for materially rational information. This is an especially influential information supplement in decisions where material rationality is insufficient for fully reducing uncertainty (Kahneman 2003; Kahneman and Egan 2011; Macrae and Bodenhausen 2000; Neth and Gigerenzer 2015; Tversky and Kahneman 1974).

Human cognition operates differently under conditions of uncertainty and unprecedented risk. Within psychology this is understood as 'type one cognition', which involves rapid, reflexive considerations of subjectively relevant factors and their interpretation via heuristics, or cognitive 'shortcuts' (Evans and Stanovich 2013, pp. 224–226; Macrae and Bodenhausen 2000, pp. 94–98). This model has served as an inferential workhorse in the field of behavioral economics, helping to explain instances where actors are observed to deviate from material rationality in their political and economic decisions (Kahneman 2003). There is broad consensus that this reflexive mode of cognition is not only involuntary during standard decisions, but especially under stress and time constraints (Kahneman 2003, p. 1467; Kuklinski and Quirk 2000; Neth and Gigerenzer 2015; Tversky and Kahneman 1974, p. 1124). The global crisis, and especially the challenges it posed to central banks, is precisely the decision context in which one would expect this social cognition.

One of the most common forms of decision heuristics used in type-one processing is reliance on indicators of social similarity, based on aforementioned in- and out-group distinctions (Dunning and Cohen 1992; Dunning and Hayes 1996; Eberhardt et al. 2004; Krueger and Clement 1994; Olivola et al. 2012). These hard-wired conceptions of the 'other' allow humans to circumvent the comprehensive consideration of objective information pertaining to their choice. In this way, they function to lighten the demand on cognitive economies in decision processes marked by temporal and distributive duress, such as the swap lines considerations at the Fed. There is no reason to believe that members of the Fed would be exempt from this tendency toward type-one cognition or reliance on group heuristics. While some cognitive patterns vary over individuals, type-one cognitive processing is found to generalize across populations (Lopez and McDermott 2012). Research has only found negative relationships between relevant elite characteristics, such as achievement motivation, and material rationality (Humphreys and Revelle 1984, p. 181).

It is important to note that heuristics are stop-gaps, solutions when materially rational cognition is less feasible, or insufficient. This yield two theoretical expectations regarding their role in Fed decision-making during the crisis. First, given the context of the global crisis' effects and rapid regulatory responses, there should be some level of heuristic reliance in Fed decision-making, on average, as a function of broad global uncertainty. Second, reliance on an in-group heuristic of social similarity should be greater where other materially rational decision factors, such as need or exposure, left some residual uncertainty. These are the cases where heuristics would be most informative supplements to Fed decision-making. Conversely, where there was little to no material uncertainty, one would expect lower reliance on type one cognition heuristics, such as social similarity. As such, my theory of social rationality in crisis decision-making applies more specifically to more uncertain cases, and should offer less power in more certain cases.

This logic maps quite closely onto the discussion dynamics among Fed members during their meetings regarding potential swap recipients. Early cases, such as the ECB and Swiss National Bank, were discussed in notably different ways from the later, less certain cases such as New Zealand and emerging market economies. For example, despite being the first currency swap recipient decided by the Fed, the ECB is functionally discussed as a bygone conclusion in these meetings, with proponents speaking in strictly material terms of 'addressing dollar shortages', 'producing positive spillover effects', and 'improving global credit markets' (US Federal Reserve 2007, p. 7). The Swiss case, discussed a week later, was similarly seen as materially certain by Fed members. Need was highlighted in material terms of 'credit squeezes' and 'dollar demand', eliciting support from all but one member present, who opposed on similarly material concerns of market reactions (US Federal Reserve 2007, pp. 4–14). Unsurprisingly, the UK and Canada receive similar treatment in these early discussions on swap recipients.

Conversely, discussions on the later groups of swap recipients exhibited significantly greater uncertainty and attention to candidates' social parameters. While Fed members highlighted explicit scope conditions for candidacy along line of economic mass, growth, and crisis severity (US Federal Reserve 2008a, p. 10), social considerations were frequently employed in choosing among less certain candidates. For example, one member noted that Mexico makes sense because 'they have a sophisticated central

bank and a very good central bank governor,' and that 'Singapore is unique' as 'it would be beneath Lee Kwan Yew's dignity' to approach the IMF (US Federal Reserve 2008b, p. 17). In virtually all clarifying discussions from this meeting on the least certain group of recipients, Fed members debated the social rationality of extending or withholding a line. Across recipient cases, there is a clear, positive relationship between the uncertainty of a central bank's material candidacy, and the social heuristics employed.

In these ways, the meeting minutes alone offer some initial support for this theory and its expected implications for decision processes. Federal Reserve members first delineated potential cases by material need or exposure. When this was sufficient for a decision, as in the early cases of the ECB, Swiss National Bank, UK, and Canada, no other decision factors appeared in their discussions. However, when residual uncertainty lingered among materially rational candidates, members then began employing social considerations related to the professional capabilities of governors, their relationships with other actors in the global economy (like the IMF), and their similarity to the Fed on institutional and regulatory dimensions. This suggests that, in some cases, and especially the later recipients, one should anticipate a meaningful role for social similarity in affecting the probability of a foreign central bank receiving a swap line from the Fed.

Extant theory on the decision-making processes of regulatory elites supports these propositions, and aligns with the evidence from these meeting minutes at the Federal Reserve during their discussion of swap candidates. It is well-established that social similarity functions to reduce elites' respective uncertainty on one others' behaviors, and that this is especially salient when that similarity is readily and consistently demonstrated (Mizruchi and Stearns 2003). This comports not only with generalized psychological theories of human behavior and heuristic reliance, but further helps to explain the presence of social considerations in these meeting minutes when materially rational accounts would not expect them. In the context of central banks and their members, three types of similarity are especially influential for guiding elite coordination: professional backgrounds, public speeches, and regulatory infrastructure. Below, I review literature on each type of social similarity in the context of international financial governance, to justify its use for predicting swap line receipt. I build on these inferences from relevant literatures to offer discrete, falsifiable hypotheses regarding social rationality in the Fed's decision process.

> H_1 (Walk Like Me): Similarity between foreign central bankers' and Federal Reserve members' professional backgrounds is positively associated with likelihood of a swap line.

Elites' shared professional ties matter for understanding political economic outcomes (Bourdieu 1998; Broughton 2008; Mills 1956). Individuals bridge organizations both within and across national boundaries via their shared professional experiences (Mizruchi 2013), which constructs club structures that guide group heuristic decisions. These ties are demonstrably consequential for elites' interactions with domestic regulatory bodies, and transnational financial governance generally (Seabrooke and Tsingou 2009). Importantly, this is not simply a feature of financial elites in the private sector, or pathologies within specific regulatory bodies. Rather, these broader ties of shared

professional backgrounds constitute large social spaces that connect members of the financial elite from both ends of the public-private divide (Young et al. 2017).

This is especially salient in the case of lenders of last resort, spanning a broad collection of institutions from the IMF (Chwieroth 2015; Chwieroth 2009), to domestic central banks (Johnson 2016). The effect of elite professional socialization has been tested not only in the industrialized West, but also in various Asian countries (Baker 2010; Selmier II 2013). It is not a circumstantial influence on financial governance, but rather generalizes across contemporary capitalist economies to a notable degree. In order to measure these relationships among central bankers, I draw on extensive work which leverages large-scale network analysis to map social ties among financial elites and organizations (Carroll 2004; Heemskerk et al. 2012; Mizruchi 2013; Van Apeldoorn and De Graaf 2014). In this approach, the distance within professional networks of foreign central banks to the Federal Reserve should be meaningful for the likelihood of a given central bank receiving a currency swap line from the Fed during the global financial crisis.

> H_2 (Talk Like Me): Similarity between foreign central bankers' and Federal Reserve members' public speeches is positively associated with likelihood of a swap line.

Central banks publicly attempt to both 'talk' and 'listen' to their respective markets; the Fed is not an outlier in this respect (Abolafia 2005; 1991, p. Ch. 1; Hall 2008; Holmes 2009). This dynamic is a feature of broader nuances in financial markets; they respond very actively to subtle differences in the wording of central bank communications, as significant investment is guided by their decisions. However, this is not strictly market-facing behavior. For example, one member of the Fed during the global financial crisis has described the linguistic homophily the Fed engaged in with foreign central banks: "Fed officials took pains to coordinate their communication with foreign central banks. Efforts were made to adopt common language in describing the dollar-liquidity problems that were faced and the policy actions that were put in place" (Sheets 2018, p. 2). Central bankers pay attention to one others' language, and it is a feature of their coordination.[2]

This relates to a broader literature on the nature of elite communities. Linguistic sociology offers robust accounts of shared vocabulary and grammar within these communities, and its influence for mutual adherence to shared norms and rules (Gumperz and Levinson 1991). These 'linguistic communities' matter for research within IPE, as exemplified by the significance of Federal Reserve communications for financial market volatility, coordinating both domestic and international policy, and transaction costs associated with trade negotiations (Amaya and Filbien 2015; Ehrmann and Fratzscher 2007b, 2007a; Hüning 2017; Selmier and Oh 2013). These social expectations would be useful heuristics for decision-making under the complex uncertainty associated with distributive crisis decisions (Abolafia 2005). The Fed's conscious attention to this coordination strongly suggests that this similarity affected socially rational decision-making.

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[2] Research shows central banks' pre-crisis statement strategies were targeted primarily toward market actors (Blinder et al. 2008) and highly differentiated between major central banks (Ehrmann and Fratzscher 2007a).

H₃ (Look Like Me): Similarity between the regulatory attributes of foreign central banks and the Federal Reserve is positively associated with likelihood of a swap line.

Shared regulatory infrastructure and distributive mechanisms mitigate uncertainty over the downstream use of a currency swap line, a concern highlighted by Fed members in discussing emerging market economy candidates, specifically (US Federal Reserve 2008a, pp. 10–11). Institutional characteristics of a central bank affect anything from its balance sheet stability, to its capacity to pursue unique crisis management policies (Barth et al. 2001; Davies and Green 2010; Dittmar et al. 1999). Predictability of how these swap lines would be used is important in the context of selecting appropriate foreign recipients, and institutional similarity to the Fed functions as a heuristic for this predictability. As such, it should be expected to play a role in socially rational decision-making at the Fed during the financial crisis.

Very few dimensions of central bank institutional design matter more to fellow central bankers than political independence (Beju et al. 2017; Garriga 2016; Kern et al. 2019; Mabbett and Schelkle 2019; McNamara 2002). This is especially salient in crisis conditions, as it affects the likely ways in which dollar swap funding would be used by those banks, a subject which Fed members discussed at length in their decisions (US Federal Reserve 2008b, pp. 30–39). This is further supported by a separate construct in IPE, institutional isomorphism, which suggests that pressures across functionally similar organizations leads them to become similar in more than just their formal duties (DiMaggio and Powell 1983; Frumkin and Galaskiewicz 2004). Given that this process produces perceived legitimacy among members of the organizational culture (Radaelli 2000), it serves only to compound the expectations that this dimension would serve as a socially rational heuristic for Fed decision-makers. Legitimacy, as a product of isomorphism, should further fill in gaps left by material uncertainty and socially inform Fed decision processes.

4 Data and variable measurement

The primary dependent variable in my analysis is whether a foreign central bank received a currency swap line from the Federal Reserve. This is a binary indicator, which equals 1 if a central bank received a swap line, and 0 if not, as is the standard specification in other analyses of this process (Aizenman and Pasricha 2010; Allen and Moessner 2010; Broz 2015). I also code other information on the swap lines by recipient, such as peak lending amount through the swap facility, and the date of the Fed's announcement regarding the central banks' selection as a recipient. These data are drawn from other analyses of this selection process, and confirmed with public records. The explanatory variables in this analysis fall into one of three classes: economic and political controls, materially rational predictors from prior studies, and socially rational predictors premised in the theory and hypotheses offered above. I describe each below in detail.

Drawing on existing analyses of this swap recipient selection process, and the decision factors highlighted by Fed members during discussions, I include a number of economic and political controls in this analysis. Members of the Fed explicitly

discussed selection preference for larger economies, with histories of sound economic management, and which were most affected by the crisis (US Federal Reserve 2008a, p. 10). I account for economic mass with logged values of GDP in 2007, as is common elsewhere. For history of sound economic management, I construct the same proxy as used in other studies, namely the 10-year average CPI inflation in a given country (Broz 2015, pp. 336–337). I proxy crisis depth with two measures: GDP growth in the fourth quarter of 2007, and the ratio of liquid liabilities to non-gold reserves in a country. These variables are built using data from the World Bank. I include additional controls in robustness tests, including FDI inflows drawn from the World Bank, US alliances from the Correlates of War Project (Gibler 2008), and Polity democracy scores (Marshall 2019).

Beyond these controls, there were a number of material factors which other research has demonstrated as consequential for swap line receipt. The first of these is the exposure of US banks to foreign markets, a key material explanation in a number of other studies on this selection process (Aizenman and Pasricha 2012; Broz 2015; McDowell 2017b). This is the sum of outstanding US claims in a foreign economy by the end of 2007, divided by the total volume of outstanding US bank claims internationally during that time (Broz 2015, pp. 334–335). This is thus measured as the percentage share of US bank exposure in 2007 to a given economy, and built with the consolidated banking statistics dataset from the Bank for International Settlements (BIS 2019). Similarly, I include a value for a country's share of total US trade in 2007 as a measure of trade exposure, drawing on data from the Correlates of War project (Barbieri et al. 2008). Finally, I include a binary variable indicating whether a foreign economy is a global financial center (Mainelli and Yeandle 2007). This maps not only onto theories that the Federal Reserve sought to preserve global economic stability, but also draws on extant evidence that these locations were more likely to receive swap lines, in general (Broz 2015, p. 335).

Finally, I construct three indicators of social similarity between foreign central banks and the Federal Reserve, in line with the hypotheses presented earlier. The first of these measures the similarity of foreign central bankers' professional backgrounds to Fed members' ('walk like me'). There are several means of measuring professional similarity, and here I draw on a recently introduced construct of 'social distance' in the political economy of finance (Young et al. 2017). The basic logic is that actors in global finance inhabit complex networks composed of their professional relationships, and their mutual distance in those networks has social import. This approach to social distance permits the mapping of social space inhabited by actors and organizations in global finance, and the estimation of their respective proximities to one another.

For this analysis, I build measures of social distance between central banks following the same basic logic. I use BoardEx data to construct these networks, which includes information on the employment of senior personnel in over 800,000 organizations across several decades.[3] The first step of measuring social distance between central banks involves building a network of individuals and organizations, linked by employment, for each year of data. I then collapse this network to include only

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[3] This dataset has cases of differently recorded firm names for what is actually the same organization. I use the approach developed by (Marple et al. 2017) to disambiguate the redundant names; see the original paper for description of the impact of these techniques on correcting network metrics such as distance scores.

organizations, with connections between them proportional to the number of their shared employees within a given time window. Finally, I measure spatial distance between any foreign central banks and the Federal Reserve in this network. I normalize these scores such that central banks with infinite distance (no network path to the Fed) have a proximity score of 0, and the Federal Reserve (with perfectly zero-distance to itself) has a proximity score of 1.[4] The final score included in the regression models below is the maximum proximity of central banks to the Fed within networks built from employment data in the five years preceding the crisis.

The second social predictor pertains to the similarity of central bankers' speeches against those made by Federal Reserve members ('talk like me'). The Bank for International Settlements hosts a public repository of central bankers' speeches, collected on the grounds of their substantive importance, recency, and delivery by a senior central banker.[5] This contains over 10,000 speeches given by senior central bankers between 1997 and 2018. This measure of similarity is captured by the proportion of shared, meaningful terminology across central bankers' speeches in each year.[6]

This score is specifically estimated as the percentage of shared unique terms in speeches by members of the Federal Reserve and representatives from all foreign central banks in any given year (Mullen 2015: 16). These speeches are first cleaned of common terms, such as prepositions and conjunctions, in order to capture the proportion of shared meaningful terms, as in other work on central banker speeches (Amaya and Filbien 2015). Then, for each central bank, I estimate this proportion of shared terminology for every pair of their speeches and those from the Fed, in every year of the data. In total, these measures drew from comparisons of over 12 million pairs of speeches made by central bankers and Fed members between 1997 and 2006, omitting speeches in 2007 due to the intentional nature of linguistic coordination with the Fed, as described by one member previously. The measure included in the models is the maximum similarity score of foreign central banks' speeches with Fed members' speeches in the five years preceding the crisis.

The third and final social predictor measures the similarity of foreign central banks' institutional designs to the Fed's ('look like me'). While institutional design of central banks is broadly consequential for understanding global finance, the role of central bank independence is especially salient (see: Beju et al. 2017; Kern et al. 2019; Levieuge et al. 2017; Pinter 2018).[7] I estimate this similarity score as the absolute value of the pairwise differences between foreign central banks' independence scores, from the Federal Reserve's score in 2007. As such, this indicator reports institutional *dissimilarity*, and I expect it to have a negative effect in the probability of swap receipt. Because there are a broad number of datasets available on central bank independence, I drew from a recently compiled and updated version of the score which covers virtually

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[4] Edge weights were log-normalized, as in (Young et al. 2017) for appropriate distance estimation.

[5] A representative for the BIS highlighted these parameters in an e-mail from August 8, 2016 (Canelli 2016)

[6] These speeches were downloaded from the main website in bulk, as permitted by the organization. Each speech was coded using the front-matter of the speech, wherein the individual and their organizational and national affiliations are listed. These codes were checked to ensure consistency, and no errors were found. See appendix I for more detailed information on the population of this speech similarity indicator.

[7] There is an extensive literature review on the social construction and social importance of these measures, even when not relative to another state as specified here. See: Cargill 2016; McNamara 2002; & Tognato 2012 for review.

all countries in the world system (Garriga 2016). These data improve on others with approximately 100 more countries, and with more granular variance in the metric across observations.

5 Empirical results

The data compiled to test these hypotheses allow me to explore the role of social similarity under three different scope conditions. First, as these covariates have been collected for every foreign economy on which they are available, I test the aggregate effect of social rationality alongside material predictors in logistic regression models to estimate effects on likelihood of a swap line. Second, I use the results of these models to test more specifically for social covariates' effects among recipient states, and the degree to which social predictors reduced uncertainty among the final swap line recipients. Third, I pair these data with other supporting evidence to demonstrate that in at least one pair of cases, these social measures were the deciding factor in swap receipt. In this section, I use the data described above to test the effects of social rationality in each of these scope conditions, moving from all cases, to final recipients, and to the cases of New Zealand and Chile.

The hypotheses generated from my theory of social rationality in swap recipient selection across all foreign economies are strongly supported by regression results. Table 1 reports coefficient estimates on relevant control variables, material predictors, and social predictors, from logistic regression models with robust standard errors.[8] In these models, I exclude independent Eurozone states (as the ECB received a single covering swap line), and include an observation for the entire EU area with aggregated values (summed or averaged where appropriate). I also exclude all states which do not have a central bank. Models in Table 1 include all recipient banks, though the results are consistent when excluding the first two groups of recipients (UK, Switzerland, Canada, Japan, and the EU), which had clear, immediate material need for dollar liquidity.[9]

All economic controls are in the expected direction; higher economic mass is positively associated with swap receipt, and higher GDP growth is negatively associated with swap receipt.[10] Ten-year inflation averages, as a negative proxy for good economic management, are significantly and negatively related to swap line receipt as expected. As in prior studies, US bank exposure is positive and significant, and holding all else equal, share of US trade is negative and inconsistently significant across these models. Controlling for these effects, the coefficient estimates on all three social predictors are significant at or below the 0.05 level, and in the expected direction.

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[8] Summary statistics for these variables are reported in Appendix II. Some variables have been logged for the regression models. White tests for heteroskedasticity show R^2 on uncorrected models ranging from 0.06 to 0.18, indicating a need for robust (HC1) standard errors. Results are consistent and significant in probit model specifications.

[9] See Appendix III for comparable models without these first two groups of recipients in the data

[10] The second measure of crisis depth, liquid liabilities to non-gold reserves, performs identically well in these model specifications. It is omitted from table 1 due to greater missing data on this indicator than on GDP growth, and because the global financial center covariate significantly predicts it ($\beta = 1.92$; $p < 0.001$; $R^2 = 0.14$). Appendix IV demonstrates that the GDP growth and liability to non-gold reserves predictors have identical effects on the likelihood of swap receipt when tested independently of the financial center covariate.

Table 1 Swap Receipt Likelihood and Social Similarity

	Dependent variable: Swap Line Receipt			
	Walk	Talk	Look	–
Network Proximity	5.578**			
	(2.498)			
Speech Similarity		1.582***		
		(0.558)		
Institutional Dissimilarity			−2.793**	
			(1.364)	
GDP	1.449**	2.104***	1.144**	1.414**
	(0.687)	(0.795)	(0.527)	(0.594)
GDP Growth (%)	−2.253***	−4.528***	−4.091**	−2.252***
	(0.783)	(1.238)	(1.601)	(0.843)
Inflation	−0.579***	−0.446**	−0.662***	−0.483***
	(0.173)	(0.218)	(0.203)	(0.167)
Global Financial Center	18.225***	21.574***	20.246***	18.702***
	(1.803)	(1.966)	(2.724)	(1.696)
US Trade Share (%)	−1.036*	−0.703	−1.049	−1.249**
	(0.535)	(0.892)	(0.865)	(0.582)
US Bank Exposure	2.525**	2.403**	3.047***	2.609**
	(1.093)	(1.024)	(1.053)	(1.125)
Constant	−58.753**	−53.764***	−12.497	−33.444**
	(23.062)	(20.816)	(15.750)	(15.416)
N	139	139	137	139
Pseudo-R^2	0.895	0.933	0.914	0.887

Note:

$^*p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$

Proximity to the Fed in professional co-employment networks, similarity of speeches, and institutional similarity are all major predictors of swap line receipt from the Fed during the financial crisis.

These models demonstrate that, even in aggregate, socially rational factors had a significant effect on the Fed's ultimate selection of swap line recipients among all relevant central banks. These results are robust to a number of other relational predictors which could be argued as confounding vectors of similarity, including total FDI inflows in a foreign economy, formal security alliance statuses of foreign states with the United States, and whether the foreign state is also a democracy (see Appendix V for these robustness test models). Even alongside this battery of other potential confounds, all of which are insignificant with the exception of democracy, the primary social predictors from Table 1 remain significant and in the expected direction. These effects are also robust to different time specifications of measurement; professional and speech similarity maintain positive coefficient estimates at both 1-year and 10-year average

measures beyond the 5-year averages tested in Table 1 (see Appendix VI for sensitivity test models).

These results offer strong support for the theory; even in aggregate, social predictors played a role alongside material factors.[11] However, it is not clear that every recipient presented the same degree of uncertainty to Fed decision-makers when they were considered for a swap. The regression results above allow for a deeper look into the residual material uncertainty associated with each swap recipient. The control model in Table 1 (fourth column) yields the predicted probabilities of each case receiving a swap, based on strictly material factors per the existing approaches to this process. The residual of these probabilities, or their difference from 1, can be understood as the material uncertainty in each recipient case. These material probabilities and residual uncertainty can then be paired with the predictions from the social models, and used to estimate the degree of material uncertainty that is reduced by incorporating these social predictors into the models. Table 2 reports these values for all states that received a swap line, delineated by the order and grouping of their receipt and predicted probabilities across the two classes of models.

This table reveals interesting dynamics associated with the swap selection process at the Fed during the crisis. First, the uncertainty with initial swap recipients was virtually zero; the five swap lines initially announced by the Fed went to cases with clear material need. However, the latter nine swap lines were distributed to states with a wide band of material uncertainty, ranging from 0% (Singapore) to 95% (New Zealand). Naturally, there was no uncertainty to reduce in states from these first two groups of swap recipients, given materially predicted receipt probabilities of 100%. However, among the other groups, these social factors reduce residual material uncertainty by 58.8% (proportion of material uncertainty column absorbed by the social correction column). This effect is larger in the third group, with an average reduction of 82.2%, but is still large in the fourth group at 40.1% (50.2% excluding Singapore). These nine swap recipients are thus significantly better explained by material and social predictors together than by the material predictors alone.

This trend offers two useful insights related to the broader argument of this paper. First, uncertainty was clearly not homogeneous among the swap recipients, and the Fed acted first with counterparties who had the most severe and demonstrable material need. This confirms a number of separate accounts, and lends credence to the notion that social factors matter for swap selection in addition to, not instead of material factors. Second, this trend demonstrates that as the Fed extended these facilities to broader groups of considered counterparties, as in the third and fourth group of final recipients, their decision process faced an increasing band of uncertainty along material dimensions. Even among states from the third and fourth group of swap line recipients, social factors served to increase the certainty associated with their receipt as predicted by these statistical models. Social predictors' ability to reduce this uncertainty serves as strong evidence that social rationality played a crucial role in the swap selection process

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[11] Please see Appendix VII for an asymptotic equivalent of the Hausman test showing no evidence of endogeneity in the speech similarity covariate within the second model presented in Table 1. Please see Appendix VIII for a test of multicollinearity in the CBI predictor, which shows no evidence for coefficient estimate issues in the main models.

Table 2 Receipt Probability by Model Among Recipient Banks

State	Group	Material Probability	Material Uncertainty	Social Probability	Social Correction	Peak Lending
Switzerland	1	100%	0%	100%	0%	$13.1b
European Union	1	100%	0%	100%	0%	$170.9b
United Kingdom	2	100%	0%	100%	0%	$96.3b
Canada	2	100%	0%	100%	0%	$0.0b
Japan	2	100%	0%	100%	0%	$50.2b
Denmark	3	99.15%	0.85%	99.92%	0.77%	$10.0b
Australia	3	98.12%	1.88%	99.76%	1.64%	$10.0b
Norway	3	89.22%	10.78%	97.60%	8.38%	$8.0b
Sweden	3	75.43%	24.57%	93.47%	18.04%	$10.0b
Singapore	4	100%	0%	100%	0%	$0.0b
Korea	4	94.78%	5.22%	96.66%	1.88%	$4.0b
Mexico	4	67.94%	32.06%	91.80%	23.86%	$3.2b
Brazil	4	61.64%	38.36%	68.31%	6.67%	$0.0b
New Zealand	4	5.35%	94.65%	74.23%	68.88%	$0.0b

at the Fed, not only in aggregate selection, but specifically among the cases where one would expect it to have influence.

Finally, there is evidence that social rationality played a deciding role in some discussions on swap recipients who exhibited very high residual material uncertainty. An especially salient example is the October 29th, 2008 meeting, when members discussed the fourth group of recipients detailed in Table 2 (US Federal Reserve 2008a). While the four emerging market economies which did receive a swap line following this meeting have been well studied in other research (Aizenman and Pasricha 2010), this meeting leaves another unanswered puzzle. Specifically: why did New Zealand receive a swap line, when Chile did not? Both states were discussed explicitly during this October meeting, and each had support among some members present. Each was described as a 'complementary' addition to other swap recipients in prior groups, especially the third group including Australia, Denmark, Norway, and Sweden (US Federal Reserve 2008a, pp. 10, 17–18). Chile even formally requested a line (Prasad 2015, p. 208). When accounting for material factors from the control model in Table 1, both of these candidates had a predicted probability near 5%; of these two materially uncertain cases, one received a line.

A close reading of these meeting minutes, however, shows very different treatment for these two potential recipients. Richard Fisher introduces Chile as a candidate early in the meeting, on the grounds that 'its representation is important and its nature unique,' arguing it would be 'complementary' to other emerging market recipients 'by virtue of their immediate impact on our economy, their unique role in our hemisphere, and the fact that I doubt that they would want to go to the IMF in the first place' (US Federal Reserve 2008a, pp. 17–18). The reception to this proposal was

fascinating and mixed; it produced a discussion over the following 12 pages of meeting notes where members discussed cases 'like Chile,' and their respective positions on whether they should be included in the broader swap line facilities. Chile here was a heuristic for uncertain candidates that members had to decide on during this meeting.

The response to Chile's candidacy was very mixed. Eric Rosengren pushed back, arguing that 'rather than trying to draw the line and figure out whether Chile or some other country is appropriate, we could collateralize it. … that might be an alternative way to draw the line rather than trying to come up with criteria that seemed a little difficult to understand' (US Federal Reserve 2008a, pp. 25–26). Yet others, such as Thomas Hoenig, bristled at this reaction and asked: 'what will happen, then, if we do have an issue that involves—pick a country—Chile? Are we going to send them to the IMF? … Will that then create uncertainties about others? Are you really not concerned about the stigma and the implications of this?' (US Federal Reserve 2008b, p. 28). In the pages of meeting notes where Chile's candidacy was discussed, material factors were not once used as features in a final decision. Rather, the majority of the discussion hinged on the implications of uncertainty, stigma, and costs of not knowing.

As compared to Chile, one would expect that New Zealand was a sure case in reading these meeting minutes. The state's candidacy for a swap was mentioned only once, by Chairman Bernanke, on the grounds that it 'would complement the swap agreements that we have already enacted' (US Federal Reserve 2008b, p. 10). There was no comment on New Zealand's candidacy, and no opposition when it was raised for a vote later in the meeting minutes. Although the two states were discussed in the same group of uncertain candidates, and had virtually identical predicted probabilities of swap receipt from material models, Chile faced extreme scrutiny and did not receive a swap line, whereas New Zealand was approved without any discussion by present members. What explains this significantly different treatment of otherwise comparable candidates at the Fed during this final and most materially uncertain selection process? I argue that social similarity ultimately played the deciding role in the selection between these two cases, and that these social factors sufficiently corrected the uncertainty Fed members associated with each case.

Table 3 reports the predicted probabilities for both Chile and New Zealand, drawn from both material models, and models with social factors included. As previously mentioned, the two states are nearly equally likely recipients when considering material factors alone; New Zealand was only 1.05 times (0.25%) more likely than Chile to receive a swap along these dimensions. However, when accounting for social factors in the expanded models, New Zealand is more than 500 times (74.1%) more likely to receive a swap than Chile, mapping directly onto the observed outcomes of this selection process and the discussion of the two cases in the meeting minutes. Broadly, while the two candidates would be indistinguishable in other existing analyses of this swap recipient selection process, the theory of social rationality and swap selection proposed and tested in this paper helps to explain the differences in their outcomes significantly better.

This difference in swap selection seems to have had real implications for these materially uncertain cases. One immediate measure is the difference in pre- and post-crisis averages of liquid liabilities to non-gold reserves ratios for both states. While Chile witnessed an insignificant increase (+6.74 %, $p = 0.341$), New Zealand saw a significant, sharp 28.89% drop ($p = 0.001$) following the crisis. This aligns closely with

Table 3 Probability of Receipt for Cases by Model

	Swap?	Material Probability	Social Probability	Ratio
New Zealand	Yes	5.35%	74.23%	13.88
Chile	No	5.10%	0.13%	0.03
Ratio	–	1.05	580.54	–

other evidence regarding these economies' post-crisis recovery patterns. Chile saw broad drops in output and disruptions in the financial sector, and in the same report, heavily faulted the US regulatory system for the crisis and these effects (De Gregorio 2009, pp. 4–5). Conversely, New Zealand issued a post-crisis report crediting US swap lines for stabilizing interest rates in fragile financial markets (Bollard 2012, p. 59).

6 Discussion and conclusion

The global financial crisis was a rare example of regulatory decision-making under systemically complex and consequential uncertainty. Where previous analyses of Federal Reserve currency swap distribution have focused primarily on materially rational indicators of recipient selection, I argue that this approach offers only a partial explanation for the final recipient group. Drawing on psychological theories of decision-making under uncertainty and literature on regulatory elites' coordination, I assert that the social similarity between central banks and the Federal Reserve was a critical cognitive heuristic for Fed members in their decision-making on issuing these swap lines. The uncertainty of this crisis-era decision, I argue, was socially managed.

In order to defend this assertion, I offered three hypotheses regarding the role of professional, speech, and institutional similarity in swap line receipt, derived from literature on the psychology of human decision-making and elite behavior in financial governance. I then tested these three hypotheses with a novel dataset, comprised of material predictors leveraged in other studies, and three new variables of professional, speech, and institutional similarity between foreign central banks and the Fed. In logistic regression models predicting swap line receipt, all three variables are significant and in the expected direction. In a subset of only the recipient cases, I also demonstrated that these social models perform significantly better than the material models alone, showing that they account for a significant amount of residual uncertainty from the material predictors. Finally, in the case of New Zealand and Chile, I show using these models and external evidence that social similarity played a critical role in the choice between these two candidates. Broadly, all of this evidence demonstrates that social similarity played a meaningful role in swap selection not only in aggregate, but also specifically among the most materially uncertain cases among potential recipients. As expected, social rationality critically supplemented these decisions.

The results presented here have serious implications for the macroeconomic performance of economies across the world since the global financial crisis. The US may have relied on a number of strategic considerations to allocate these swap resources to foreign economies, ranging from simply its domestic banking interests (Broz 2015), to

the defense of its global hegemony writ large (Helleiner 2014). These are consequential for understanding the intended outcome of their actions during this time. However, given the evidence provided here that social similarity played some meaningful role in swap allocation, the effects of their decision range beyond the scope of their strategic, material intentions. We know recipients experienced significant dollar demand relief (Goldberg et al. 2010), and that non-recipients who needed these lines experienced serious, negative economic downturns (Aizenman and Pasricha 2012). Now we know that some of these post-crisis outcomes may have been decided by social factors, and not only material conditions.

These findings have several theoretical implications. First, they add to constructivist literature on identity and the international political economy of finance. Specifically, this analysis has offered a degree of nuance in terms of *when* social factors like homophily have strong influence. As suggested by theories of theories of decision-making under uncertainty, we should expect social heuristics to matter especially during times of significant uncertainty, and to function as a supplement to standard modes of decision-making. However, to clarify this nuance, future research should investigate the degree to which this type of cognition operates on a day-to-day basis. Beyond this, it is important to determine the scope conditions of this sort of rationality. For example, future research should explore if social similarity operated similarly among domestic banks under the TARP program. Broadly, while this paper has initiated an empirical investigation of social similarity in uncertain decision processes, it leaves open a broad array of domains in which to further test and refine the theoretical mechanisms at play among decision makers.

These results also suggest a need for future research on the drivers of this form of social similarity. While this analysis has demonstrated that socially rational factors held a meaningful effect on swap line decisions, it remains agnostic on the process by which this similarity was produced between central banks. It may thus be asked, what makes a state more or less "like" Chile or New Zealand, in the eyes of Federal Reserve members? Existing research has highlighted a number of ways in which this similarity may have been built, as in the case of epistemic capture of post-Soviet banking elites (McNamara 2002) or more on-going socialization processes at global forums (Tsingou 2014). There may also be meaningful historical determinants in some cases, such as a role of prior colonial history and institutional development, or cultural similarities along linguistic and professional lines. Future research should consider the ways in which this similarity is constructed, in order to better understand its effect in cases like this one.

Finally, there is also a very clear policy implication to these findings. While crises such as this one cannot be well-predicted, governance bodies such as the Federal Reserve can prepare for these events ahead of time. Virtually every other federal agency charged with oversight of a publicly hazardous sector is mandated to prepare for catastrophic outcomes within their purview (La Porte 2015). It is unreasonable to exempt financial management bodies such as the Fed from this general rule, especially given the scale of the global financial crisis and the stop-gap approaches witnessed during its fallout. Standard operating procedures and emergency plans are precisely the sort of preparation which reduce reliance on the social heuristics analyzed in this paper, and would make the Fed a far more equitable and robust lender of last resort in future crises. As such, the evidence offered in this piece suggests a need to

treat central banks as any other public regulatory body: responsible for preparing responses to potential catastrophes.

Compliance with ethical standards

Conflicts of interest   I have no conflicts of interest to declare for this piece.

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