

# What Drives Global Lending Syndication? Effects of Cross-Country Capital Regulation Gaps

**Janet Gao**  
*Indiana University*  
janetgao@indiana.edu

**Yeejin Jang**  
*University of New South Wales*  
y.jang@unsw.edu.au

## Abstract

We examine how cross-country differences in capital regulations shape the structure of global lending syndicates. Using globally syndicated loans extended by banks from 44 countries, we find that strictly regulated banks participate more in syndicates originated by lead lenders facing less stringent capital regulations. This finding is consistent with the explanation that strictly regulated banks seek risky deals outside the border and loosely regulated banks have an advantage to procure such deals. Accordingly, lending syndicates involving loosely regulated lead arrangers and strictly regulated participants extend loans to riskier borrowers, charge higher spreads, and incur higher default rates. The effect of regulatory differences is mitigated when participants are subject to higher accounting standards, and amplified when the participant and lead banks share prior syndicate relations. Finally, we show that global syndication exposes both participants and lead arrangers to greater systemic risk.

Key words: Global Syndication, Syndicated Loans, Capital Regulation, Bank Accounting.

JEL classification: G21, G30

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# 1 Introduction

The syndicated lending market has become highly globalized. Banks participate extensively in syndicates organized by banks from other countries, thus becoming closely connected in a global syndication network. Over the past two decades, the total amount of globally syndicated loans has risen from \$800 billion in the 1990s to over \$2 trillion in recent years. U.S. banks, for example, have increased their allocation to foreign-led syndicates from less than 30% of their total syndicated lending to nearly 60% during the period of 1995 through 2016. Despite the importance of global syndication, little is known regarding banks' incentives to form global syndicates. In particular, what makes banks participate in deals originated by lead lenders from other countries? Does this choice generate implications for the type of loans that are funded? Answering these questions is key to understanding the drivers underlying capital flows that fund large-scale corporate activities.

We examine how capital regulation gaps across countries shape the structure of global lending syndicates. Capital regulations have been shown to have a profound influence on banks' risk appetite and lending activities. There are at least two reasons for why capital regulations may generate an effect on global syndicate structure. First, banks under lax capital regulation regimes face fewer barriers in developing lending relationships with risky and more opaque borrowers (Thakor, 1996; Laeven and Levine, 2009). They can thus accumulate experience in prospecting, screening, and monitoring those borrowers. Second, banks facing restrictive regulations have an incentive to extend risky loans outside the border (e.g., Ongena et al., 2013). As countries do not perfectly synchronize their capital regulations, strictly regulated banks can rely on the expertise of a loosely-regulated lead bank to procure risky deals by participating in the lending syndicate it organizes.

Using a sample of globally syndicated loans extended by banks from 44 countries during the period of 1995–2016, we examine the structure of global lending syndicates in relation to the capital regulation disparity between lead and participant countries. We find that strictly regulated banks participate significantly more in syndicates organized by loosely regulated lead arrangers. This pattern is robust to controlling for bank-pair fixed effects and year fixed effects. These specifications suggest that the observed relation be-

tween cross-country regulatory differences and global syndication is not driven by banks' innate characteristics or other time-invariant factors that affect the matching between banks. Notably, the association between capital regulation gaps and syndicate structures is concentrated in cases where the participant bank and the lead arranger have a prior syndication relationship and when the lead arranger has rich experience in lending to risky and opaque firms. Our estimates suggest that a one-standard-deviation increase in the capital regulation gap is associated with a 9% *greater* increase in syndication activity when the participant and lead banks have syndicated in the past compared to the case where they have not. The same increase in regulation gaps also leads to a 20% *greater* increase in global syndication when the lead lenders become more specialized in deals with small, private, and unrated borrowers. Overall, we find that banks participate more in syndicates led by less regulated banks. This pattern is consistent with the lead banks having expertise in prospecting risky borrowers and participant banks seeking risky loans.

Note that our findings are not without tension. There are reasons to believe that global syndication structures do not relate to capital regulation gaps between lead and participant countries, or even exhibit the opposite pattern to what we observe. First, syndicating with foreign banks can be subject to various frictions, including cultural differences, political risks, and legal barriers (Mian, 2006; Dell'Ariccia and Marquez, 2010; Giannetti and Yafeh, 2012). These frictions can diminish the benefit of participating in foreign-led syndicates. Second, lead arrangers facing restrictive capital regulations may also have the incentives to invite loosely regulated participants, as those participants can contribute cheap capital to the syndicate (Kashyap et al. 2010; Baker and Wurgler, 2015). Such an incentive predicts the opposite syndication pattern, i.e., the pairing between strictly regulated lead lenders and loosely regulated participants. The results we find thus reflect a "lower" bound of the effect of capital regulation gaps. In other words, our findings suggest that banks form global syndicates according to the regulation differences across their countries, even though they have to overcome other institutional frictions and competing incentives.

We investigate the economic mechanisms underlying our findings in several steps. First, we inspect borrower and loan characteristics to test the argument that strictly reg-

ulated banks syndicate with loosely regulated lead arrangers in order to invest in risky deals. We first note that loosely regulated lead lenders originate more deals to small, private, and unrated firms. Banks from other countries facing more stringent capital regulations than the lead lenders are also more likely to participate in such deals. Moreover, syndicates involving more stringently regulated participants charge higher interest rate spreads to their borrowers and incur higher default rates. The effect is economically large: a one-standard-deviation increase in capital regulation gap between lead lenders and participant banks is associated with a 5-basis-point increase in loan spreads and a 50% increase in default rate relative to the sample average. These findings are consistent with tightly regulated banks seeking riskier deals arranged by less regulated lead banks.

How does global syndication benefit the participants? We posit that, aside from sharing the expertise of a foreign lead lender, strictly regulated participants can invest in risky deals outside the border without facing increased regulatory scrutiny. As borrowers of syndicated loans often reside in the same country as the lead arranger, they are often outside the home country of our participant banks of interest. The geographical distance between borrowers and participant banks (and thus their regulators) generates additional difficulty preventing regulators from accurately assessing the credit quality of those borrowers.<sup>1</sup> This opens the opportunity for banks to manipulate the reporting of the credit risk associated with those loans.

To substantiate this claim, we explore the role of accounting standards and capital adequacy in modulating banks' incentives to participate in foreign-led lending syndicates. If banks are required to publish high-quality, transparent accounting statements, their regulators will face less challenge in evaluating the credit quality of banks' assets. This will make it less appealing for banks to seek risky investment outside the border, potentially through global syndication. As such, we expect that accounting quality should mitigate the effects of capital regulation disparity across countries. If a bank has low capital

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<sup>1</sup>Regulators also recognize that examining foreign syndicated loans is not as straightforward as examining domestic loans. For example, the "Manual of Examination Policies" issued by the FDIC claims that "the difference in international lending is that applicable information is usually less readily available and less detailed.... Thus, in the financial evaluation of international loans, the credit decision must frequently be based on information inferior to that available in domestic applications."

reserves, it is more likely to face a binding capital requirement. We expect such a bank to have a greater incentive to seek risky deals by joining global syndicates. Consistent with our conjectures, we find that banks facing stringent capital regulations increase their syndication activity with loosely regulated lead lenders by 16% if they face low accounting standards. Strictly regulated banks also increase global syndication activity by 7% if they have low Tier 1 capital.

Consistent with banks investing in riskier loans through foreign-led syndication, such syndication activities are associated with increased systemic risk exposures for both the lead arranger and the participant banks. We consider a range of market-based measures of systemic risk, including long-run marginal expected shortfall (LRMES), the variance of banks' stock prices, and the correlation of a bank's stock returns with the MSCI world index. Across all measures of systemic risks, we find that banks are exposed to greater risks when they participate more in syndicates led by loosely regulated lead arrangers. Moreover, lead banks that source capital from more strictly regulated participant banks are also more exposed to systemic risks. This finding helps to rule out an alternative explanation, which states that lead lenders invite strictly regulated participants because those participants have stronger balance sheets and are better able to withstand shocks. This hypothesis suggests that global syndication should reduce risk exposure, instead of increasing it. It is also at odds with our finding that poorly capitalized banks are more frequent participants of global syndicates than well capitalized banks.

We conduct two additional analyses to address potential endogeneity concerns that could bias our findings. We begin by addressing the concern that our results could be driven entirely by borrowers' credit demand. To remove the effects of borrower-side determinants, we design a test that holds fixed the time-varying conditions of the borrower and examine the relation between a country's capital regulation stringency and its banks' likelihood to participate in the lending syndicate. Our estimates suggest that a one-standard-deviation increase in the stringency of capital regulation is associated with a 14% increase in the likelihood that a bank participates in a given global syndicate. This result shows that the relation between capital regulation stringency and banks' tendency

to participate in foreign-led syndicates is not solely driven by borrowers' credit demand. We next address a reverse causality concern that global syndication may influence the differences in capital regulations across countries. We employ an instrumental variable (IV) estimation, selecting as instruments the historical and social features of a country that have been shown to predict banking regulation (e.g., Houston et al., 2012; Karolyi and Taboaba 2015). The IV-based analyses confirm our baseline results that differences in capital stringency promote the syndication between strictly regulated participants and loosely regulated lead arrangers.

In our final analyses, we test the robustness of our baseline results to alternative measurement and sampling choices. First, we measure syndication activities using the dollar amount of loan shares contributed by each bank. We next control for participant and lead banks' having a subsidiary in each other's country. Lastly, we consider other risk-inducing banking regulations instead of capital regulation, such as low requirement to entry and deposit insurance. Our results persist throughout all of these analyses.

Our study is the first to examine banks' participation choice in global lending syndicates. There has been limited research on the formation and structure of syndication networks, especially in a global context. The majority of studies in the debt contracting literature do not discuss the composition of lending syndicates. Cai (2010) and Cai et al. (2017) explore reasons for syndication such as reciprocity and past lending experience, but do not consider syndicate formation among banks from different countries. Houston et al. (2018) examine the effect of social ties between bank executives on the likelihood that they co-lead a lending syndicate. Our study complements their work by examining how participant banks match with lead arrangers in a global context. Our findings suggest that capital regulation gaps across countries have a strong influence on the formation of global syndicates, leading strictly regulated banks to participate in syndicates organized by loosely regulated lead lenders. Importantly, such a syndicate structure is associated with greater systemic risk exposure. As capital regulations are designed to promote the safety and soundness of banking systems, our findings generate implications for banks' risk-taking incentives and the effectiveness of banking regulations.

Our study also contributes to research on the syndicated loans market. Existing studies in this area generally focus on the information asymmetry between lead and participant lenders and the effect of lead lenders' reputation (e.g., Sufi, 2007; Ball et al., 2008; Ivashina, 2009; Gopalan et al., 2011; Bushman et al., 2017). Other studies examine the effect of institutional investors' participation on contract terms (Ivashina and Sun, 2011; Lim et al., 2014). This literature has not examined the composition of syndicate members in detail, or banks' choice of syndication partners from other countries. We add to this research by showing that global syndication is a dominant feature of this market and that banks can strategically choose their syndicate partners to exploit capital regulatory differences across countries. Our results also suggest that high-quality accounting standards enforced in a country can deter banks' strategic syndication motives.

Finally, our study adds to the discussion on banks' regulatory arbitrage behavior (e.g., Houston et al., 2012; Ongena et al., 2013; Karolyi and Taboada, 2015; Frame et al., 2017; Karolyi et al., 2018). Studies in this literature focus on banks' investment activities outside the border, such as establishing foreign subsidiaries, setting up branches, and acquiring other banks. They find that banks circumvent domestic regulations by investing in a less regulated country. Our findings add to this discussion by suggesting the role of global syndication. Specifically, participating in a global syndicate is a convenient way for tightly regulated banks to invest outside the border. In doing so, banks can rely on the expertise of a less regulated lead lenders to prospect, screen, and monitor risky borrowers.

The paper proceeds as follows. Section 2 discusses existing literature and develops testable hypotheses. Section 3 introduces the data source, sample construction, and empirical strategy. Section 4 presents results regarding the relationship between capital regulation gaps and global syndication structure. Section 5 tests potential economic mechanisms. Section 6 describes analyses to address endogeneity concerns. Section 7 discusses additional robustness tests. Section 8 concludes.

## 2 Hypothesis development

### 2.1 Global syndication

There is limited research on the formation of global syndication networks. In particular, little is known regarding what determines the pairing between lead arrangers and participant lenders from other countries. The extant literature on debt contracting often takes the structure of lending syndicates as given (e.g., Dichev and Skinner, 2002; Asquith et al., 2005; Armstrong et al., 2010). Some studies focus on the shares retained by lead arrangers and investigate how lead lenders' shares can be influenced by the information asymmetry between lead and participant lenders or the information frictions between lenders and borrowers (e.g., Sufi, 2007; Ball et al., 2008; Ivashina, 2009; Gopalan et al., 2011; Lin et al., 2011; Bushman et al., 2017). Yet, these studies do not focus on the composition of syndicate participants or examine the matching between lead arrangers and participant banks.

Some recent studies focus on a specific type of syndicate lenders and how their participation influences loan pricing. For example, Ivashina and Sun (2011) and Lim et al. (2014) study the demand from institutional investors. Other studies consider syndicate formation based on experience or expertise. Cai (2010) shows that syndicate lenders follow a reciprocal arrangement, in which lead arrangers participate in syndicates organized by their participants in the future. Cai et al. (2017) find that lead banks select syndicate participants based on the participants' past experience in similar loan types. A related paper, Houston et al. (2018), examines the lead-arranger network among a select group of large, global banks, and show that social ties among bank executives increase the likelihood that banks co-lead a lending syndicate.

We add to this line of research by examining the formation of global syndication networks. Our study considers the pairing between lead arrangers and participants across a wide range of countries and regulation regimes. By examining banks' participation in global lending syndicates in relation to the stringency of capital regulations they face, we present several innovations to the literature. First, we evaluate the importance of banking



regulations as a determinant of syndication structure. Second, as syndicated loans fund a substantial portion of corporate activities, we are able to assess the influence of global syndication activities on the access to credit by corporate borrowers. Finally, our analyses generate implications for the risk-taking incentives of banks and speak to the risk spillover across banking systems.

## **2.2 Capital regulation and bank lending behavior**

There is extensive research on the effect of capital regulations on banks' risk tolerance and lending choices. Prior studies show that capital-constrained banks cut lending in their home countries, particularly to risky borrowers (see, e.g., Thakor, 1996; Barth et al., 2004; Khwaja and Mian, 2008; Laeven and Levine, 2009). Using a panel of international banks, Barth et al. (2004) find a negative association between capital regulation stringency and non-performing loans. Laeven and Levine (2009) also document a positive relationship between capital stringency and bank financial health. As loosely-regulated banks face fewer restrictions in their lending choices, we posit that these banks have an advantage in building relationships with riskier and more opaque borrowers. Over time, banks facing lax capital regulations can develop an expertise in prospecting, screening, and monitoring risky borrowers. When these banks organize a lending syndicate, they can attract participants from other countries seeking risky investments.

Despite the continuing push for international coordination of banking regulations, substantial differences still exist regarding capital reserve requirements and the implementation of those requirements across countries. Such regulation gaps provide opportunities for strictly regulated banks to conduct risky investments outside the border. Growing evidence supports this conjecture: stringent regulations lead banks to set up subsidiaries, purchase assets, and branch out in less regulated countries (Houston et al., 2012; Ongena et al., 2013; Karolyi and Taboaba, 2015). These studies suggest that banks' investment activities are not completely bound by home country regulation. As such, we expect that strictly regulated banks have incentives to participate in global syndicates that lend to risky borrowers.

The findings of above studies that banks can evade home country regulation rely on the assumption that banks can obscure their foreign activities from regulators and report a lower risk level on their balance sheet. In the context of lending, there are at least two ways in which banks may manipulate their reporting to alleviate the burden of capital regulations. First, under risk-based capital regulations, banks have some discretion to assign risk weightings to their assets (Vallascas and Hagendorff, 2013; Begley et al., 2017).<sup>2</sup> Plosser and Santos (2018) find that low-capital banks bias downward the riskiness of their share in syndicated loans to improve their Tier 1 capital. Second, banks have discretions to adjust their loan loss provisions when they face capital constraints (Kim and Kross, 1998; Beatty et al., 2002; Bushman and Williams, 2015). For example, Beatty and Liao (2011) show that banks' reporting of loan loss provisions can moderate the impact of capital regulation on their lending amounts. Based on these two reasons, we expect banks to have greater discretion in reporting credit risk when borrowers are outside the border (which is often the case when banks participate in foreign-led syndicates). This is because regulators in the home country face more information frictions when assessing the risk profile of foreign borrowers.

## 2.3 Hypotheses

Based on the above discussion, we conjecture that loosely regulated banks have a greater advantage in leading syndicates that lend to riskier and more opaque borrowers. Tightly regulated banks have the incentive to invest in such lending syndicates because they face regulatory constraints in lending to risky borrowers in their home country, and also due to a lack of expertise in selecting and monitoring those borrowers. This leads to our main hypotheses:

**Hypothesis 1** *Banks participate more in syndicates organized by lead banks facing less stringent capital regulations.*

**Hypothesis 2** *Global syndicates involving participant banks under more stringent capital*

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<sup>2</sup>Risk-based capital regulations specify the minimum capital reserve as a percentage of risk-weighted assets, where the weighting scheme depends on broad risk categories of the assets (Basel Accords).

*regulations extend riskier loans.*

We also expect that banks under stringent regulations will have a greater incentive to seek risky, profitable investment opportunities outside the border when they are more capital constrained. This leads to the following hypothesis:

**Hypothesis 3** *Strictly regulated banks are more likely to be participants in global syndicates led by a loosely regulated lead arranger if those banks are more capital constrained and subject to lower accounting standards.*

Finally, we expect that all banks (both lead arrangers and participant banks) that seek risky loans through global syndication are more exposed to systemic risk. This is because participants contribute capital to assist the origination of risky deals.

**Hypothesis 4** *Banks that are more involved in global syndication are exposed to greater systemic risk.*

We also consider two sets of alternative hypotheses that predict different lending patterns in the global syndication market. First, lead arrangers may have incentives to choose less regulated participants, because those participants face lower costs of capital (Kashyap et al., 2010; Baker and Wurgler, 2015). Inviting less regulated participants can thus help the lead arrangers to stay competitive in the syndicated lending market. This argument generates the opposite prediction regarding global syndication structure as Hypothesis 1, which we outline below:

**Hypothesis 1a** *Banks participate more in syndicates organized by lead banks facing more stringent capital regulations.*

Second, it is also possible that lead arrangers in this market prefer participants under more stringent regulations because those participants have healthier balance sheets, which allow them to withstand negative credit shocks. The capital reserves of participants can cushion the lead arranger from potential spillover effects induced by those negative shocks as well (Nirei et al., 2016). This argument justifies the pairing between stringently

regulated participants and loosely regulated lead arrangers. Yet, it predicts that global syndicates are organized to diffuse credit risk instead of seeking risk:

**Hypothesis 3a** *Strictly regulated banks are less likely to be participants in global syndicates led by a loosely regulated lead arranger if those banks are more capital constrained and subject to lower accounting standards.*

**Hypothesis 4a** *Banks that are more involved in global syndication are exposed to lower systemic risk.*

## 3 Data

### 3.1 Sample Construction

We obtain data on syndicated bank loans during the period from 1995 through 2016 from the LPC Dealscan database. This database has been frequently used in studies on syndicated lending in the international context as well as research on the formation of lending syndicates (see, among others, Ferreira and Matos, 2012; Ivashina et al., 2015; Cai et al., 2017; Houston et al., 2018). We restrict the set of lenders to those classified as banks in Dealscan. We also focus on countries that are both active lenders and borrowers in the global syndication network. Specifically, we require a country to have more than five banks that have extended syndicated loans and to have borrowers receiving more than 200 loans throughout our sample period.<sup>3</sup> Single-lender loans and loans with missing country information for lenders are excluded. These selection criteria limit our sample to 44 countries, which originate more than 96% of the loans in the Dealscan universe. We further focus on “relevant” global syndication partners, i.e., pairs of banks from different countries that appear in the same syndicated deal at least once in our sample period. This criterion eliminates bank pairs with no variation in syndication activities thus preventing

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<sup>3</sup>We additionally exclude Vietnam and Panama from the sample due to the lack of bank regulation information and the prevalence of shell companies.

an inflation of the sample.<sup>4</sup>

We aggregate loans and classify locations of lenders based on ultimate parent banks. This aggregation choice takes into account that banks may extend loans through their foreign subsidiaries and the possibility that the capital adequacy of parent banks can affect the lending behavior of subsidiaries and branches.<sup>5</sup> To identify the ultimate parent bank of each lender, we primarily rely on the information regarding bank ownership structure provided by Dealscan and revise that information based on bank mergers.<sup>6</sup>

Our empirical objective is to examine the decision of banks to participate in loans originated by foreign lead arrangers.<sup>7</sup> We organize our testing sample in two ways. Our primary sample is a bank-pair-year panel that contains 673,108 observations of 55,149 bank pairs and spans the years from 1995 through 2016. The unit of observation is a pair of lead bank  $i$  and participant bank  $j$  ( $i \neq j$ ) in a given year  $t$ . These data provide granular information on how individual banks respond to country-level regulations, thus allowing us to examine whether the differences in capital regulation stringency between two countries affect the likelihood that banks from one country join syndicates initiated by banks from the other country.

Our second sample is a loan-level sample, in which the unit of observation is a syndicated loan package. This sample allows us to examine the implications of syndicate structures for corporate borrowers. To obtain borrowers' financial information, we match the borrowers in Dealscan to Compustat North America and Global databases.<sup>8</sup> Using the loan-level sample, we examine the riskiness of the loans extended by syndicates in-

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<sup>4</sup>Including all bank pairs will not change our statistical inferences.

<sup>5</sup>In untabulated analyses, we verify that our results hold if lender locations are classified at the subsidiary level. The majority of banks in our sample (92%) do not have subsidiaries outside their home countries. We discuss in greater detail the potential influence of this aggregation choice on our results and control for the existence of foreign subsidiaries in Appendix B.

<sup>6</sup>Dealscan provides information only on the most recent ownership status. For example, Wachovia was an independent bank entity prior to its merger with Wells Fargo in 2008, but it is identified in Dealscan as a subsidiary of Wells Fargo for all loans it extended. We re-assign loans to ultimate parent banks prior to those mergers based on banks' merger information from SDC, supplemented by institution history from the National Information Center (NIC). We thank Ha Nyugen for assisting us in this process.

<sup>7</sup>We follow Bharath et al. (2011) and define lead lenders as banks that are classified by Dealscan as "Lead Arranger," "Agent," "Administrative Agent," "Arranger," or "Lead Bank."

<sup>8</sup>This restricts our sample to loans extended to public firms. For U.S. borrowers, we use the link table provided by Chava and Roberts (2008) to match to Compustat, and for non-U.S. borrowers, we manually match to Global Compustat based on borrower names and locations.

volving loosely regulated lead arrangers and strictly regulated participants. Specifically, we look into the characteristics of borrowers, pricing terms, and performance of the loans.

### 3.2 Global Syndication Measures

We consider two measures of syndication activity. First, we define *Syndicate* as a dummy variable indicating whether banks from two countries syndicate together in a given year, with one bank being the lead arranger and the other bank being the participant. Specifically, *Syndicate* is defined as follows:

$$Syndicate_{i,j,t} = \max_{k \in K_{i,t}} 1_{i,j,k},$$

where  $i$  indicates a lead bank,  $j$  indicates a participant bank, and  $k$  indicates a syndicated loan.  $1_{i,j,k}$  is an indicator function that equals one if bank  $i$  is a lead arranger and bank  $j$  is a participant in loan  $k$ .<sup>9</sup>  $K_{i,t}$  represents the set of all globally syndicated loans extended by bank  $i$  in year  $t$ .

*Syndicate* is a coarse measure of global syndication because it does not capture the intensity of syndication activities or the relative importance of a specific participant to a lead arranger. We next construct a continuous variable to capture such information. For each bank pair, we define *%Syndicate* as the percentage number of syndicated loans in which bank  $i$  is a lead arranger and bank  $j$  is a participant as a proportion of the total number of syndicated loans originated by bank  $i$  in year  $t$ . *%Syndicate* is defined as:

$$\%Syndicate_{i,j,t} = \frac{n_{i,j,t}}{\sum_{h \in B_{i,t}} n_{i,h,t}},$$

where  $n_{i,j,t}$  represents the number of loans arranged by bank  $i$  in which bank  $j$  participates during year  $t$ , and  $B_{i,t}$  indicates the collection of all banks (both domestic and foreign) that have participated in syndicates originated by bank  $i$  in year  $t$ . Thus, *%Syndicate* reflects the importance of bank  $j$  to bank  $i$  relative to other participants of bank  $i$ .<sup>10</sup>

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<sup>9</sup>If bank  $a$  and bank  $b$  have participated in syndicates originated by each other, we assign two variables for this bank pair:  $(a, b, t)$  and  $(b, a, t)$ , where  $(a, b, t)$  indicates whether bank  $b$  participates in bank  $a$ 's deals in year  $t$  and  $(b, a, t)$  indicates whether bank  $a$  participates in bank  $b$ 's deals.

<sup>10</sup>In Section 7, we construct an alternative measure that considers the dollar amount of capital contributed by each participant bank. We do not use that measure as our main dependent variable because only 27% of loans have available information on lender shares in Dealscan.

### 3.3 Capital Regulation

We extract country-level capital regulatory stringency from Barth et al. (2013) (*Capital Stringency*). *Capital Stringency* is a composite index measuring the level of capital reserves required and the extent to which the capital requirement of a country reflects certain risk elements and market value losses. This index reflects not only the minimum capital adequacy ratio but also the source of capital reserves and the way in which banks assign risk weighting to their assets (Barth et al., 2004 and 2013). The regulatory indices are based on cross-country surveys conducted by the World Bank. Four surveys were conducted (in the years 1999, 2002, 2005, and 2011) in 107 countries. Following Karolyi and Taboada (2015), we apply this variable from the 1999 survey for observations from 1995 through 2001, the values from the 2002 survey for observations from 2002 through 2004, the values from the 2005 survey for observations from 2005 through 2010, and the values from the 2011 survey for observations from 2011 through 2016.

### 3.4 Controls

Syndication activities can be affected by the economic conditions in the country of each syndicate member. We thus control for country-level macroeconomic conditions that might affect the demand for and supply of bank credit. First, we control for the difference in investment opportunities available in the participant's country and the lead arranger's country using the difference in GDP per capita ( $\Delta GDP \text{ per Capita}$ ) and the difference in real GDP growth ( $\Delta GDP \text{ Growth}$ ). We further control for differences in currency appreciation ( $\Delta \text{Exchange Rate Return}$ ) and monetary policy rates ( $\Delta \text{Interest Rate}$ ) between two countries in a given year. In addition, we control for the information asymmetry and cultural differences between lead and participant countries using the log of geographical distance (*Distance*), an indicator variable denoting whether the two countries share the same language (*Common Language*), and the intensity of trade activities between two countries (*Bilateral Trade*). *Distance* is defined as the circle distance between the capital cities of two countries. We obtain these country-level macroeconomic variables from the World Bank and IMF databases.

In loan-level analyses, we control for borrower characteristics, including firm size, tangibility, profitability, and whether a firm has credit ratings. We also control for deal characteristics, such as loan maturity, covenants, loan size, and the number of facilities in a package. Detailed variable definitions and data sources are provided in Appendix A.

### 3.5 Empirical Methodology

Our baseline approach examines whether and how cross-country differences in the stringency of capital regulations relate to syndication activities between two banks. To do so, we regress measures of syndication between lead bank  $i$  and participant bank  $j$  on the difference in capital regulation stringency faced by those banks. Specifically, we estimate the following model:<sup>11</sup>

$$SyndicateActivity_{i,j,t} = \beta_1 \Delta Capital Stringency_{i,j,t} + \beta_2 Controls + \phi_i + \eta_j + \mu_t + \epsilon_{i,j,t}, \quad (1)$$

where  $i$  indicates a lead bank,  $j$  indicates a participant bank, and  $t$  indicates the year of observation.  $SyndicateActivity_{i,j,t} \in \{Syndicate_{i,j,t}, \%Syndicate_{i,j,t}\}$ .  $\Delta Capital Stringency_{i,j,t}$  measures the difference in capital regulation stringency between the participant bank country and lead bank country (i.e., participant – lead). Higher values of  $\Delta Capital Stringency_{i,j,t}$  indicate that the participant bank faces more stringent regulations than the lead arranger.

The estimation includes lead bank fixed effects ( $\phi_i$ ) and participant bank fixed effects ( $\eta_j$ ) to control for time-invariant characteristics of banks. Our strictest specification includes bank-pair fixed effects to control for matching effects between a lead arranger and a participant bank. We also include year fixed effects,  $\mu_t$ , to control for the correlation between syndication activities and capital regulation driven by common time-series trends. *Controls* include cross-country differences in macroeconomic conditions (i.e.,  $\Delta GDP per Capita$ ,  $\Delta GDP Growth$ ,  $\Delta Exchange Rate Return$ , and  $\Delta Interest Rate$ ), together with the geographical distance between two countries, whether they share a common language,

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<sup>11</sup>We estimate the equation using a linear probability model instead of probit or logit specifications, because nonlinear models could generate inconsistent results given the number of fixed effects included.





**Figure 1. Participation in global syndicates by U.S. banks over time.** This figure presents the time-series trend of U.S. banks’ participation in syndicated loans originated by banks from other countries (i.e., foreign-led syndicates). The blue columns indicate the total amount of capital that U.S. banks contribute to foreign-led syndicates every year. The solid line indicates the percentage of capital contributed by U.S. banks to foreign-led loans relative to the total capital contributed by U.S. banks to all syndicated loans each year. The left vertical axis shows the amount of contribution (in \$billions), the right vertical axis indicates percentage contribution, and the horizontal axis indicates years.

and the amount of bilateral trade. Since our independent variable captures regulatory gap between countries, standard errors are clustered at the country-pair level.

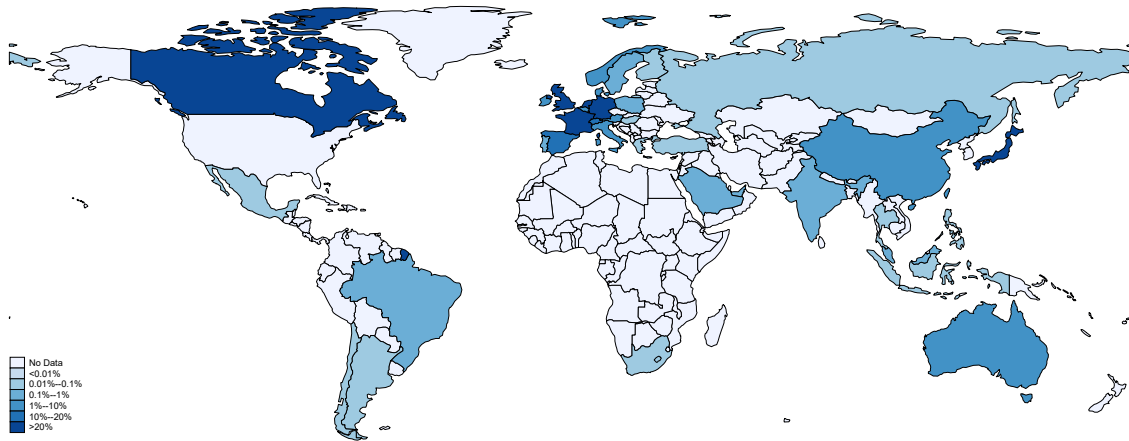
*Hypothesis 1* predicts that strictly regulated banks participate in global lending syndicates led by less regulated banks, which suggests that  $\beta_1 > 0$ . *Hypothesis 1a* suggests that  $\beta_1 < 0$ .

## 4 Capital Regulation Gaps and Global Syndication

### 4.1 Univariate Analyses

We start our analyses by describing some important characteristics of the syndicated lending market. We first take a U.S.-centered perspective to exemplify patterns and trends in banks’ participation in global syndicates. We then look at the correlation between a bank’s tendency to syndicate globally and the capital regulations it faces.

Figure 1 shows U.S. banks’ contribution to foreign-led syndicates over time. In the

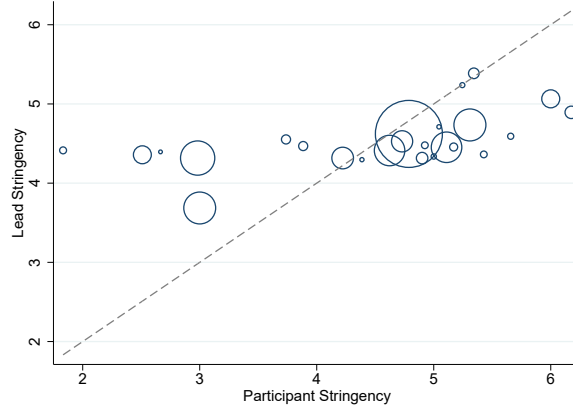


**Figure 2. Participation of Foreign Banks in U.S.-led Syndicates.** This figure illustrates the average percentage of the number of loans arranged by U.S. lead banks in which banks from a given country participate. The color scales suggest the degree of participation, with darker colors indicating a higher participation rate.

late 1990s, U.S. banks allocated less than \$100 billion capital to foreign-led syndicates, which accounts for a quarter of their total lending. By 2016, their contribution to foreign-led syndicates more than doubled, reaching nearly 60% of their total syndicated lending. This growing trend of cross-country syndication suggests that banks are increasingly connected in a global lending network, providing capital to borrowers around the world.

We next examine the heterogeneity in foreign banks’ participation in U.S.-led syndicates. Figure 2 depicts the percentage of syndicated loans participated by banks from each country, with darker colors indicating higher participation rates. There is considerable heterogeneity in syndicate participation rates across countries. For example, banks from Canada, E.U. countries, and Japan are among the most active participants in U.S.-led syndicates. Chinese, Indian, and Australian banks exhibit moderate participation rates, while Russia and other eastern European countries rarely participate. These patterns suggest that it is important to control for country-level intrinsic characteristics through fixed effects and measures of economic development such as GDP per capita.

Finally, we visualize the pairing between lead and participant banks in relation to the capital regulation stringency they face. Figure 3 exhibits the distribution of loans according to the capital stringency in the lead lenders’ and participants’ countries. Each circle represents the average capital regulation stringency faced by syndicate lead arrangers for participant banks in each country, and the size of the circle represents the total number



**Figure 3. Capital regulation stringency of lead and participant countries.** This figure shows the relationship between the capital stringency in the participant’s country and the lead lender’s country in global syndicates. The plot contains 25 countries that contribute the highest amount of capital in the syndicated lending market. Each circle represents the deals that banks from a given country participates in. The vertical axis represents the average capital stringency of all lead banks. The size of the circle represents the dollar amount of each country’s contribution, and the dashed line is a 45-degree line where the capital stringency of the lead arrangers equals that of the participant country.

of loans syndicated by those banks. For the brevity of display, we only use 25 most active participating countries in the syndicated lending market. The vertical (horizontal) axis represents the capital regulation stringency of the lead (participant) country. We also draw a 45-degree line that marks the boundary at which regulatory stringency is the same in the participant and lead countries. If banks’ choices of syndicate members are not related to the capital regulations they face, we should observe an even distribution of loans across all combinations of regulatory regimes. In contrast, the patterns in Figure 3 shows that the majority of loan syndicates are composed of relatively loosely regulated lead arrangers and strictly regulated participants (under the 45-degree line). The most strictly regulated participants deviate the most from the 45-degree line and join syndicates organized by loosely regulated lead arrangers.

In the remainder of this section, we report summary statistics related to the variables of interest in our study. Table 1 reports the capital regulation stringency and syndication activities for each of the top 20 countries in terms of syndicated lending volume. Column (1) reports capital regulation stringency for each country. Among the top syndicate lenders, U.S. banks are moderately regulated, with eight countries having equally strict or stricter capital regulations than U.S. and 11 countries with looser regulations. Column (2) shows the total loan amount originated by banks in each country. The statistics show

that U.S. banks are the most active players in the syndicated loans market, originating over \$32 billion worth of loans. Banks in U.K., Germany, France, and Japan are also high-volume lenders in this market. Column (3) presents the percentage of total loan amount contributed by foreign banks for loans originated by banks in a given country, and Column (4) reports the percentage of foreign participant banks over the total number of participants. There is substantial variation in the syndication structure across different countries. Japanese banks, for example, maintain a relatively “isolated” syndication style in that only approximately 30% of their syndicated loans are funded by foreign banks. In a typical Japan-led syndicate, foreign banks account for less than 20% of all syndicate members. European banks, on the other hand, seem to lend in a more “open” style. For example, in an average Swiss bank-led loan, 96% of syndicate participants are foreign banks, and those banks contribute 36% of the total loan amount. U.S. banks exhibit an intermediate degree of global syndication activity, as foreign banks account for 42% of participants for U.S.-led loans and contribute about 33% of the capital.

TABLE 1 ABOUT HERE

Table 2 provides the summary statistics for the variables we use in our analyses. Panel A reports statistics for the bank-pair-year sample, and Panel B provides statistics for the loan-level sample. Each panel includes measures of global syndication activities, cross-country differences in the stringency of capital regulation, and control variables. In the bank-pair-year sample, *Syndicate* ( $\%Syndicate$ ) has a mean of 0.26 (2.52) and a standard deviation of 0.44 (10.12). The average level of  $\Delta Capital Stringency$  is close to zero and has a standard deviation of 2.22. These statistics suggest that there is considerable variation in the stringency of capital regulation and syndication activities across countries and over time. In the loan-level sample,  $\Delta Capital Stringency$  has a standard deviation of 2.05. The average loan in our sample has about 64% participants that are located in a different country from the lead arranger.

TABLE 2 ABOUT HERE

## 4.2 Baseline Analyses

We estimate Equation 1 using a bank-pair-year panel to examine the relation between capital regulation differentials across countries and syndication activities. Table 3 reports the results. Columns (1) through (4) examine the likelihood of syndication between two banks, *Syndicate*, and Columns (5) through (8) consider the intensity of syndication activity, *%Syndicate*. For each dependent variable, we first report regression results with lead bank-, participant bank-, and year-fixed effects and then add controls in stages. Finally, we present the results with bank-pair-fixed effects.

TABLE 3 ABOUT HERE

We find that the differences in capital regulation stringency between the participant and lead countries are positively associated with syndication activities between the two banks. The estimates suggest that a one-standard-deviation increase in *Capital Stringency* for the participant country (2.22) is associated with a 1-percentage-point increase in the likelihood that banks from two countries collaborate on a syndicated lending deal, which represents a 4% increase relative to the sample average of the likelihood of global syndication. The analyses of the extent of syndication activity yield a similar effect. The estimates in Column (4) indicate that a participant is 0.11 percentage points more likely to join a lending syndicate organized by a lead arranger that faces looser capital regulation by one standard deviation. This magnitude accounts for an approximately 5% increase relative to the sample mean of *%Syndicate*.

The results from our baseline analyses are consistent with *Hypothesis 1*, i.e., strictly capital regulations create an incentive for banks to participate in global syndicates originated by loosely regulated banks in other countries.

## 4.3 Cross-Sectional Analyses

We explore cross-sectional characteristics that could influence banks' incentives for forming global syndicates. We first consider the lending relationships between lead and participant banks. Cross-country syndication is fraught with information frictions, cul-

tural or language barriers. Prior syndication experience should help to remove such frictions. We thus expect that, as the regulation gap between two countries widens, banks in those countries are more likely to form global syndicates if they have prior syndication experience before. Prior syndication experience is measured in two ways. First, we define *Past Syndicate Relationship*, a dummy variable that equals one if the lead and participant banks have collaborated in a syndicate deal in the previous five years, and zero otherwise. Second, we measure the extent of past syndication relationships using the number of past loans that two banks have extended jointly, scaled by the number of loans arranged by the lead bank, in the past five years (*Past Syndicated Loans*).

We next examine the role of lead banks' lending expertise. We expect that strictly regulated banks are more likely to participate in syndicates originated by banks that have more experience in prospecting risky and opaque borrowers. Lead lenders' experience is measured in three ways. First, we calculate the average size of borrowers for which a bank originated syndicated loans during the past five years (*Past Borrower Size*). A lower value of *Past Borrower Size* suggests that a bank has more experience lending to smaller (and potentially riskier) borrowers.<sup>12</sup> Second, we measure the percentage of private borrowers that a bank originated loans to in the past five years (*%Private Borrowers*). Finally, we use the percentage of past borrowers of a bank that do not have a credit rating at the time of loan origination (*%Unrated Borrowers*). Higher values of either of these measures indicate that a lead arranger has more experience lending to opaque borrowers.

We regress banks' global syndication activities on the full interaction of capital regulation gaps and the above bank characteristics. Table 4 reports the results. For brevity of display, we only report results for *%Syndicate*, although the results from *Syndicate* generate similar implications. Panel A displays results for past syndication experience. Columns (1) and (2) report results for the indicator for whether banks share a past syndication relationship. Columns (3) and (4) report results for the intensity of past syndication relationships. The interactive terms between  $\Delta$ *Capital Stringency* and measures of prior syndication experiences yield positive and statistically significant coefficients. The

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<sup>12</sup>*Past Borrower Size* is only estimated for loans extended to public borrowers.

estimates suggest that with a one-standard-deviation increase in regulation differences, banks with prior syndication experiences increase their global syndication activities by 9% more than banks without past syndication experiences ( $= 2.22 \times 0.098/2.52$ ). Our findings suggest that, as banks seek investment opportunities outside the border, they are more likely to turn to lead lenders with whom they have previously worked before.

TABLE 4 ABOUT HERE

Panel B reports results for lead banks' lending expertise. Columns (1) and (2) show results for past borrower size.  $\Delta Capital Stringency \times Past Borrower Size$  generates a negative coefficient, suggesting that strictly regulated banks are more likely to collaborate with lead arrangers that have rich lending experience with small borrowers. Columns (3) and (4) present results for lead banks' experience with private borrowers and Columns (5) and (6) display results for lead banks' experience with unrated borrowers. The interaction terms between capital regulation gaps and lead arrangers' experience with private and unrated borrowers both attract positive and significant coefficients. The estimates suggest that a one-standard-deviation increase in capital regulation gaps between the lead and participant countries is associated with a 6 (4) percent *greater* increase in global syndication activities if the lead arranger has worked with 10% more unrated (private) borrowers. These magnitudes account for around 20% changes relative to the sample mean of *%Syndicate*.

The results from our cross-sectional analyses help pinpoint factors that can alter banks' incentives to form global lending syndicates. The effect of capital regulation gaps on global syndication is concentrated for banks that have syndicated in the past, suggesting that syndication relationships build trust between banks and help them overcome frictions such as information asymmetry or cultural barriers. Strictly regulated banks are also more likely to join global syndicates whose lead arrangers have rich experience lending to smaller and more opaque borrowers. This evidence lends support to the argument that strictly regulated banks can benefit from the expertise of less regulated banks in originating risky loans through global syndication.

## 5 Economic Mechanisms and Implications

Why do strictly regulated banks participate in syndicates led by loosely regulated banks? We conduct several sets of analyses to investigate the economic mechanisms underlying this finding and its implications. First, we look into the characteristics of borrowers and the pricing and performance of loans associated with syndicates composed of loosely regulated lead arrangers and strictly regulated participants. This helps us verify the assumption that banks under lax regulations have the advantage of prospecting risky borrowers, and that banks under strict regulations seek risky investments. In the second step, we explore potential reasons for why strictly regulated banks may benefit from global syndication. In particular, we consider the possibility that strictly regulated banks may have the incentive and the discretion in reporting the risks related to foreign borrowers. Finally, we evaluate the implications of global syndication for the systemic risk exposure of both lead and participant lenders. If syndication provides a channel for global banks to procure and fund risky deals, we expect such lending activities to induce greater systemic risk exposure.

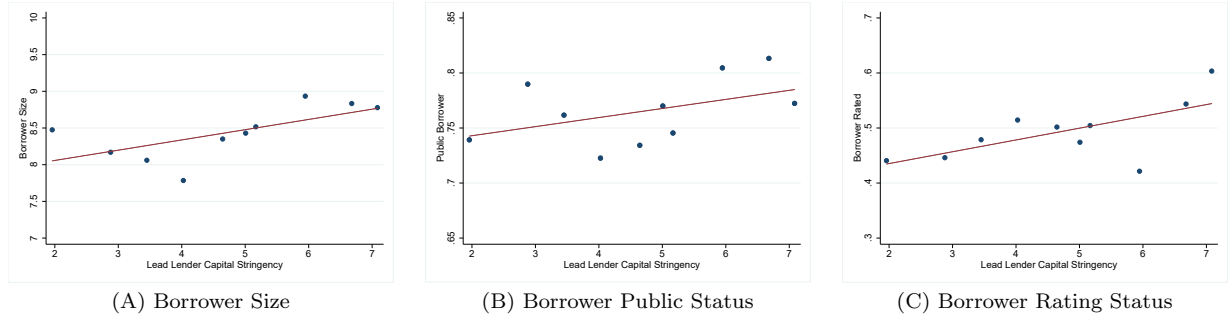
### 5.1 Borrower Selection, Loan Pricing, and Loan Performance

Our baseline results show that strictly-regulated banks often participate in global lending syndicates led by less regulated banks. This syndication pattern can be explained by strictly regulated participants seeking risky deals by relying on less regulated banks, who have the advantage to prospect risky borrowers. We verify this explanation by examining whether loosely regulated lead lenders and stringently regulated participants extend loans to riskier borrowers. We also examine whether those loans have higher interest rate spreads and higher default rates.

#### 5.1.1 Borrower Characteristics and Lead Lenders' Capital Stringency

We begin by looking into the relationship between borrowers' credit quality and the capital regulation stringency faced by lead arrangers. We consider several measures of





**Figure 4. Capital stringency faced by lead arrangers and borrower characteristics.** This figure depicts the relation between lead arrangers’ capital regulation stringency and the characteristics of the borrower they lend to. Panel (A) shows borrower size. Panel (B) shows the percentage of borrowers that are public firms, and Panel (C) shows the percentage of borrowers that have a credit rating. In each panel, the dots represent the average borrower characteristics in a given lead lender capital stringency decile. The horizontal axis indicates the capital regulation stringency faced in lead arrangers’ countries, and the vertical axis indicates the characteristics of the borrower that the lead arrangers lend to. The red solid line represents the fitted regression line of borrower characteristics on capital stringency. All regressions control for industry-fixed effects at the 2-digit SIC level.

credit quality, including borrower size, whether the borrower is a public firm, and whether it has a credit rating outstanding at the time of loan issuance. If loosely regulated banks have an advantage to prospect riskier and more opaque borrowers, they should be observed to originate more loans to small, private, and unrated borrowers.

Figure 4 depicts the relationships between lead lenders’ capital stringency and borrower risk profiles. In Panel A, we compare the size of borrowers of strictly regulated and loosely regulated lead arrangers. Panel B shows the percentage of borrowers that are public firms, and Panel C reports the percentage of borrowers that have a credit rating. For each characteristic, we divide all of the sample loans into decile groups based on lead arrangers’ capital stringency, and plot the average borrower characteristic within each group. The dots represent the average borrower characteristics in each capital regulation decile group, and the solid line represents the estimated regression slope from regressing borrower characteristics on lead arrangers’ capital stringency. The regressions control for industry-fixed effects.

There is a positive relationship between the capital regulation stringency faced by lead banks and the credit quality of their borrowers. Loosely regulated lead lenders lend to smaller borrowers. They also lend to more private firms and firms without credit ratings. These patterns are consistent with our conjecture that less regulated lead arrangers develop expertise lending to riskier and more opaque borrowers.

### 5.1.2 Borrower Characteristics and Capital Stringency Gaps

We next examine whether syndicates with more regulated participants and less regulated lead arrangers lend to riskier firms. Accordingly, we define  $\Delta$  *Capital Stringency* for a loan package as the difference between the average capital stringency across all participant banks and the capital stringency of the lead arranger. Our sample of globally syndicated loans can be partitioned into two groups, one with participants facing stricter regulations than the lead bank, and the other with participants facing looser regulations than the lead bank. Panel A of Table 5 reports differences in borrower characteristics between the two groups, together with the statistical significance of the differences. Syndicates that involve more stringently regulated participants extend more loans to small, private, and unrated firms, all of which indicate a riskier borrower base.

TABLE 5 ABOUT HERE

### 5.1.3 Loan Pricing, Performance, and Participants' Capital Stringency

Finally, we relate loan spreads and loan performance to the difference between the capital regulations faced by participant and lead banks. Loan spreads on a loan package are measured by the weighted average of all-in-drawn spreads (*Loan Spread*) in basis points over LIBOR across all facilities in the package. Weights are assigned based on facility amount. Loan spreads represent the total fees and interest rates that a borrower needs to pay to compensate lenders for its credit risk (e.g., Hertz and Officer, 2012; Altman and Suggitt, 2000). Loan performance is measured by the occurrence of borrower default (*Loan Default*), as defaults are economically important credit events that are costly to lenders (Murfin, 2012; Gopalan et al., 2011). *Loan Default* is an indicator that equals one if the borrower drops to a default rating according to Standard & Poor's ("D" or "SD") prior to loan maturity. We then multiple this indicator by 100, so the regression coefficients indicate default likelihood in percentage points.

Formally, we estimate the following regression model:

$$Y_k = \theta_1 \Delta Capital\ Stringency_k + \theta_2 Controls_k + \kappa_m + \eta_c + \xi_i + \tau_t + \epsilon_k, \quad (2)$$

where  $Y_k \in \{Loan\ Spread, Loan\ Default\}$ . In Equation 2,  $k$  indicates a syndicated loan,  $m$  indicates the borrower's industry,  $c$  indicates the borrower's country,  $i$  indicates the lead arranger's country, and  $t$  indicates the year of loan issuance.  $\Delta Capital\ Stringency_k$  is the difference between the average capital stringency across all foreign participants' countries and the capital stringency in the lead lender's country in year  $t$ . *Controls* include borrower characteristics such as size, asset tangibility, and profitability, as well as an indicator for whether the borrower has a credit rating. In default regressions, we drop *Borrower Rated* as a control because loan default is only defined for rated borrowers. The estimation also includes deal-level characteristics such as maturity (*Loan Maturity*), the number of covenants (*Loan Covenants*), the log amount of loan principal (*Loan Size*), and the number of facilities in the deal (*Loan Facilities*). In addition, we control for borrower-industry fixed effects ( $\kappa_m$ ), year fixed effects ( $\tau_t$ ), borrower-country fixed effects ( $\eta_c$ ), and lead lender-country fixed effects ( $\xi_i$ ).

If banks from strictly regulated countries participate in foreign-led loan syndicates in search of risky loans, we should expect higher spreads and poorer performance from these loans. In other words, we predict that  $\theta_1 > 0$  for both spreads and default.

Panel B of Table 5 reports the results from estimating Equation 2. Columns (1) through (3) report results for loan spreads, and Columns (4) through (6) report results for loan default. For each dependent variable, we first present results controlling for industry and year fixed effects. We then control for the percentage of foreign participants in the syndicate. Finally, we add controls for borrower-country fixed effects and lead-country fixed effects. The last set of fixed effects help us trace time-series changes in loan risk within the same country. Across all specifications, the capital regulation gap between participants and lead arrangers is positively associated with loan spreads. The strictest estimation (Column (3)) suggests that a one-standard-deviation increase in the regulatory gap is associated with 5 basis points higher interest rate spreads on the loan contract. The presence of foreign participants, measured by *%Foreign Participants*, is also

associated with riskier loans. A one-standard-deviation increase in foreign participation (32%) is associated with a 16 basis points increase in spreads. These results support our argument that globally syndicated loans deliver higher returns to participant banks and are likely to carry greater credit risk.

Default regressions generate similar implications. Capital stringency gaps between participant and lead countries are consistently associated with worse loan performance. The estimation suggests that a one-standard-deviation increase in the regulatory gap is associated with 0.3 percent higher default rates, which is a significant change compared to the sample average default rate of 0.6 percent. This result provides evidence suggesting that strictly regulated banks participate in riskier loan deals that exhibit poor ex post performance.

Overall, our analyses in this section suggest that loosely regulated banks originate loan syndicates lending to riskier and more opaque borrowers and strictly regulated banks participate in those syndicates. Global syndicates involving loosely regulated lead lenders and heavily regulated participants also underwrite loan contracts with high interest rate spreads and face a high default rate. These results support the argument that strictly regulated banks participate in syndicates originated by less regulated lead arrangers in pursuit of risky investment. We analyze the incentives of participants in more detail next.

## 5.2 Participant Banks' Incentives

How do strictly regulated banks benefit from participating in risky deals outside the border? In this section, we investigate the possibility that, by investing in a foreign-led syndicate, strictly regulated banks can have greater discretion in reporting the credit risk of a foreign borrower. We do so by examining cross-sectional variation in a bank's participation in global syndicates based on the accounting standards it faces and its capital constraint.

We first examine the role of banks' accounting standards. Higher accounting standards suggest that banks are required to publish standardized and transparent financial statements, which can reduce the information asymmetry faced by regulators in assessing

banks' risk exposure and inhibit banks' ability to manipulate their reporting of asset risks or loan losses. As such, higher accounting quality should mitigate the relation between capital regulation gaps and global syndicated lending.

Information on the accounting quality of a country's banking system comes from the survey conducted by Barth et al. (2004). It is measured by a score consisting of the following criteria: (1) banks are required to prepare consolidated accounting statements; (2) accrued interests and principals of performing loans enter banks' income statements, (3) accrued interests and principals of non-performing loans do not enter income statements; (3) banks need to disclose off-balance sheet items, (5) banks need to disclose governance and risk management framework; and (6) bank directors are legally liable for publishing erroneous or misleading information. We define an indicator for low accounting standards, *Low Accounting Quality*, which equals to one if a country's accounting standards falls to the bottom tercile of the sample. We regress syndication activities on the full interaction between the capital regulation gaps ( $\Delta Capital Stringency$ ) and *participant* banks having low accounting quality, and expect the interaction term to generate positive coefficients.

Next, we examine the effect of banks' capital adequacy. If a bank facing stringent capital regulations is also short on capital reserves, it should have a greater incentive to seek riskier investment outside the border that offer high returns. Accordingly, we expect that participant banks with low Tier 1 capital should have a greater tendency to participate in syndicates led by less regulated banks. We define an indicator, *Low Tier 1 Capital*, that equals one if a participant bank's Tier 1 capital is in the bottom tercile of the sample. We regress syndication activities on the full interaction between  $\Delta Capital Stringency$  and *Low Tier 1 Capital*, and expect the coefficient to be positive.

Table 6 reports the results from the above interaction tests. Consistent with our conjecture,  $Capital Stringency \times Low Accounting Quality$  generates positive and statistically significant coefficients, which suggests that strictly regulated banks are more likely to participate in global syndicates when they are not required to follow stringent accounting practices or publish transparent financial statements.  $Capital Stringency \times Low Tier 1 Capital$  also generates a positive coefficient, suggesting that banks have a

greater incentive to join foreign-led global syndicates when they are capital constrained. The estimates suggest economically important effects: A one-standard-deviation increase in capital stringency gaps is associated with a 16% increase in global syndication activities for banks facing low accounting standards, and a 7% greater increase for banks with low capital reserves.<sup>13</sup>

TABLE 6 ABOUT HERE

### 5.3 Implications for Banks' Systemic Risk

As banks extend loans to risky borrowers abroad, a natural question emerges as to whether this lending practice exposes these banks to greater systemic risk. We attempt to address this question by examining market-based measures of systemic risk, which reflect changes in banks' risk exposure in a timely manner.<sup>14</sup> In particular, we examine banks' long-run marginal expected shortfall (*LRMES*), average daily volatility (*DVar*), estimated beta of banks' equity returns to the MSCI world index (*Beta*), and the correlation between equity returns and the world index (*Corr*). We aggregate all risk measures at an annual frequency.

We examine how global syndicated lending relates to the risk exposure of both participant and lead banks. For participants, we first gauge the extent to which a bank participates in global syndication using *Global Participation Ratio*, the amount of funds that the bank contributes to foreign-led syndicated loans scaled by its total amount of contribution to the loan syndicates it participates in during a year. We then regress systemic risk measures on the full interaction of *Global Participation Ratio* with the average differences in capital stringency faced between the bank and its foreign lead arrangers. This interaction term thus suggests the level of regulatory arbitrage that the bank engages in through global syndication. For lead arrangers, we construct a measure, *Global Lead Ratio*, as the value of syndicated loans that a bank originates that involve foreign participants scaled by the total amount of loans it originates in a given year. The in-

<sup>13</sup>The calculation is as follows:  $16\% = 2.22 \times (0.162 + 0.016) / 2.52$ ; and  $7\% = 2.22 \times (0.086 - 0.001) / 2.52$ .

<sup>14</sup>We thank the New York University V-Lab for sharing measures of systemic risks with us.

teraction of *Global Lead Ratio* and the capital regulation gap between the bank and its foreign participants reflects the extent to which a lead bank sources capital from strictly regulated banks. Our analyses sample on banks that have syndicated with foreign banks in the previous year. All independent variables are lagged by one year.

Table 7 reports the results. Panel A presents the results for participant banks, and Panel B presents the results for lead banks. Across all risk measures, results suggest that participant banks face greater exposure to systemic risk when they participate more in syndicates led by banks from less regulated countries. Lead banks also face greater risk exposure when they include strictly regulated participants in the syndicates they originate, as indicated by the positive coefficients on  $\Delta Capital Stringency \times Global Lead Ratio$ . These results generate consistent interpretations with our loan-level analyses, i.e., global syndication is associated with riskier lending practices and potentially exposes banks to higher levels of systemic risk.

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TABLE 7 ABOUT HERE

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Our findings complement those in Karolyi et al. (2018), who show that cross-border lending reduces the systemic risk exposures of banks in the host country due to increased competitive pressure. The differences in results may arise from the fact that syndication represents a cooperative form of lending. Participating in a global syndicate may not intensify competition in the lead lender’s country but instead provide support for the investment decisions made by the lead lender.

## 6 Endogeneity Concerns

Our baseline estimations generate findings consistent with capital regulation gaps affecting global syndication structures. However, there remain concerns that omitted variables or reverse causality could confound our findings. We address these potential concerns in this section. First, we assess the extent to which borrower-side characteristics may influence our findings by controlling for borrower-year fixed effects. We next con-

sider a reverse causality issue, i.e., cross-border syndication activities could influence the differences in capital regulation across countries. We attempt to alleviate this concern using an IV-based estimation. We discuss these analyses in turn.

## 6.1 Controlling for Borrower-Side Dynamics

One concern regarding our baseline results is that the relation between capital regulation gaps and global syndication activities can be driven by unobservable borrower-side conditions such as credit demand or credit quality. To account for such possibilities, we design a test to examine banks' participation decisions while controlling for time-varying borrower conditions.

We start by constructing a borrower-year panel, including all borrowers in Dealscan during years when they receive at least one syndicated loan. In doing so, we also require the syndicated deal to have face value larger than \$100 million. This step effectively restricts our sample of firms to those with sizable credit demand that is likely to necessitate global syndication. We then expand the sample to a borrower-year-country panel to compare the participation of all foreign banks that are potential syndicate partners. In doing so, we define "foreign" banks as those located outside the countries of the borrower and the lead lender.

Using the borrower-year-country sample, we examine the relation between capital stringency in a given country and the decision of its banks to participate in a syndicated loan. Formally, we estimate the following model:

$$Participate_{f,j,t} = \theta_1 Capital\ Stringency_{j,t} + \theta_2 Controls + \Gamma_{f,t} + \nu_{f,j,t}, \quad (3)$$

where  $f$  indicates the borrower firm,  $j$  indicates a potential participant country, and  $t$  stands for the year.  $Capital\ Stringency_{j,t}$  stands for the capital stringency of country  $j$  in year  $t$ .  $Participate_{f,j,t}$  is an indicator variable that equals one if any bank in country  $j$  is a syndicate participant in at least one of the loans extended to borrower  $f$  during year  $t$ .  $Controls$  include macroeconomic variables in bank  $j$ 's country during year  $t$ . We also control for *Distance*, *Common Language*, and *Bilateral Trade*. *Distance* measures



the maximum distance between the geographical distance from the lead arranger country to the borrower country and that from the participant country to the borrower country. *Common Language* takes the value of one if the lead country, borrower country, and the participant country share the same language, zero otherwise.

The key feature of this test is that we control for borrower-year fixed effects ( $\Gamma_{f,t}$ ) to fix the credit conditions of the borrower. We further introduce lead-country-year fixed effects to hold constant the regulation faced by the lead arranger. If banks under strict capital regulations are incentivized to syndicate abroad, we expect that  $\theta_1 > 0$ .

Panel A of Table 8 reports the results of this estimation. Column (1) shows the effect of capital regulation on banks' participation decisions controlling for borrower-year fixed effects. Column (2) adds country-level control variables. Columns (3) and (4) repeat the tests in Columns (1) and (2) while adding lead-country-year fixed effects. Across all models, capital stringency bears a positive and significant coefficient. The estimates from Column (1) suggest that a one-standard-deviation increase in the stringency of capital regulation of a foreign country is associated with an approximately 0.7-percentage-point increase in the participation of its banks. This effect represents a 14% increase compared to the average participation rate of only 4.8 percent. The coefficient remains similar after we control for participant country characteristics and lead-country-year fixed effects.

Results from this analysis confirm our baseline finding that banks under stringent capital regulations are more likely to participate in loans initiated by less regulated banks and that this finding is unlikely to be driven by borrower-side credit demand.

TABLE 8 ABOUT HERE

## 6.2 An Instrumental Variable Estimation

Finally, we address the reverse causality concern that global syndication activities may influence the differences in capital regulations across countries. Admittedly, it is challenging to find perfectly exogenous changes in capital regulations. We attempt to alleviate this concern using an IV-based estimation. Following previous literature (Hous-

ton et al., 2012; Karolyi and Taboada, 2015), we select instruments that reflect historical and social traits of a country. Specifically, we use the income inequality of a country, the percentage of years that a country has been independent since 1776, the number of banking crises occurring in a country’s history, and the government ownership of banks.

Using these instruments, we conduct two-stage least squares regressions. In the first stage, we regress the differences in capital regulation on the differences in IVs between two countries. In the second stage, we regress syndication activities on the capital regulation differentials that are predicted by the first stage. Panel B of Table 8 presents the results from the second stage. The IV approach yields similar results as our baseline estimations, with the predicted differences in capital regulation ( $\Delta \widehat{Capital\ Stringency}$ ) yielding positive and statistically significant coefficients for syndication activities. These results confirm our argument that strictly regulated banks are more likely to participate in global lending syndicates originated by less regulated lead banks.

## 7 Robustness

We conclude our investigation by testing the robustness of our baseline findings. In particular, we examine an alternative measure of syndication activities and the effect of banks having foreign subsidiaries. In Appendix B, we further test the effects of other risk-inducing bank regulations on global syndicate structures.

Our measures of syndication activity rely on counting the number of loans instead of the dollar amount contributed by each participant bank. This is because Dealscan provides only sparse information regarding lenders’ shares (for only 27% of deals). Nevertheless, with the information available, we construct an alternative measure of syndication activity using the amount of capital contributed by participant banks. Specifically, we compute the proportion of the loan amount originated by a lead bank that is contributed by a certain participant bank in a given year (*Syndicate Share*). This measure complements our main measures by gauging directly the capital investment by banks. Table 9 shows that our results persist with this alternative measure.

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TABLE 9 ABOUT HERE

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We next discuss the possibility that banks may establish subsidiaries in countries with lax regulations (Frame et al. (2017)), which may weaken their incentives to participate or originate global syndicated loans. As we attribute lending by subsidiaries to the ultimate parent bank, we account for the possibility that banks may issue loans through their subsidiaries. However, there may be cases in which banks establish subsidiaries for reasons other than, but correlated with, regulatory differentials across countries. To alleviate potential concerns related to these reasons, we control for the existence of foreign subsidiaries. Panel B of Table 9 show that our baseline result persists when we control for whether the participant bank has subsidiaries in the lead lender’s country and whether the lead lender has subsidiaries in the participant’s country. Our results are robust to these controls.

## 8 Conclusion

Global syndication is a common practice in the market for corporate loans and is increasing in popularity over time. Analyzing the capital regulations faced by participant and lead banks, we find evidence suggesting that regulation gaps across countries can shape the structure of global lending syndicates. Specifically, strictly regulated banks participate more in syndicates initiated by lead banks that are subject to less stringent regulations. Global syndicates formed by loosely regulated lead arrangers and strictly regulated participants are associated with a riskier borrower base, higher interest rate markups, and poor-performing loans. These findings are consistent with banks facing strict capital regulations searching for risky, yet profitable deals by partnering with loosely regulated lead banks.

Global syndication benefits participant banks in two ways. First, they can rely on the lead lender’s expertise in prospecting risky borrowers. Second, as borrowers are often located outside the border, participant banks face lessened regulatory scrutiny in

reporting the credit risk associated with those borrowers. Consistent with the latter explanation, we find the effect of capital regulation gaps on global syndication to be mitigated when participant banks need to follow high accounting standards in publishing their financial statements.

Our study is the first to examine how regulatory gaps across countries can shape global syndication structures. The results suggest that banks can strategically choose syndicate partners to benefit from the capital regulation regimes they face. Our findings not only suggest a novel determinant of global syndication, but also generate important implications for corporations' access to capital and banks' systemic risk exposure. By contributing funds to foreign-led syndicates, banks under strict regulations direct their capital to fund high-risk corporate activities. In the meanwhile, they expose themselves to greater systemic risk. As such, global syndication driven by cross-country regulatory gaps engenders an economically important effect on the stability of banking systems.

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**Table 1****Summary Statistics for Capital Stringency and Global Syndication Activity**

This table shows the summary statistics for capital stringency and loan syndication activities by country. We present the statistics for the top 20 countries in terms of syndication lending volume. Column (1) reports the capital stringency index average over the available surveys of each country. Column (2) reports the aggregated dollar amount of loans (in billions of \$US) extended by banks in a given country. Column (3) shows the percentage of the dollar amount of loans contributed by foreign participant banks. When loan share of each lender is missing, we assume all lenders contribute equally. Column (4) shows the average number of foreign participants as a proportion of the total number of participants in lending syndicates originated by banks in each country. Countries are listed in descending order of the aggregated loan amount.

Country	(1) Capital Stringency	(2) Aggregate Loan Amount (\$US Bil)	(3) % Contributed by Foreign Banks	(4) % Foreign Participants
USA	4.8	32,240	32.8%	42.0%
United Kingdom	5.3	11,963	34.9%	91.5%
Germany	5.3	8,942	32.2%	82.8%
France	4.5	8,652	32.5%	83.5%
Japan	3.0	6,844	30.4%	19.5%
Canada	2.8	6,453	35.7%	66.0%
Switzerland	4.8	5,259	35.7%	96.1%
Netherlands	4.5	4,929	32.4%	96.5%
Italy	3.1	3,299	24.4%	82.2%
Spain	6.0	2,904	23.5%	75.7%
Australia	6.3	1,486	27.2%	78.8%
Belgium	4.6	1,309	23.2%	97.4%
China	4.0	1,297	20.2%	39.1%
Norway	5.0	852	30.5%	94.4%
Singapore	6.0	765	22.8%	94.7%
Sweden	2.0	704	27.4%	94.4%
Denmark	4.8	472	28.5%	97.3%
Austria	4.5	428	22.4%	89.7%
UAE	4.5	400	20.7%	82.6%
Ireland	4.7	388	22.4%	96.4%



**Table 2****Summary Statistics for Capital Stringency and Global Syndication Activity**

This table presents the summary statistics for our variables of interest. Panel A shows the summary statistics for the bank-pair-year sample. Panel B presents the summary statistics for the loan-level sample. Definitions of all variables are provided in Appendix A.

<b>Panel A: Bank-Pair-Year Sample</b>			
	Mean	Median	Std. Dev.
<i>Syndicate</i>	0.259	0	0.438
<i>%Syndicate</i>	2.517	0	10.116
<i>ΔCapital Stringency</i>	-0.067	0	2.222
<i>ΔGDP per Capita</i>	-0.109	-0.050	1.279
<i>ΔGDP Growth</i>	0.002	0.001	0.038
<i>ΔExchange Rate Return</i>	0	0.001	0.087
<i>ΔInterest Rate</i>	0.006	0	0.156
<i>ΔDistance</i>	8.249	8.724	1.082
<i>ΔCommon Language</i>	0.132	0	0.338
<i>ΔBilateral Trade</i>	0.073	0.036	0.122
<i>Past Syndicate Relationship</i>	0.558	1	0.497
<i>Past Syndicated Loans</i>	0.030	0.002	0.065
<i>Past Borrower Size</i>	10.168	10.235	0.980
<i>%Private Borrowers</i>	0.599	0.543	0.214
<i>%Unrated Borrowers</i>	0.931	1	0.104

<b>Panel B: Loan Sample</b>			
	Mean	Median	Std. Dev.
<i>ΔCapital Stringency</i>	-0.682	-0.667	2.053
<i>%Foreign Participants</i>	0.635	0.667	0.323
<i>Loan Spread</i>	156.403	137.500	110.246
<i>Loan Default</i>	0.022	0	0.145
<i>Borrower Size</i>	8.342	8.341	1.646
<i>Borrower Profitability</i>	0.123	0.117	0.091
<i>Borrower Tangibility</i>	0.320	0.257	0.252
<i>Loan Maturity</i>	49.176	60	21.598
<i>Loan Covenants</i>	1.247	1	1.417
<i>Loan Size</i>	20.195	20.212	1.310
<i>Loan Facilities</i>	1.667	1	1.088

**Table 3**

**Effect of Capital Regulations on Syndication Activities**

This table shows the relation between syndication activities across countries and the differences in the stringency of capital regulation. The regressions are conducted on a bank-pair-year panel, spanning the period from 1995 through 2016. The dependent variable in Columns (1) through (2) is *Syndicate*, the indicator for syndication between two banks. The dependent variable in Columns (3) through (8) is *%Syndicate*, the number of syndicated loans between two banks scaled by the total number of loans extended by the lead bank. All regressions except for Columns (4) and (8) control for year fixed effects, lead-bank fixed effects, and participant-bank fixed effects. Columns (4) and (8) control for year fixed effects and bank-pair fixed effects. The definitions of all variables are provided in Appendix A. Standard errors are clustered by country-pair. Robust *t*-statistics are shown in parentheses. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively.

Dep. Var.:	<i>Syndicate</i>				<i>%Syndicate</i>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta$ <i>Capital Stringency</i>	0.004** (2.53)	0.004** (2.27)	0.004** (2.28)	0.004* (1.90)	0.052*** (2.58)	0.050** (2.43)	0.051** (2.44)	0.043** (1.99)
$\Delta$ <i>GDP per Capita</i>		0.014 (0.99)	0.015 (1.20)	0.015 (1.16)		0.312** (1.96)	0.328** (2.21)	0.349** (2.24)
$\Delta$ <i>GDP Growth</i>		0.153*** (2.93)	0.154*** (2.99)	0.132** (2.51)		0.349 (0.38)	0.389 (0.43)	-0.267 (-0.30)
$\Delta$ <i>Exchange Rate Return</i>		0.020 (1.20)	0.018 (1.07)	0.019 (1.14)		0.406 (1.34)	0.371 (1.22)	0.380 (1.30)
$\Delta$ <i>Interest Rate</i>		0.002 (0.06)	0.013 (0.41)	-0.006 (-0.19)		2.054*** (3.46)	2.208*** (3.53)	1.861*** (3.25)
<i>Distance</i>			-0.062*** (-16.53)				-0.728*** (-12.60)	
<i>Common Language</i>			0.020* (1.79)				0.122 (1.03)	
<i>Bilateral Trade</i>			0.010 (0.26)				0.071 (0.14)	
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lead Bank FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Participant Bank FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Bank-Pair FE	No	No	No	Yes	No	No	No	Yes
Observations	673,108	620,979	618,131	617,451	673,108	620,979	618,131	617,451
Adjusted $R^2$	0.218	0.221	0.235	0.321	0.176	0.172	0.175	0.123

**Table 4****Cross-sectional Analyses**

This table shows the role of past syndication relations and lead banks' lending expertise in modulating the relation between capital regulation gaps and global syndication activity. The dependent variable is *%Syndicate*. Panel A reports results from interactive regressions of capital regulation gaps and past syndication relation between two banks. Syndication relationships are measured by an indicator for the lead and participant banks having been in the same syndicate in the past 5 years (*Past Syndicate Relationship*) and the number of loans they issued together scaled by the number of loans arranged by the lead bank in the past five years (*Past Syndicated Loans*). Panel B reports the interactive effect of capital regulation gaps and lead arrangers' experience in lending to small and opaque borrowers. Columns (1) and (2) report results for lead arrangers' average borrower size in the past five years. Columns (3) and (4) examine the percentage amount of loans that the lead bank extended to private borrowers in the past five years. Columns (5) and (6) examine the percentage amount of loans that the lead bank extended to unrated borrowers in the past five years. The definitions of all variables are provided in Appendix A. Controls include the same set of variables used in Table 3. Standard errors are clustered by country-pair. Robust *t*-statistics are shown in parentheses. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively.

**Panel A: Past Syndication Relationships**

Dep. Var.: <i>%Syndicate</i>	(1)	(2)	(3)	(4)
$\Delta$ <i>Capital Stringency</i> $\times$ <i>Past Syndicate Relationship</i>	0.080** (2.24)	0.098** (2.50)		
<i>Past Syndicate Relationship</i>	3.952*** (28.88)	3.726*** (27.09)		
$\Delta$ <i>Capital Stringency</i> $\times$ <i>Past Syndicated Loans</i>			0.701** (2.16)	0.803** (2.10)
<i>Past Syndicated Loans</i>			65.434*** (82.09)	64.455*** (67.38)
$\Delta$ <i>Capital Stringency</i>	-0.046** (-2.17)	-0.057** (-2.57)	0.012 (1.32)	0.005 (0.57)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Lead and Participant Bank FE	Yes	No	Yes	No
Bank-Pair FE	No	Yes	No	Yes
Observations	527,475	525,999	519,370	517,755
Adjusted $R^2$	0.135	0.170	0.288	0.283

**Panel B: Lead Arranger Expertise**

Dep. Var.: <i>%Syndicate</i>	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta$ <i>Capital Stringency</i> $\times$ <i>Past Borrower Size</i>	-0.018** (-2.22)	-0.021*** (-2.86)				
<i>Past Borrower Size</i>	-0.009 (-0.41)	-0.010 (-0.45)				
$\Delta$ <i>Capital Stringency</i> $\times$ <i>%Private Borrowers</i>			0.155** (2.51)	0.183** (2.36)		
<i>%Private Borrowers</i>			-0.720*** (-3.19)	-0.638*** (-2.77)		
$\Delta$ <i>Capital Stringency</i> $\times$ <i>%Unrated Borrowers</i>					0.321** (2.49)	0.262* (1.75)
<i>%Unrated Borrowers</i>					-0.720** (-2.35)	-0.760** (-2.45)
$\Delta$ <i>Capital Stringency</i>	0.234*** (2.95)	0.276*** (3.72)	-0.057 (-1.35)	-0.080 (-1.52)	-0.261** (-2.19)	-0.211 (-1.52)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Lead and Participant Bank FE	Yes	No	Yes	No	Yes	No
Bank-Pair FE	No	Yes	No	Yes	No	Yes
Observations	269,011	264,112	573,062	571,671	573,062	571,671
Adjusted $R^2$	0.247	0.425	0.0933	0.140	0.0932	0.140

**Table 5**  
**Capital Regulations, Borrower Characteristics, and Loan Terms**

This table examines the relationship among the capital regulation faced by syndicate participants, borrower characteristics, and loan terms. The sample contains all globally syndicated loans to publicly traded borrowers during the period from 1995 through 2016. Panel A compares the characteristics of borrowers between loans extended by syndicates where the foreign participants face stricter regulation than the lead lender and loans extended by syndicates where foreign participants face looser regulation than the lead lender. Panel B examines loan spreads and loan default. *Loan Default* is defined as an indicator variable that equals one if the borrower drops to a default rating from S&P during the course of the loan, zero otherwise. Default regressions only use loans extended to rated borrowers. The definitions of all variables are provided in Appendix A. Standard errors are clustered by borrower country. Robust *t*-statistics are shown in parentheses. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively.

<b>Panel A: Borrower Base</b>						
Sample:	(1)	(2)	(3)			
	$\Delta Capital Stringency \geq 0$	$\Delta Capital Stringency < 0$	Difference ((1) – (2))			
<i>Borrower Size</i>	8.145	8.500	-0.355***			
<i>Public Borrower</i>	0.727	0.734	-0.007*			
<i>Rated Borrower</i>	0.532	0.585	-0.053***			

<b>Panel B: Loan Spreads and Default</b>						
Dep. Var.:	<i>Loan Spread</i>			<i>Loan Default</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
<i><math>\Delta Capital Stringency</math></i>	2.730*** (7.35)	1.728** (2.31)	2.334*** (6.16)	0.056* (1.97)	0.072** (2.31)	0.144*** (7.18)
<i>%Foreign Participants</i>		41.187*** (5.42)	49.043*** (9.86)		-0.683* (-1.84)	1.404* (1.70)
<i>Borrower Size</i>	-22.889*** (-12.56)	-24.372*** (-11.90)	-21.868*** (-8.11)	-1.159*** (-17.67)	-1.129*** (-20.47)	-1.085*** (-26.89)
<i>Borrower Profitability</i>	-188.793*** (-4.89)	-181.168*** (-4.77)	-193.909*** (-6.15)	-14.295*** (-11.78)	-14.384*** (-12.28)	-14.493*** (-17.17)
<i>Borrower Tangibility</i>	21.198** (2.59)	20.588** (2.63)	23.964*** (4.36)	1.927*** (4.31)	1.927*** (4.35)	2.326*** (7.67)
<i>Borrower Rated</i>	23.127*** (7.85)	25.373*** (8.83)	14.289*** (2.74)			
<i>Loan Maturity</i>	0.528*** (8.89)	0.501*** (9.43)	0.563*** (18.17)	0.038*** (3.14)	0.039*** (3.29)	0.044*** (4.06)
<i>Loan Covenants</i>	7.801*** (8.55)	8.725*** (8.24)	7.618*** (10.99)	0.559*** (7.85)	0.549*** (8.35)	0.426*** (6.00)
<i>Loan Size</i>	-11.303*** (-5.53)	-11.727*** (-5.55)	-12.155*** (-7.48)	0.061 (0.69)	0.071 (0.78)	0.083 (1.06)
<i>Loan Facilities</i>	22.574*** (8.81)	21.755*** (9.51)	22.008*** (10.88)	0.547*** (6.31)	0.557*** (6.66)	0.557*** (6.60)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Borrower Country FE	No	No	Yes	No	No	Yes
Lead Country FE	No	No	Yes	No	No	Yes
Observations	61,946	61,946	61,945	44,397	44,397	44,394
Adjusted $R^2$	0.459	0.467	0.498	0.0617	0.0618	0.0635

**Table 6**  
**Participant Banks' Accounting Standards**

This table shows the role of bank accounting standards in the participant country. The dependent variable is *%Syndicate*. Columns (1) and (2) examine the interaction effect of capital regulation gaps and banks' accounting standards (*Low Accounting Quality*). Columns (3) and (4) examine the interaction effect of capital regulation gaps and participant banks' capital inadequacy (*Low Tier 1 Capital*). The definitions of all variables are provided in Appendix A. Controls include the same set of variables as in Table 3. Standard errors are clustered by country-pair. Robust *t*-statistics are shown in parentheses. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively.

Dep. Var.: <i>%Syndicate</i>	(1)	(2)	(3)	(4)
$\Delta$ <i>Capital Stringency</i> $\times$ <i>Low Accounting Quality</i>	0.162*** (3.22)	0.162*** (3.11)		
<i>Low Accounting Quality</i>	0.343** (2.51)	0.386*** (2.84)		
$\Delta$ <i>Capital Stringency</i> $\times$ <i>Low Tier 1 Capital</i>			0.056 (1.43)	0.086** (2.04)
<i>Low Tier 1 Capital</i>			0.474*** (4.86)	0.420*** (4.28)
$\Delta$ <i>Capital Stringency</i>	0.025 (1.07)	0.016 (0.69)	0.014 (0.48)	-0.001 (-0.03)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Lead and Participant Bank FE	Yes	No	Yes	No
Bank-Pair FE	No	Yes	No	Yes
Observations	618,131	617,451	219,383	218,189
Adjusted $R^2$	0.175	0.124	0.158	0.132

**Table 7****Global Syndicated Lending and Banks' Systemic Risk**

This table shows the effects of the global syndicated lending on the systemic risks of participant banks and lead banks. The test uses a bank-year panel, sampling on all publicly traded banks that have non-missing systemic risk measures provided by the NYU V-Lab and have led or participated in at least one globally syndicated loans in the previous year. In Panel A, the bank of interest is a bank participating in foreign-led global syndicates.  $\Delta Capital Stringency$  is computed as the difference between the bank's own country's capital stringency and the average capital stringency faced by the lead arrangers of syndicates in which the bank participates in a year.  $Global Participation Ratio$  is the ratio of the amount of globally syndicated loans that the bank participates in scaled by the total amount of loans in which the bank participates in a given year. In Panel B, the bank of interest is a lead bank.  $\Delta Capital Stringency$  is computed as the difference between the average participant banks' capital stringency and the bank's own country's capital stringency.  $Global Lead Ratio$  is the ratio of the amount of globally syndicated loans that the bank originates scaled by the total amount of loans that the bank originates in a given year. In each panel, the dependent variable is the long-run marginal expected shortfall ( $LRMES$ ) in Column (1), the average daily variance of a bank ( $DVar$ ) in Column (2), a bank's beta relative to the MSCI world index in Column (3), and a bank's equity price correlation with the MSCI world index ( $Corr$ ) in Column (4). All regressions include bank and year fixed effects. Independent variables are lagged by one year. Standard errors are clustered by bank. Robust  $t$ -statistics are shown in parentheses. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively.

**Panel A: Effects on Participant Banks**

Dep. Var.:	(1) <i>LRMES</i>	(2) <i>DVar</i>	(3) <i>Beta</i>	(4) <i>Corr</i>
$\Delta Capital Stringency \times Global Participation Ratio$	0.0173** (2.10)	0.0000 (0.09)	0.0523* (1.93)	0.0194** (2.06)
$\Delta Capital Stringency$ (Own – Lead)	-0.0195** (-2.42)	-0.0000 (-0.31)	-0.0618** (-2.37)	-0.0197** (-2.14)
$Global Participation Ratio$	-0.0045 (-0.84)	-0.0001 (-1.47)	-0.0111 (-0.63)	0.0020 (0.40)
Bank FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	3,327	3,327	3,327	3,327
Adjusted $R^2$	0.781	0.404	0.750	0.905

**Panel B: Effects on Lead Banks**

Dep. Var.:	(1) <i>LRMES</i>	(2) <i>DVar</i>	(3) <i>Beta</i>	(4) <i>Corr</i>
$\Delta Capital Stringency \times Global Lead Ratio$	0.0391*** (3.15)	0.0005*** (3.19)	0.1271*** (3.02)	0.0087 (0.84)
$\Delta Capital Stringency$ (Participant – Own)	-0.0370*** (-2.97)	-0.0005*** (-3.08)	-0.1178*** (-2.76)	-0.0090 (-0.87)
$Global Lead Ratio$	0.0083 (1.62)	-0.0000 (-0.82)	0.0315* (1.83)	0.0137*** (2.71)
Bank FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	2,467	2,467	2,467	2,467
Adjusted $R^2$	0.796	0.401	0.761	0.909

**Table 8**  
**Alleviating Endogeneity Concerns**

This table reports results that help alleviate concerns that the baseline findings are driven by borrower-side conditions or reverse causality. Panel A examines the participation of banks in a global syndicate while holding fixed borrower-side conditions. The sample is a borrower-year-country panel, including all borrowers in Dealscan that obtain at least one syndicated loan with face value over \$100 million in a given year. We sample all the countries outside of the borrower's location and the lead lender's country and treat banks in those countries as potential foreign participants. The dependent variable is *Participate*, a dummy variable that equals one if at least one bank in a given country participates in the syndicated deal extended to a given borrower during a given year. Controls include the GDP per capita, GDP growth, exchange rate return, and the interest rate in the *participant* bank's country. We also control for the maximum distance between the borrower and the lead lender and between the borrower and the participant bank, whether the lead lender, participant, and the borrower countries share the same language, and the bilateral trade between lead and participant countries. All regressions include borrower-year fixed effects. Column (2) additionally includes lead-country-year fixed effects. Panel B shows the results from instrumental variable regressions (two-stage-least-square). The regressions are conducted on a bank-pair-year panel. The dependent variable in the first stage is  $\Delta \widehat{Capital\ Stringency}$ , and the dependent variables in the second stage are *Syndicate* and *%Syndicate*.  $\Delta \widehat{Capital\ Stringency}$  indicates the difference in capital regulatory stringency between two countries that is predicted from the first stage. The instruments include between-country differences in income inequality (measured by the Gini index), the percentage of years of that a country has been independent since 1776, the number of banking crisis in its history, and the percentage of government ownership of banks. Controls include the same set of control variables as in the baseline analyses. Standard errors are clustered by lead country. Robust *t*-statistics are shown in parentheses. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively.

<b>Panel A: Controlling For Borrower-Side Conditions</b>		
Dep. Var.: <i>Participate</i>	(1)	(2)
<i>Capital Stringency</i>	0.003*** (4.68)	0.003*** (5.41)
Controls	Yes	Yes
Borrower $\times$ Year FE	Yes	Yes
Lead Country $\times$ Year FE	No	Yes
Observations	1,765,937	1,765,867
Adjusted $R^2$	0.118	0.119
<b>Panel B: Instrumental-Variable Approach</b>		
Dep. Var.:	(1) <i>Syndicate</i>	(2) <i>%Syndicate</i>
$\Delta \widehat{Capital\ Stringency}$	0.013*** (2.74)	0.192*** (3.31)
Year FE	Yes	Yes
Bank-Pair FE	Yes	Yes
Hansen's <i>J</i> -statistics ( <i>p</i> -value)	0.70	0.91
LM statistics ( <i>p</i> -value)	< 0.01	< 0.01
<i>F</i> -statistics ( <i>p</i> -value)	< 0.01	< 0.01
Observations	460,577	460,577

**Table 9****Robustness: Syndicate Shares and Foreign Subsidiaries**

This table displays additional robustness results. Panel A shows results from *Syndicate Share*, the percentage of capital contributed by a participant bank to syndicated loans originated by a lead bank in a given year. Panel B reports results when we control for whether the lead bank has a subsidiary in the participant's country (*Lead Subsidiary*) and whether the participant bank has a subsidiary in the lead lender's country (*Participant Subsidiary*). Controls include the same set of variables in the baseline regressions. The definitions of all variables are provided in Appendix A. Standard errors are clustered by country-pair. Robust *t*-statistics are shown in parentheses. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively.

<b>Panel A: Syndicate Shares</b>		
Dep. Var.: <i>Syndicate Share</i>	(1)	(2)
<i>ΔCapital Stringency</i>	0.012** (2.07)	0.011*** (2.59)
Controls	Yes	Yes
Year FE	Yes	Yes
Lead and Participant Bank FE	Yes	No
Bank-Pair FE	No	Yes
Observations	92,406	78,747
Adjusted $R^2$	0.398	0.515
<b>Panel B: Foreign Subsidiaries</b>		
Dep. Var.:	(1)	(2)
	<i>Syndicate</i>	<i>%Syndicate</i>
<i>ΔCapital Stringency</i>	0.004** (2.28)	0.051** (2.44)
<i>Lead Subsidiary</i>	0.006 (0.66)	0.227** (2.18)
<i>Participant Subsidiary</i>	-0.000 (-0.04)	0.296** (2.25)
Controls	Yes	Yes
Year FE	Yes	Yes
Lead and Participant Bank FE	Yes	Yes
Observations	618,131	618,131
Adjusted $R^2$	0.235	0.175



## Appendix A Variable Definitions

- **Syndication Activity** (Source: Dealscan)

*Syndicate<sub>*i,j,t*</sub>*: Indicator variable equal to one if there is more than one syndicated loan issued in which bank *i* is the lead lender and bank *j* is a participant in year *t* and zero otherwise.

*%Syndicate<sub>*i,j,t*</sub>*: The number of loans issued between two banks in which bank *i* is the lead lender and bank *j* is the participant in year *t* as a proportion of the total number of loans led by bank *i* in year *t*. This variable is presented in percentage points.

- **Bank Regulations** (Source: Barth et al., 2013)

*Capital Stringency*: Index that measures the stringency of regulations on the capital reserve banks must hold and on the sources of funds that count as regulatory capital. A higher value indicates greater stringency.

*Entry Requirement*: Index that measures the extent to which various types of legal submissions are required to obtain a banking license. A higher value indicates greater stringency to limit competition.

*Funding Insured*: Percent of the commercial banking system's assets is funded with insured deposits. A higher value indicates a higher degree of moral hazard.

- **Country-level Control Variables**

*GDP per Capita*: Log of real GDP per capita in U.S. dollars. (Source: World Bank)

*GDP Growth*: The annual real growth rate of GDP. (Source: World Bank)

*Exchange Rate Return*: The annual real exchange rate return of local currency to the U.S. dollar, deflated using the Consumer Price Index (2000 constant). (Source: World Bank)

*Interest Rate*: A central bank policy rate. Replaced with a discount rate at which commercial banks can borrow from the central bank if missing. (Source: IMF International Financial Statistics)

*Distance*: Log of circle distance between the capital cities of two countries.

*Common Language*: Indicator variable equal to one if the two countries share the same language and zero otherwise. (Source: World Bank)

*Bilateral Trade*: Maximum of bilateral imports and exports between lead and participant countries. Bilateral imports (exports) are calculated as the total value of imports (exports) by a lead country from a participant country as a proportion of total imports by the lead country. (Source: IMF's Direction of Trade Statistics)

- **Bank-level Variables**

*Past Syndicate Relationship*: An indicator that equals one if two banks have been in the same lending syndicate in the past five years. (Source: Dealscan)

*Past Syndicated Loans*: The number of loans that two banks have jointly issued (in the same lending syndicate), scaled by the number of loans arranged by the lead bank in the past five years. (Source: Dealscan)

*Past Borrower Size*: The average size of borrowers that a bank lend to, serving as a lead arranger, in the past five years. (Source: Dealscan)

*%Private Borrowers*: The percentage of borrowers that are private firms among all the borrowers that a bank lend to, serving as a lead arranger, in the past five years. (Source: Dealscan)

*%Unrated Borrowers*: The percentage of borrowers without a credit rating among all the borrowers that a bank lend to, serving as a lead arranger, in the past five years. (Source: Dealscan)

*Low Accounting Quality*: An indicator that equals one if a bank's accounting transparency index falls below 5. (Source: Barth et al., 2013)

*Tier 1 Capital*: An indicator that equals one if a bank's ratio of Tier 1 capital to risk-weighted assets falls into the bottom tercile of the sample. (Source: Bankscope)

*LRMES*: Annual average of the long-run marginal expected shortfall with respect to the MSCI All-Country World Index, where a crisis is defined as a 40% decline in the market. (Source: NYU V-lab)

*DVar*: Annual average of the daily variance of the bank's stock price over a year. (Source: NYU V-lab)

*Beta*: Annual average of the daily Beta of the bank with respect to the MSCI All-Country World Index, using a Dynamic Conditional Beta model. (Source: NYU V-lab)

*Corr*: Average of the correlation of the firm with respect to the MSCI All-Country World Index, using an asymmetric dynamic conditional correlation model. (Source: NYU V-lab)

- **Borrower Characteristics** (Source: Compustat and Global Compustat)

*Size*: Log of total assets (AT)

*Profitability*: Operating income (OIBDP)/total assets (AT)

*Tangibility*: Property, plant, and equipment (PPENT)/total assets (AT)

*Rated*: A dummy variable that equals one if the borrower has S&P credit rating, zero otherwise

- **Loan Characteristics** (Source: Dealscan)

*Loan Spread*: All-in-drawn loan spread over LIBOR

*Loan Default*: Indicator variable equal to one if the borrower receives default ratings from S&P during the course of the loan

*Loan Maturity*: Loan maturity in months

*Loan Covenants*: Total number of covenants on the loan package

*Loan Size*: Log of the loan amount in U.S. dollars

*Loan Facilities*: The number of facilities within a loan package

*%Foreign Participants*: The number of foreign participants as a proportion of the total number of participant banks in a syndicate

## Appendix B Other Risk-Inducing Regulations

We consider two other regulations that might induce banks to pursue cross-border risk-taking behavior. The first is regulatory restrictions on entry into the banking sector (*Entry Requirement*). Stricter requirements for new bank entry reduce the competition faced by incumbent banks, thus alleviating the pressure for banks to bear higher credit risk to achieve profits (Bushman et al. (2016)). Accordingly, we expect stricter entry requirements to be negatively correlated with banks' participation in global syndicates.

The next dimension is the deposit insurance coverage ratio (*Funding Insured*). Deposit insurance intensifies potential moral hazard problems, whereby depositors do not have strong incentives to monitor banks' activities (Demirgüç-Kunt and Kane, 2001). Therefore, banks in countries with high deposit insurance may conduct more risky lending activities than regulators find desirable (e.g., Demirgüç-Kunt and Detragiache, 2002; Laeven, 2002). As such, we expect that banks from countries with greater deposit insurance coverage are more likely to participate in global syndicates.

Table B1 reports the results that are consistent with our conjectures. A one-standard-deviation increase (1.11) in the difference between the entry requirement in the participant and lead countries is associated with a 0.7 (0.18)-percentage-point decrease in *Syndicate* (*%Syndicate*). Deposit insurance generates a larger effect: A one-standard-deviation increase in the difference in deposit insurance is associated with a 1-percentage-point higher likelihood that a bank will participate in a global syndicate.

TABLE B1 ABOUT HERE

These results corroborate our baseline findings that global syndication is affected by risk-taking incentives induced by banking regulation. When regulations induce more risk taking, banks participate more in foreign-led global syndicates.

**Table B1**  
**Effects of Other Risk-Inducing Regulations: Entry Requirement and Funding Insurance**

This table examines two other aspects of banking regulation. Columns (1) and (2) examine the effects of *Entry Requirement*, representing a regulatory requirement for entering the banking industry. Columns (3) and (4) examine the effect of *Funding Insured*, the percent of deposits insured by the regulatory body. Bank regulatory indices are from the surveys conducted by Barth et al. (2013). The definitions of all variables are provided in Appendix A. The regressions are conducted on a bank-pair-year panel, spanning the period from 1995 through 2016. Controls include the differences in GDP per capital, GDP growth, exchange rate returns, and interest rates between the participant and lead countries. We also control for between-country distance, common language, and bilateral trade. Standard errors are clustered by country-pair. Robust *t*-statistics are shown in parentheses. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively.

Regulation:	<i>Entry Requirement</i>		<i>Funding Insured</i>	
	(1)	(2)	(3)	(4)
Dep. Var.:	<i>Syndicate</i>	<i>%Syndicate</i>	<i>Syndicate</i>	<i>%Syndicate</i>
$\Delta$ Regulation	-0.005** (-2.10)	-0.162*** (-4.76)	0.023 (1.49)	0.389* (1.75)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Lead, Participant Bank FE	Yes	Yes	Yes	Yes
Observations	676,483	676,483	169,694	169,694
Adjusted $R^2$	0.227	0.170	0.266	0.159