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Regulatory Arbitrage and Loan Location Decisions by Multinational Banks

Asli Demirgüç-Kunt, Bálint L. Horváth, and Harry Huizinga

Abstract

This paper examines the impact of international differences in capital regulation on multinational banks' loan origination location decisions. International loan location decisions represent a key banking margin that has previously not been examined in the literature on regulatory arbitrage by banks. Our estimation relies on within-loan contribution variation in location options for individual multinational banks that participate in a syndicated loan. We examine how the loan location choice and the intensity of regulatory arbitrage are affected by borrower transparency. We find that greater borrower transparency to a local bank establishment makes loan location at this establishment more likely, and that regulatory arbitrage is more intense in the case of more transparent borrowers.

KEYWORDS
Regulatory arbitrage, capital regulations, loan origination

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1. Introduction

Banks that participate in the international syndicated loan market tend to be multinational themselves, operating banking establishments in several countries. This implies that banks typically have a choice in which country to originate their share of a syndicated loan, taking into account international differences in, among other things, capital regulation. This paper examines the impact of international differences in capital regulation on banks' international loan origination location decisions. International loan location decisions represent a key banking margin that has previously not been examined in the literature on regulatory arbitrage by banks.

Our main focus is on the role of borrower transparency in affecting loan location outcomes and regulatory arbitrage. We find that greater borrower transparency to a bank establishment—in addition to less stringent regulation—makes loan origination at an establishment more likely. Furthermore, the estimated sensitivity of loan location to international differences in capital regulation is greater for more transparent borrowers, which implies that loan location choice represents a trade-off between more efficient information acquisition and weaker regulation. As a corollary, international regulatory differences could prompt a bank to choose a loan location that is suboptimal from an information acquisition perspective, leading to less efficient information acquisition about prospective borrowers and ultimately less informed lending decisions.

Previous papers have examined a range of margins that are affected by regulatory arbitrage. Specifically, Houston, Lin, and Ma (2012) document that banks direct greater financial flows to countries with looser regulations. In addition, Karolyi and Taboada (2015) find that banks in countries with stricter regulations tend to take over banks in countries with more relaxed regulations. Analogously, Frame, Mihov and Sanz (2020) show that US Bank Holding Companies establish foreign subsidiaries especially in countries with less stringent regulations. Our finding that international loan location decisions reflect regulatory arbitrage is complementary to these earlier contributions, as directing financial flows or banking FDI towards countries with more lenient regulations enables multinational banks to originate additional loans subject to the more lenient regulations in these countries.

In this paper, we combine data on syndicated loan origination with data on the ultimate owners of the originating banks, and on the international subsidiary network of multinational banking groups. This banking group structure information is combined with further banking group and borrower accounting and other information. Our main sample covers 214, 230 cross-border syndicated loan contributions by individual banks from Dealscan provided to borrowers in 151 countries by 42 multinational banking groups headquartered in 10 countries during the 1999–2014 period. Our estimation relies on within-loan contribution variation in origination locations for individual banking groups, which enables us to fully control for borrower, banking group as well as loan characteristics.

Estimating a conditional logit model, we first establish that banks' international loan location decisions reflect regulatory arbitrage. In particular, we find that banks are less likely to originate a loan in a country with more stringent capital regulation. This effect is estimated to be stronger for weakly capitalized multinational banking groups, and stronger for loans to riskier borrowers.

Next, we examine the effect of borrower transparency on location choices and on the intensity of regulatory arbitrage. In a syndicated loan setting, there tends to be asymmetric information between lead banks and other banks that participate in a loan syndicate. This reflects that lead banks typically perform the main tasks of selecting and monitoring borrowers, for which they earn a fee. This potentially creates conflicts of interest between lead banks and other participating banks, as lead banks could underperform their information collection and provision tasks at any stage of the syndication process (Sufi, 2007; Gustafson, Ivanov, and Meisenzahl, 2021). Potential conflicts of interest within a loan syndicate underscore the importance for each individual bank to have some independent capacity to collect information on prospective and actual borrowers.

Depending on the particular borrower, the various entities of a multinational bank have differing capabilities to assemble and assess relevant information. This suggests that loan location choices reflect a trade-off between more efficient information acquisition about a borrower and weaker regulation. To test this, we examine whether the sensitivity of loan location outcomes to regulatory differences depends on proxies for a bank's preferred location for information acquisition and the cost of deviating from this preferred location.

If the multinational bank has an establishment in the borrower country, this banking establishment is likely to be the preferred location for information collection about the borrower. In line with this, we find a higher likelihood of loan location in the borrower country. Similarly, we find that loan location is more likely in a country that more heavily specializes in the borrower's industry, which could facilitate information gathering and evaluation. We further show that the intensity of regulatory arbitrage increases with borrower transparency, as proxied by the existence of a credit rating and lower cultural differences between the borrower country on the one hand and the bank establishment and parent bank countries on the other. Similarly, there is some evidence that the intensity of regulatory arbitrage increases with international language similarity. These results are robust to controlling for borrower risk.

Our findings, indicating more intense regulatory arbitrage in the case of more transparent borrowers, are consistent with the notion that the loan location choice represents a trade-off between more efficient information acquisition and weaker regulation. As a corollary, international regulatory differences could prompt a bank to choose a loan location that is suboptimal from an information acquisition perspective. The implied distortion is potentially material, as information acquisition is a key banking function (Diamond, 1984). As a result of this distortion, banks could incur higher information collection costs or collect less information, leading to less informed and inferior lending decisions.

We further examine whether the intensity of regulatory arbitrage has changed after the financial crisis that started in 2007, finding evidence of regulatory arbitrage in the pre-crisis period 1999–2006, but not in the later period 2007–2014. We show evidence that this decline in regulatory arbitrage can be explained by higher bank capitalization levels in the later period, given that regulatory arbitrage is less intense for better capitalized banks.

In a final test, we consider how capital regulation stringency affects the share of loans provided through a foreign subsidiary in regressions with loan volume data aggregated at the borrower country-parent bank country level. We find that the share of cross-border loans originated through foreign subsidiaries is positively related to capital regulation stringency. This result confirms that capital regulation stringency affects loan origination location decisions, and show that these decisions have material effects on loan origination volumes in the countries where a multinational bank operates.

This paper adds to a literature that has addressed a range of facets of international regulatory arbitrage.[1] Using consolidated international banking statistics from the BIS, Houston, Lin, and Ma (2012) find that banks tend to have greater claims on countries with less burdensome regulation, which the authors interpret as evidence of regulatory arbitrage by international banks. The provision of loans to borrowers in countries with less stringent regulations would imply regulatory arbitrage, if these loans are originated by subsidiaries located in these countries, as then the more lenient local regulatory regimes apply. The consolidated banking statistics from the BIS analysed by Houston, Lin, and Ma (2012), however, do not provide information on where international loans have been originated, and hence they cannot indicate the precise way in which banks engage in regulatory arbitrage.

Considering international bank M&As, Karolyi and Taboada (2015) show that acquiring banks tend to be located in countries with stronger regulations than their targets, and that abnormal returns are larger when acquirers come from more restrictive banking environments. These results suggest that international bank M&As are structured to create subsequent opportunities for international regulatory arbitrage, most likely in the area of credit provision. Consistent with this, Frame, Mihov, and Sanz (2020) show that US Bank Holding Companies (BHCs) are more likely to operate subsidiaries in countries with weak regulation and supervision, and that financial institutions' decisions to operate in environments with lax environments are associated with an increase in BHC risk and BHCs' contribution to systemic risk.

Examining the riskiness of bank credit, Ongena, Popov, and Udell (2013) find that lower barriers to entry, tighter restrictions on bank activities and to some degree higher minimum capital requirements at home are associated with lower banking standards abroad, consistent with regulatory arbitrage. Unlike Ongena, Popov and Udell (2013), we consider the within-loan contribution loan location decision by individual multinational bank, thereby controlling, among

1 Acharya (2003), Dell'Ariccia and Marquez (2006), and Morrison and White (2009) analyze international competition with respect to capital regulation from a theoretical perspective.

other things, for loan characteristics including borrower risk. We expand our understanding of how borrower risk affects regulatory arbitrage, however, by showing that the sensitivity of loan origination location to capital regulation stringency is greater in the case of loans to riskier borrowers.[2]

Regarding syndicate composition, Gao and Jang (2020) find that strictly regulated banks participate more in syndicates with lead banks facing less stringent capital regulations. The resulting lending syndicates are shown to extend loans to riskier borrowers, which suggests that strictly regulated banks rely on the expertise of less regulated banks to gain access to risky international lending opportunities. Moreover, the tendency of banks to participate in loan syndicates with less strictly regulated lead banks is stronger for less transparent banks, which suggests that less transparent banks are better able to hide the riskiness of their syndicated loans from bank supervisors. Our finding that regulatory arbitrage with respect to within banking group loan location is stronger for more transparent borrowers is robust to controlling for the measure of bank transparency considered by Gao and Jang (2020).

In their study on international cooperation among bank supervisors, Beck, Silva-Buston and Wagner (2023) find that such cooperation increases bank stability more if the parent bank has to have audited financial statements, implying that cooperation among bank supervisors is more effective if it relies on credible information that can be exchanged with other parties. Beck, Silva-Buston and Wagner (2022) further show that banks tend to shift lending and risk to subsidiary countries that are not included in the cooperation agreement. Our paper instead shows that regulatory arbitrage regarding loan origination location is more intense for more transparent borrowers. Taken together, the papers by Beck, Silva-Buston, and Wagner and our work show that the availability of information at the levels of supervisory authorities as well as banks can affect different aspects of regulatory arbitrage.

In the remainder, section 2 describes the data. Section 3 describes the estimation approach, and it presents empirical results on how international differences in capital regulations affect the location of loan origination. Section 4 shows evidence on how these differences affect the share of cross-border loans originated through a foreign subsidiary. Finally, section 5 concludes.

2. Data

2.1 Sample construction

Data on syndicated loans are from the Loan Pricing Corporation's Dealscan database for the period 1995–2016. These data include the identities and residencies of borrowers and lenders as well as the contributions of individual lenders to each loan facility. Figure 1 plots the development of aggregate

2 Buchak, Matvos, Piskorski and Seru (2018) and Irani, Iyer, Meisenzahl and Peydró (2020) provide evidence of regulatory arbitrage between banking and shadow banking sectors within the US.

cross-border syndicated loans by banks over the 1995–2016 period, showing a generally upward trend that was temporarily reversed during the financial crisis of 2008–2009.

We are interested to know which lenders are foreign subsidiaries of international banks. To inform on this, Dealscan provides information on a lender's ultimate parent bank, but only for the final year of the sample. In practice, ownership links among banks vary over time due to mergers and acquisitions. To take this into account, we use the Dealscan-Compustat link provided by Schwert (2018) that connects the most active lenders in Dealscan to their respective banking groups on a quarterly basis, taking into account mergers and acquisitions over time. We define a lender to be a foreign subsidiary, if the banking group that it belongs to according to Compustat is headquartered in another country than the lender itself as reported by Dealscan. As we are interested in international bank regulatory arbitrage, we drop all loans provided by non-bank lenders, and in our benchmark sample we also drop purely domestic loans where the ultimate parent bank and the borrower reside in the same country.

To examine a bank's choice of loan origination location, we need information on an international bank's entire foreign subsidiary network, including those foreign subsidiaries that do not provide loans as reported in Dealscan. For this purpose, we use information on the ownership of foreign subsidiaries by multinational banks located in OECD countries from Silva (2019) which is available for the years 1999–2014. We match the loan data with borrower country and bank establishment country variables from various sources, as described below. This produces a set of 214,230 individual loans to borrowers in 151 countries by 42 multinational banking groups headquartered in 10 countries.[3,4] This loan sample has broad geographical coverage: lending banks are located in 27 OECD countries (out of 34 OECD countries), while borrowers reside in 151 countries (out of 176 countries with borrowing firms in Dealscan).[5] On average, a banking group has subsidiaries in 5.1 foreign countries. For about 70% of individual loans, Dealscan does not report the loan volume. This reduces the number of borrower countries to 82 in the foreign subsidiary loan share regressions that require information on loan volumes, unlike the loan origination location regressions.[6]

2.2 Variables

In the loan location regressions, the dependent variable is the loan origination dummy variable that equals one for the country of loan origination, and zero for other bank location countries. The mean of this variable is 0.182 as seen in Panel A of Table 1.

3 By a loan we refer to the individual contribution of a lender in a facility. Facilities are credit agreements between a borrower and one or more lenders.

4 Schwert's (2018) Dealscan-Compustat link contains information on 119 banking groups, out of which 46 banks can be matched with Silva's (2019) dataset of subsidiary ownership. Matching further with information on dependent variables reduces the sample to 42 multinational banks.

5 See Tables A2 and A3 in the Appendix.

6 For the top 5 lender countries, Table A4 in the Appendix provides information on the top 3 borrower countries and the top 3 subsidiary countries. For lenders in Germany, Japan, and the UK, the US is the top borrower as well as subsidiary country. For lenders in the US, the UK is the top borrower country as well as the top subsidiary country. For lenders in France the top borrower country is the US and the Netherlands is the top subsidiary country.

The main independent variable is Capital regulation, which is an index of the stringency of capital adequacy standards, taken from successive World Bank regulation and supervision surveys (see Barth et al., 2004 and 2006).[7] Among other things, this index reflects whether the minimum capital-asset ratio requirement is risk weighted in line with the Basel guidelines, whether the minimum ratio varies as a function of market risk and whether the market value of loan losses not realized in accounting books are deducted (see Barth, Caprio and Levine, 2004, Table 1).

The responsiveness of loan location to capital regulations could be different for banks depending on their regulatory capital ratio, as weakly capitalized banks potentially gain more from regulatory arbitrage. To examine this, we alternatively include the Tier 1 capital ratio, which is the consolidated banking-group ratio of Tier 1 capital to risk-weighted assets, and Total capital ratio, which is the consolidated banking-group ratio of total regulatory capital relative to risk-weighted assets. These capital ratios are for the year before the pertinent loan was originated, and they are winsorized at the 1% and 99% levels.[8]

In addition, we consider three indices of borrower risk to examine whether loan location is more sensitive to capital regulations for riskier borrowers. First, Borrower E/A is the borrower's ratio of equity to assets in the previous year. Second, Borrower Z-score is Altman's Z-score calculated for the borrower in the year before the loan was provided. Higher values of Altman's Z-score indicate a lower likelihood of bankruptcy. Third, Borrower ROA is the borrower's pre-tax income divided by assets in the prior year. Accounting data for borrowers are taken from Worldscope.

The loan origination location choice potentially represents a trade-off between more efficient information acquisition about a prospective borrower and weaker regulation. To test this, we consider several variables that proxy for a bank's preferred habitat for information acquisition and the cost of deviating from this preferred habitat. Domestic is a dummy variable that equals one if a banking establishment is located in the country of the borrower. In this case, the borrower's country is likely to be the preferred origination country on information acquisition grounds. Around 6.2% of banking establishments are located in the same country as the borrower.

Borrower rated is a dummy variable indicating that the borrower has a credit rating issued by Standard & Poor's, Moody's or Fitch Ratings. For firms with a credit rating, more information is readily available and hence the cost of deviating from any preferred information habitat is lower.

7 Following Houston, Lin and Ma (2012), we take values of the regulatory indices for the years 1995 to 1999 from the first survey (measuring regulation in 1999); for the years 2000 to 2003, we use the second survey reflecting regulation as of the end of 2002; for the years 2004 to 2007, the third survey's results are used (reflecting regulation at the end of 2005); for the years 2008 to 2012, we take the results of the fourth survey documenting regulation at the end of 2012; finally, for the years 2013 to 2016 we use the results of the fifth survey measuring regulation at the end of 2016. One of the subcomponents of Capital regulation (Overall capital stringency) cannot be calculated using data from the fifth wave of the survey because of missing information. For this wave, we take the values of Capital regulation in the fourth wave and adjust it using changes in the other subcomponent, Initial capital regulation, that is available.

8 Borrower characteristics mentioned below are similarly winsorized.

Cultural difference (borrower—entity) and Cultural difference (borrower—parent) are the cultural differences between the borrower and bank establishment countries, and between the borrower country and parent bank countries, respectively. Cultural difference is measured as the Euclidian distance between national measures of traditional versus secular/rational and survival versus self-expression orientations, based on survey data from the World Values Survey. Greater cultural differences vis-à-vis the borrower country could increase the difficulty of information acquisition about the borrower, and hence increase the cost of deviating from any preferred habitat for information acquisition. Using this measure of cultural difference, Giannetti and Yafeh (2012) have shown that more culturally distant lead banks offer borrowers smaller loans at higher interest rates.

Common spoken language (borrower—entity) and Common spoken language (borrower-parent) are the probabilities that pairs of people chosen at random from the borrower country and the bank establishment and parent bank countries, respectively, understand one another in some language. These common language variables are taken from Melitz and Toubal (2014). A common language with the borrower should facilitate information acquisition about the borrower, and hence reduce the cost of originating a loan outside the preferred habitat on information grounds. As a control variable, the regressions further include Common spoken language (parent—entity), which is the probability that pairs of people chosen at random from the bank establishment and parent bank countries understand one another in some language.

A final index of borrower transparency is Accounting (borrower), which is an index of accounting standards in the borrower country in 1993. Higher values indicate more disclosure in firms' annual reports. A greater informativeness of a borrower's accounting statements is expected to render loan origination location more sensitive to capital regulation.

The sensitivity of loan location to capital regulation may also depend on the transparency of bank accounting statements to bank supervisors. In particular, we expect a bank to be more interested in originating loans in a country with less stringent capital regulation especially, if bank financial statements in that country are relatively less transparent. To test this, we consider Low transparency (entity), which is a dummy variable indicating that the Financial Statement Transparency index in Barth et al. (2013) has a value less than five.

Loan location can further depend on the experience of a bank establishment to provide loans to firms in the sector of the borrower firm, relative to banking establishments of the same banking group located in other countries. To proxy for this, we construct Specialization as the ratio of the value added produced by the 2-digit SIC industry of the borrower relative to GDP in a potential loan origination country in a given year, relative to its mean across all potential loan origination countries.

Changes in arbitrage related to capital regulations may not only depend on variation in de jure capital regulations, but also on changes in supervisory efforts to prevent it. As a proxy for changes in supervisory effort, we consider changes in the number of staff involved in the supervision of

banks in the bank's parent country. Specifically, Supervisory staff takes on a value of 1 for the years 1999–2006, and for the years 2007–2014 it is constructed as the average supervisory employment during 2007–2014 divided by the average supervisory employment during 1999–2006. On average, Supervisory staff increased 43.2% from 1999–2006 to 2007–2014.

Similarly to prior research (for instance, Houston, Lin and Ma, 2012), we include several country-level regulatory and supervisory and other institutional variables that may affect international loan origination location. Among these, Overall activity restrictions is an index of the extent to which banks can engage in securities, insurance and real estate activities. Official supervisory power is an index of the power of the supervisory authorities to take specific actions to prevent and correct problems in banks. Monitoring is an index of the strength of private monitoring of banks through, for instance, certified audits and ratings by international credit rating agencies Creditor rights taken from Djankov et al. (2007) measures the strength of creditors' rights in case of a bankruptcy.[9] Information sharing measures rules affecting the scope, accessibility, and quality of credit information available through public or private credit registries.[10] Time to enforce contracts is the time required to resolve a commercial dispute, calculated as the average number of calendar days from the filing of the lawsuit in court until the final determination and, in appropriate cases, payment in a country.[11] As a final institutional variable, Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence in a country.

We also control for the development and the size of the banking establishment country. In particular, we include the natural logarithm of GDP per capita measured at constant 2010 US dollar prices, Log real GDP per capita, and the natural logarithm of the total population, Log population.

In a robustness check, we include the policy interest rate, IR, representing the central policy rate or discount rate in the month of loan origination as an index of local funding costs. This variable is taken from the IMF's International Financial Statistics database (IFS).

Finally, we control for the distances between a bank establishment's country and the countries of the borrower and parent bank. Specifically, Log distance (borrower—entity) and Log distance (parent—entity) are calculated as the natural logarithms of 1 plus the physical distances between the capital cities of the bank entity's country and the countries of the borrower and the parent bank, respectively.

9 Since the last available data are for 2007, for subsequent years we take the values of this year.

10 This variable is from the World Bank's Doing Business database. The World Bank changed the methodology of measuring the Information sharing index in 2015. Until then, the index ranged between 0 and 6. Since the revised index ranges between 0 and 8 we multiply the post-2014 values of the index by 6/8. The first available year is 2004, and for prior years we take the values for this year.

11 This variable is from the World Bank's Doing Business database. The first available year is 2004, and for prior years we take the values for this year.

Going beyond the loan location choice, we consider the volume of cross-border loans provided through foreign subsidiaries relative to the total volume of cross-border loans at the banking group level, denoted Foreign subsidiary share. Figure 2 plots the aggregate foreign subsidiary share over the period 1995–2016, with a low of about 7% in 2001 and a high of about 16% in 2009. In the empirical analysis, we consider the foreign subsidiary loan share at the borrower country-lender parent country-year level. This foreign subsidiary loan share has a mean of 0.096 (see Panel B of Table 1).

The foreign subsidiary loan share is related to the same regulatory and institutional variables as in the loan location choice regressions. However, now these various variables are defined separately for borrower and lender countries.[12] In the foreign subsidiary loan share regressions, Log distance is the natural logarithm of 1 plus the geographical distance between the capital cities of the borrower and lender countries. Common spoken language spoken is the probability that a pair of people from the borrower and lender countries understand one another in some language.

In the foreign subsidiary loan share regressions, two additional explanatory variables are meant to control for the structure of the banking market in a borrower country, reflecting that higher margins in less competitive markets and markets with less significant government ownership of banks may attract more foreign bank lending. First, Concentration (borrower) is the assets of the five largest banks as a share of total commercial banking assets in the borrower's country. Second, Government bank ownership (borrower) is the proportion of banking assets in banks in the borrower country that are government owned, meaning that 50% or more of the shares are controlled by the government.

Regulatory arbitrage by banks potentially increases individual banking-group risk as well as a banking group's contribution to systemic risk. As shown in Table A5 in the Appendix, the share of arbitraged loans at the banking group level is negatively and significantly correlated with the banking group-level Z-score and Distance-to-default; it is positively and significantly correlated with Stock volatility and the systemic risk variables MES (5%) (see Acharya et al., 2017) and Covar (5%) (see Adrian and Brunnermeier, 2016); and it is not significantly correlated with Asset volatility.[13] Overall, these correlations suggest that regulatory arbitrage in the area of loan origination location is positively associated with a banking group's individual risk as well as its contribution to systemic risk.

3. Regulatory arbitrage and the country location of loan origination

3.1 Estimating approach

We estimate conditional logit regressions following McFadden (1974) to explain the choice of multinational banks regarding the country of loan origination. Consider a multinational banking

12 Creditor rights and Information sharing in lender countries are excluded because of a lack of sufficient variation in these variables.

13 See the Appendix for variable definitions.

group that needs to select a country c, out of the C countries where it has banking establishments, to originate a loan i. The set of possible loan location options, C, is loan specific, as multinational banks have varying parent bank locations as well as foreign subsidiary networks. Let X_{ic} be a set of country characteristics that generally includes origination country fixed effects. The conditional likelihood, P_{ic} of the banking group choosing country c for loan i is given by

$$P_{ic} = \frac{\exp(\beta X_{ic})}{\sum_{i=1}^{C}(\beta X_{ic})} \quad (1)$$

The country characteristics X_{ic} have to vary across countries c for a particular loan i.[14] In practice, this mean that the set X_{ic} cannot include characteristics of the borrower, the multinational banking group, the international loan syndicate, or the loan itself, as these are all equal across a multinational bank's location choices for a particular loan. Thus, our estimation relies on within-loan variation in origination locations for loan contributions of individual banking groups to syndicated loans, fully controlling for borrower, banking group as well as loan characteristics.[15] We estimate the set of parameters β by maximizing the full conditional log likelihood given by the sum of the logs of the conditional likelihoods in (1) for all loans, and we report standard errors that allow for clustering at the banking group level.[16] In the benchmark estimation, we restrict the sample to cross-border loans, i.e. loans to borrowers located outside the parent country. In a robustness check, however, we also include domestic loans.

Our primary interest is in estimating the role of Capital regulation in affecting possible loan location. In practice, we cannot estimate our conditional logit regressions if they jointly include a large set of origination country control variables and origination country fixed effects for a lack of convergence. Therefore, we separately present estimations based on a larger set of control controls and no country fixed effects, and based a on smaller set of controls with country fixed effects. In the latter case, the estimated effect of capital regulation on loan location only relies on time variation in this regulation. In some specifications, we include interactions of Capital regulation with borrower, banking establishment or banking group characteristics to ascertain how these characteristics affect the relation between capital regulation and location choice.

14 Formally, it can be seen that P_{ic} in (1) is invariant to an element of the set X_{ic} that has the same value for all c.

15 Our within loan contribution variation in origination locations for individual banking groups is distinct from the within overall loan variation in loan contributions (or shares) of different banks or banking groups considered by, for instance, Benincasa, Kabas, and Ongena (2022). These authors use overall loan fixed effects to control for borrower but not bank characteristics, showing that lenders react to domestic climate policy stringency by increasing cross-border lending, similarly to Laeven and Popov (2022).

16 In unreported robustness tests we calculated bootstrapped and heteroscedasticity robust standard errors, as well as standard errors clustered at the banking group * year level in regressions. All of these alternatives yield standard errors that are generally smaller than their corresponding values with clustering at the banking group level.

3.2 Initial results

The results of estimating equation (1) with the full set of origination country controls but without origination country fixed effects are reported in Panel A of Table 2. In regression 1, Capital regulation obtains a negative coefficient of −0.119 (significant at 5%), indicating that more stringent capital regulations reduce the probability of loan origination in a country. This estimated effect is economically material, as a one standard deviation increase in the value of Capital regulation gives rise to a 20.7% decrease (= 1 − *exp*(−0.119 * 1.949)) in the odds ratio of a particular location being chosen to originate a loan.

Among the control variables, Information sharing is estimated with a negative and significant coefficient, perhaps because information sharing reduces the value of investing in information collection regarding loan customers, while Rule of law obtains a positive and significant coefficient. The two distance variables enter with negative and significant coefficients, while the coefficient for Common spoken language (parent—entity) is estimated to be positive and significant.

The estimation of regression 1 is robust to i) including the borrower-country monetary policy interest rate, ii) selecting on Term A loans that tend to be held by banks, iii) excluding borrowers located in a bank establishment country, and iv) including borrowers located in the parent bank country (see Table A6 in the Appendix).

Better capitalized banking groups could engage less in capital regulation arbitrage, as they face less binding capital constraints. To test this, in regressions 2 and 3 we include interactions of Capital regulation with Tier 1 capital ratio and Total capital ratio, respectively. These interactions are estimated with positive coefficients (significant at 1%), consistent with the notion that better capitalized banks benefit less from regulatory arbitrage. In these regressions, Capital regulation has a negative coefficient (significant at 1%).

Loans to safer borrowers attract lower regulatory risk weights, and thus require less regulatory capital. This suggests that the location of safer loans may be less sensitive to international differences in capital regulations. To test this, regressions 4–6 include interactions of Capital regulation with Borrower E/A, Borrower Z-score, and Borrower ROA, respectively. These interaction terms receive positive coefficients that are significant in the cases of Borrower Z-score and Borrower ROA in regressions 5 and 6 (at 10% and 1%). Capital regulation receives a negative and significant coefficient (10% in regression 4, and 5% in regressions 5 and 6).

Panel B of Table 2 shows an analogous set of regressions that include origination country fixed effects but exclude Creditor rights, Information sharing, Time to enforce contracts, Rule of law, Log real GDP per capita and Log population as origination country controls to achieve convergence of the estimation. In regression 1, the coefficient for Capital regulation is negative and significant (at 10%), but Capital regulation * Borrower Z score becomes insignificant in regression 5. Overall, the results

of Table 2 show that a bank's loan origination location decision is subject to regulatory arbitrage, and that this arbitrage is more intense for weaker firms and banks.[17]

3.3 Regulatory arbitrage and borrower and bank transparency

Banks are expected to prefer to originate loans in locations where they can more easily evaluate and monitor borrowers, while they might be less interested in originating loans in countries where bank financial statements are more transparent to bank supervisors. This suggests that banks face trade-offs between capital regulation stringency on the one hand, and borrower and bank transparency on the other, in selecting loan location decisions. To examine these trade-offs, this section provides evidence on how the sensitivity of loan location choices to capital regulation varies with borrower and bank transparency. We start with considering how borrower transparency affects loan location choices and regulatory arbitrage.

As a first indicator of borrower transparency, we consider the Domestic dummy, which equals one if a banking establishment is located in the borrower country. If this is the case, this particular banking establishment is likely to be the preferred habitat for information collection. In regression 1 of Panel A of Table 3, which includes the full set of origination country controls but no country fixed effects, Domestic obtains a positive estimated coefficient (significant at 1%), indicating that the establishment in the borrower country is more likely to be the originating bank. Regression 2 in addition includes an interaction of Capital regulation with Domestic. In this regression, Capital regulation and its interaction with Domestic obtain coefficients of −0.189 and 0.184 (significant at 1% and 5%), while Domestic obtains a positive coefficient (significant at 5%). These results imply that loan location in the borrower country is less negatively related to regulatory stringency in this country compared to other locations, consistent with an information advantage of loan location in the borrower country.

Banks can readily obtain information about prospective borrowers that have a credit rating, which suggests that for loans to these borrowers capital regulation is a more important concern relative to any need to generate additional information. To test this, regression 3 includes an interaction of Capital regulation with Borrower rated, signaling that a firm has a credit rating. The estimated coefficient for this interaction term is negative (significant at 1%), suggesting that regulatory arbitrage is more intense in case of more transparent borrowers that have a credit rating.

Next, we consider the role of cultural distance between the borrower and bank establishment countries. A greater cultural distance makes it more difficult to gather information about a prospective borrower. Thus, a greater cultural distance could make deviating from locating a

17 In unreported OLS regressions analogous to regressions in Panels A and B of Table 2 with standard errors clustered at the potential origination location * year level we find significant and negative coefficients in regressions 1, 2, 3, 4 and 6 of Panel A, and a marginally significant, positive coefficient in regression 4 of Panel B. In both panels the interactions between Capital regulation and the regulatory capital ratios have positive and significant coefficients.

loan in the most appropriate country on information grounds more costly, which suggests a lower sensitivity of loan location to capital regulations. To test this, regression 4 includes Cultural distance (borrower—entity) and its interaction with Capital regulation. These variables obtain negative and positive coefficients (significant at 1%), respectively, consistent with the notion that regulatory arbitrage is weaker for loans subject to greater cultural distance. Alternatively, regression 5 includes an interaction of Capital regulation with Cultural distance (borrower—parent), measuring cultural distance between borrower and parent bank countries. The estimated coefficient for this interaction variable is positive (significant at 1%), indicating that cultural distance between borrower and parent bank countries also mitigates regulatory arbitrage.

Language barriers could similarly encumber information collection about potential borrowers. To test this, regressions 6–7 include common spoken language variables, analogously to the cultural difference variables in regressions 4–5. Specifically, regression 6 includes Common spoken language (borrower—entity) and its interaction with Capital regulation. This language variable is estimated to be positive (significant at 1%), while the interaction term is negative (significant at 1%). Thus, having a common language between borrower and establishment countries makes loan location more likely,[18] and it intensifies regulatory arbitrage. Regression 7 includes an interaction of Capital regulation with Common spoken language (borrower—parent), which is estimated to be insignificant.

As an additional proxy for borrower transparency, Accounting (borrower) is an index of the accounting standards in the borrower country in 1993. In regression 8, the interaction of Accounting (borrower) with Capital regulation is estimated to be insignificant. Finally, Specialization captures the weight of the borrower firm's sector in a potential loan origination country's GDP, relative to other potential loan origination countries. Regression 9 includes this variable but not its interaction with Capital regulation, yielding a positive and significant coefficient. Thus, loan origination is more likely in a country where the borrower's sector is relatively large, which could reflect relative ease of borrower evaluation. Regression 10, however, yields insignificant coefficients for Specialization and its interaction with Capital regulation.

Panel B of Table 3 reports analogous regressions where some origination country controls are replaced by origination country fixed effects. In regressions 2 and 6, interactions of Domestic and Common spoken language (borrower—entity) with Capital regulation are no longer significant, but Common spoken language (borrower—parent) * Capital regulation now is significantly negative in regression 7. Overall, Table 3 provides evidence that loan location choices reflect a trade-off between a bank's ease of information acquisition regarding borrowers and more relaxed capital regulation.

In a robustness check, we examined whether these results could reflect that borrower transparency is correlated with firm risk. In particular, we re-estimated regressions in Panel A of Table 3 after additionally including interactions of Capital regulation with Borrower E/A, Borrower Z-score, and

18 The estimated coefficients imply that this is the case for any value of Capital regulation in the sample.

Borrower ROA. In these unreported regressions, the coefficients for the transparency variables and their interactions with Capital regulation are estimated to be very similar.[19] This implies that the impact of borrower transparency on regulatory arbitrage is distinct from the effect of firm risk as represented by risk measures that are based on publicly available accounting information.

In a further test, we checked whether the effect of borrower transparency on regulatory arbitrage is different for lead banks compared to other participating banks within loan syndicates. Lead banks play a key role in collecting information on borrowers, which suggests that these banks are especially interested in originating a loan in a location where borrower information is more easily collected. Conversely, lead banks tend to retain sizeable shares of syndicated loans (Sufi, 2007), which may lead them to be more concerned about capital regulation. To distinguish lead banks from other banks, we re-estimated the regressions in Panel A of Table 3 after including triple interactions of a lead bank dummy variable, the included borrower transparency variable and Capital regulation (in addition to double interactions). In unreported regressions, the results are ambiguous and inconclusive: the triple interactions are significantly negative and positive in regressions 3 and 4, consistent with more emphasis on information collection for lead banks, but positive and significant in regression 6 consistent with less emphasis on information collection for these banks.[20]

We also examined whether our findings on the role of borrower transparency in regulatory arbitrage is robust to controlling for bank establishment transparency, from the perspective of bank supervisors. Bank transparency is proxied by Low transparency (entity), which is a dummy variable indicating that the Financial Statement Transparency index of Barth et al. (2013), which is specific to banks, is less than five. Using the same transparency variable, Gao and Jang (2020) have shown that a bank's tendency to participate in a loan syndicate with a lead bank located in a country with relatively lax capital regulation is stronger, if the bank is less transparent. The rationale is that low bank transparency makes it easier to hide the riskiness of a loan that is acquired through such a syndicate to bank supervisors. In our setting of within-loan location decisions, we hypothesize that a bank is more likely to originate a loan in a country with relatively lax capital regulation if bank transparency in that country is low, as then it can more easily conceal its tendency to locate relatively risky loans in a such a country (see Table 2).

To test this, regression 1 of Panel A of Table 4 includes Transparency (entity) and its interaction with Capital regulation, which are estimated with positive significant and insignificant coefficients, respectively. Thus, banks are more likely to locate loans in countries with low bank transparency, but bank transparency does not materially affect the sensitivity of loan location to capital regulation.[21]

19 Domestic becomes significant at 1% instead of 5% in regression 2, and Capital regulation * Common spoken language (borrower—entity) becomes significant at 5% instead of 10% in regression 6.

20 When we include an interaction of the lead bank dummy and Capital regulation in regression 1 of Panel A of Table 2, we obtain an insignificant coefficient for this variable, while Capital regulation is negative and significant (unreported).

21 In unreported regressions, we examine whether the impact of bank transparency on the sensitivity of loan location to capital regulation depends on borrower riskiness by including triple interactions of Low transparency (entity), Capital regulation and one of our three proxies for borrower riskiness, which are estimated to be insignificant.

To examine the joint effects of borrower and bank transparency on regulatory arbitrage, regressions 2–11 report the results of regressions where we re-estimate the regressions of Panel A of Table 3 after including Low transparency (entity) and its interaction with Capital regulation. In regressions 4–6, the interaction of the included borrower transparency variable with Capital regulation is significant, confirming a role for borrower transparency to affect regulatory arbitrage after we control for bank transparency. Low transparency (entity) is positive and significant in six of these additional regressions, and interactions with Capital regulation are insignificant.

In Panel B of Table 4, we find significant interactions borrower transparency variables and Capital regulation in regressions 4–6 and 8 consistent with borrowing transparency intensifying regulatory arbitrage. Low transparency (entity) is positive and significant in regressions 5–6, but its interactions with Capital regulation unexpectedly have significant coefficients of different signs in regressions 6 and 8. Overall, the finding that borrower transparency intensifies regulatory arbitrage is shown to be robust to controlling for bank transparency, while there is some evidence that bank transparency makes loan location less likely.

Our finding that borrower transparency heightens regulatory arbitrage suggests that loan location choices reflect a trade-off between the ease of information acquisition on borrowers and more relaxed capital regulation. Specifically, regulatory differences could induce a bank to select a loan location that is suboptimal from an information acquisition perspective. The implied distortion is potentially material, as information acquisition is a key banking function (Diamond, 1984). This distortion, specifically, could take the form of higher information collection costs and/or less accurate information, and as a corollary less informed and inferior lending decisions.

3.4 The development of regulatory arbitrage over time

Our data cover a relatively long period, which enables us to examine whether the intensity of regulatory arbitrage has changed over time, and in particular following the financial crisis of 2008–2009. To start to address this question, Figure 3 plots information for the period 1995–2016 on the fraction of cross-border loans that have been 'arbitraged' in the sense that they have been originated through foreign subsidiaries located in countries with less stringent capital regulations than in the parent country. The share of 'arbitraged' loans is seen to have peaked at about 8% in the year 2000, and generally was relatively high in the pre-crisis period. In this subsection, we provide further empirical evidence of the apparent break in the intensity of capital regulation arbitrage around the time of the financial crisis, and we examine potential explanations for this break.

To examine whether the intensity of arbitrage changed after the financial crisis, we re-estimate regression 1 of Panel A of Table 2 after including an interaction term of Capital regulation with the Post dummy variable, which equals 1 for the period 2007–2014. As reported in column 1 of Panel A of Table 5, this yields coefficients for Capital regulation and Post * Capital regulation of −0.288 and 0.293 (significant at 1%), respectively, consistent with regulatory arbitrage only in the earlier period.

To learn more about the time variation in regulatory arbitrage, we estimated a regression where we replaced Capital regulation as in regression 1 of Panel A of Table 2 by a set of interactions of Capital regulation with year dummies. The point estimates of the coefficients for these various interactions and the corresponding 95% confidence intervals are displayed in Figure 4. These point estimates are negative for the years 1999–2007 (and significant at 5% for the years 2002, 2003, and 2005), consistent with regulatory arbitrage in the pre-crisis period. In contrast, from 2008 the estimated coefficients are positive (and significant at 5% for the years 2008–2010), consistent with banks preferring locations with more stringent capital regulations to originate their loans in the later period. From a peak in 2008, the estimated coefficients are shown to follow a downward trend towards values closer to zero in the years 2013–2014.

Next, we explore several potential explanations of the apparent decline in regulatory arbitrage following the financial crisis. To start, after the crisis banks may have put more weight on distance in their loan origination decisions, consistent with the finding by Giannetti and Laeven (2012) that banks tend decrease their loans to distant borrowers to a larger extent when they experience a banking crisis in their home country. To control for possible changes in the role of geographical distance, regression 2 includes interactions of the Post dummy with Log distance (borrower—entity) and Log distance (parent—entity). These additional interaction terms are estimated to be insignificant, while estimated coefficients for Capital regulation and Post * Capital regulation are similar to regression 1.

The change of regulatory arbitrage following the financial crisis could further reflect changes in the regulatory regime. Figure 5 shows that there was no significant decline in the international dispersion of Capital regulation following the financial crisis that could explain a decline in regulatory arbitrage. However, regulation was changed in several other ways. The World Bank (2019, p. 44), in particular, reports a movement over time around the world towards greater supervisory powers to require banks to reduce or suspend bonuses and other remuneration to bank directors and managers, while the IMF (2015) finds that regulations were tightened in the areas of supervisory discretion and international information exchange with foreign supervisors. In our analysis, greater supervisory powers of this kind are already captured by Official supervisory power, which is an index of de jure supervisory powers.

Beyond changes in de jure supervision, regulatory arbitrage with respect to capital regulations could have been discouraged by more intense de facto supervision and enforcement of existing capital regulations. Many countries formally impose capital requirements at the consolidated bank level, but enforcement of group-wide capital requirements may only be possible if sufficient supervisory staff are available to monitor a multinational bank's worldwide operations.[22] This suggests that a greater employment of supervisory staff in a bank's parent country could reduce regulatory arbitrage.

22 In 2012, 5 out of 9 home countries and in 2016 all 10 home countries applied capital adequacy rules on a consolidated basis. Unfortunately, we only have data on this type of consolidation for these two years from World Bank surveys.

To test this, regression 3 includes an interaction of Capital regulation with Supervisory staff, which for the years 2007–2014 measures the size of a country's average supervisory staff during 2007–2014 relative to the average supervisory staff during 1999–2006, while values of 1 are assigned to this variable during 1999–2006. Capital regulation and Capital regulation * Supervisory staff obtain estimated coefficients of −0.918 and 0.623 (significant at 1%), respectively. These results suggest that regulatory arbitrage declined more during 2007–2014 for banking groups headquartered in countries with greater increases in supervisory staff in 2007–2014 relative to 1999–2006. In regression 4 we additionally include the interaction Post * Capital regulation, finding significant estimated coefficients for Capital regulation and Capital regulation * Supervisory staff of −1.163 and 0.910 (significant at 1%), respectively, while Post * Capital regulation is insignificant. Thus, the reduced regulatory arbitrage in the later period evident in regression 1 is related to increases in supervisory staff in banks' parent countries between the 1999–2006 and 2007–2014 periods.[23]

Increases in supervisory staff after the financial crisis coincided with higher bank capitalization ratios, which by themselves are associated with weaker regulatory arbitrage, as shown in Table 2.[24] To check whether the supervisory staff variable just proxies for bank capitalization ratios, we include interactions of Capital regulation with alternatively Tier 1 capital ratio and Total capital ratio in regressions 3, with the results reported as regressions 5 and 6. In these two regressions, Capital regulation * Supervisory staff is positive (significant at 10% and 5%), while the interaction of Capital regulation with either capitalization rate is positive and significant at 1%. These results suggest independent effects of greater supervisory staff and higher capitalization in reducing regulatory arbitrage after the crisis. Finally, we include Post * Capital regulation in regressions 5 and 6, and report the results as regressions 7 and 8. In these regressions, interactions of Post with Supervisory staff and the capitalization ratios remain positive and significant, while Post * Capital regulation is insignificant. Thus, the decline in regulatory arbitrage after the crisis found in regression is shown to reflect increases in supervisory staff and capitalization ratios. In the regressions in Panel B that include origination country fixed effects, we find similar results in regression 1–3, but we see that Capital regulation * Supervisory staff is no longer significant in regressions 4–8. Comparing regression 1 with regressions 7–8 in Panel B, we find that once we include origination country fixed effects the estimated decline in regulatory arbitrage found in the post-crisis period can be explained by higher capitalization ratios.

23 The point estimates of −1.163 and 0.910 in regression 9 and the mean value of Supervisory staff of 1.432 during 2007–2014 suggest that regulatory arbitrage was reversed during 2007–2014 as −1.163 + 0.910* 1.432 = 0.140 is positive (consistent with Figure 4).

24 On average, the Tier 1 capital ratio and Total capital ratio increased by 4.2 percentage points and 2.3 percentage points between the two periods.

4. Regulatory arbitrage and foreign subsidiary loan shares

In this section, we consider the determinants of the share of loans originated through foreign subsidiaries aggregated at the bilateral borrower country, parent bank country level. In particular, we estimate the following equation:

$$\begin{aligned} &\textit{Foreign subsidiary share}_{i,j,t} = \alpha + \beta X\,(\textit{lender})_{i,t} + \gamma X\,(\textit{borrower})_{j,t} \\ &+ \vartheta_1\,\textit{Log distance}_{i,j} + \vartheta_2\,\textit{Common spoken language}_{i,j} + \eta_i + \phi_j + \delta_t + \varepsilon_{i,j,t} \end{aligned} \tag{2}$$

in which $\textit{Foreign subsidiary share}_{i,j,t}$ is the foreign subsidiary loan share for loans to borrowers in country i from banks headquartered in lender country j at time t. The specification includes fixed effects for borrower countries, lender countries and time, denoted η_i, ϕ_j and δ_t respectively. Note that loan demand is common to all possible loan locations, and hence can be taken to be orthogonal to the foreign subsidiary share variables. $X\,(\textit{lender})_{i,t}$ and $X\,(\textit{borrower})_{j,t}$ are sets of lender-country and borrower-country variables including Capital regulation, respectively. A higher value of Capital regulation in the lender country renders loan origination in any foreign country more attractive, and is therefore hypothesized to increase the foreign subsidiary loan share. More stringent capital regulations in the borrower country in turn discourages loan origination in the borrower country, possibly leading to a lower foreign subsidiary loan share. We report standard errors that allow for clustering at the borrower country level.[25]

In regression 1 of Table 6, Capital regulation (lender) obtains a positive coefficient of 0.0281 (significant at 1%), indicating that more stringent capital regulations in the lender country lead to a higher foreign subsidiary loan share. This estimation implies that a one standard deviation increase in Capital regulation (lender) of 1.387 raises Foreign subsidiary share by 0.039, which amounts to 16.3% of its standard deviation. This is an economically meaningful effect.

Bank regulation potentially is endogenous to the foreign subsidiary loan share. Lender countries experiencing large syndicated loan provision through foreign subsidiaries of their international banks, could, for instance, reduce the stringency of regulation to discourage such credit provision. To mitigate potential endogeneity, we re-estimate regression 1 using instrumental variables (IVs), taking Capital regulation (lender, borrower), Overall activity restrictions (lender, borrower), Official supervisory power (lender, borrower), and Monitoring (lender, borrower) to be potentially endogenous following Houston et al. (2012). We employ instrumental variables that have been advanced by these authors as possible determinants of regulation. First, we use the time-varying means of the regulatory variables (excluding the pertinent country) to reflect possible 'regulatory contagion' (see Demirgüç-Kunt and Detragiache, 2002).[26] Second, we use a dummy variable

25 Two way-clustering at the borrower and lender country levels yields qualitatively similar results to the reported results.

26 Specifically, in case of a borrower-country (lender-country) regulatory variable, we instrument it by the mean of this variable for all borrower (lender) countries excluding the pertinent borrower (lender) country.

indicating that the central bank supervises banks for prudential purposes (from the World Bank regulation and supervision survey) to reflect that central bankers are more likely to choose bank regulation that promotes systemic stability (see Goodhart, 2002). A final instrument is the five-year moving average of the Gini index measuring income inequality (from the WDI), as regulation is in part shaped by its distributional consequences (see Beck, Levine, and Levkov, 2010).[27]

The results of the IV estimation are reported as regression 2. A positive and significant coefficients for Capital regulation (lender) in this regression points at greater foreign subsidiary usage by international banks in case of more stringent capital regulation in parent bank countries, consistent with regulatory arbitrage. In this regression, Official supervisory power (lender) obtains a positive coefficient that is not significant. As a specification test, we conducted an overidentification test based on Hansen's J-statistic with the null hypothesis that the instruments are valid, i.e. uncorrelated with the error term and correctly excluded from the estimating equation. As indicated in the table, this null hypothesis is not rejected. In addition, we conducted an underidentification test based on the Kleibergen-Paap rk Wald statistic with the null hypothesis that the model is not identified, as the excluded instruments are not sufficiently correlated with the endogenous regressors. As seen in the table, in this instance the null hypothesis is rejected. Thus, the IV regression appear to be correctly specified.

The foreign subsidiary loan share represents loans originated in the borrower country and in third countries (other than the borrower and lender countries), and thus it generally reflects regulation and other conditions in third countries as well. In regression 3, we control for this by adding third country regulatory and other variables to regression 1. These third country variables are computed as averages across parent banks on a bilateral country-year basis, where each parent bank variable is an average across the third countries where the parent bank originates at least one loan to any foreign borrower. In this regression, Capital regulation (lender) remains positive and significant. The third country variables are insignificant, with the exception of Time to enforce contracts that unexpectedly is positive and significant at 10%.

Overall, the results of Table 6 indicate that international banks originate a larger share of their cross-border loans through foreign subsidiaries if subject to stricter capital regulations in their home countries. These results imply that regulatory arbitrage can have material effects on loan origination volumes in the countries where a multinational bank operates, consistent with the evidence in the previous section that banks are more likely to originate individual loans in countries with looser capital regulations.

27 Other instrumental variables used by Houston et al. (2012) are subsumed by included fixed effects in our setting.

5. Conclusion

International loan origination location decisions are a key step in the overall regulatory arbitrage process that has so far not been analyzed in the literature. In this paper, we investigate how international differences in capital regulation stringency affect international loan origination location decisions in the cross-border syndicated loan market. The syndicated loan data, combined with data on the structure of multinational banks, enable us to see whether a multinational bank originates a loan in its home country or in a foreign subsidiary country. Lending provided through a foreign subsidiary is subject to subsidiary-country bank capital regulation, and international banks thus can engage in regulatory arbitrage with respect to capital regulations by originating loans through foreign subsidiaries located in countries with relatively weak regulations.

We find that loan location outcomes—and the intensity of regulatory arbitrage—depend on proxies for a bank's preferred location for information acquisition and the cost of deviating from this preferred location. Specifically, we show that loan location is more likely in the borrower country and in a country that specializes more in the borrower's industry, consistent with information gathering and evaluation being important concerns. Furthermore, loan location is more sensitive to regulatory differences for more transparent borrowers, as proxied by the existence of a credit rating, lower international cultural differences and greater international language similarity. Our finding that loan origination location is more sensitive to regulatory differences for more transparent borrowers is robust to controlling for firm risk as represented by risk measures that are based on publicly available accounting information.

Our results regarding borrower transparency suggest that loan location choice represents a trade-off between more efficient information acquisition about the borrower and weaker regulation. As a corollary, regulatory arbitrage may prompt banks to originate loans in countries that are suboptimal from an information collection perspective. Thus, regulatory arbitrage is likely to entail a distortion of the bank's information acquisition process, which is a core banking function. As a result of this distortion, banks could incur higher information collection costs or collect less information, leading to less informed and inferior lending decisions.

We find a decline in the intensity of regulatory arbitrage with respect to loan location in the period 2007–2014 compared to the pre-crisis period 1999–2006. This decline in regulatory arbitrage is found to reflect increased capitalization ratios of banks in the later period. Perhaps the higher capitalization ratios of banks also coincided with weaker regulatory arbitrage in other areas such as bank financial flows or banking FDI, which could be investigated in future work.

References

Acharya, V., 2003, Is the international convergence of capital adequacy regulation desirable?, *Journal of Finance* 58, 2745–2781.

Acharya, V., L. Pedersen, T. Philippon, and M. Richardson, M., 2017, Measuring systemic risk, *Review of Financial Studies* 30, 2–47.

Adrian, T., and M. Brunnermeier, 2016, Covar, *American Economic Review* 106, 1705–41.

Barth, J., G. Caprio, and R. Levine, 2004, Bank regulation and supervision: what works best?, *Journal of Financial Intermediation* 13, 2005–248.

Barth, J., G. Caprio, and R. Levine, 2006, Rethinking bank supervision and regulation: till angels govern, Cambridge, UK: Cambridge University Press.

Barth, J., G. Caprio, and R. Levine, 2013, Bank regulation and supervision in 180 countries from 1999 to 2011, *Journal of Financial Economic Policy* 5, 111–219.

Beck, T., R. Levine, and A. Levkov, 2010, Big bad banks? The winners and losers from bank deregulation in the United States, *Journal of Finance* 65, 1637–1667.

Beck, T., C. Silva-Buston, and W. Wagner, 2022, "Cooperation externalities": Supranational supervision and regulatory arbitrage, CEPR DP 16978.

Beck, T., C. Silva-Buston, and W. Wagner, 2023, The economics of supranational bank supervision, *Journal of Financial and Quantitative Analysis* 58, 324–351.

Benincasa, E., G. Kabas, and S. Ongena, 2022, "There is no planet B", but for banks "There are countries B to Z": Domestic climate policy and cross-border lending, Swiss Finance Institute Research Paper Series No 22–28.

Berg, T., A. Saunders, and S. Steffen, 2016, The total cost of corporate borrowing in the loan market: don't ignore the fees, *Journal of Finance* 71, 1357–1392.

Bharath, S., S. Dahiya, A. Saunders, and A. Srinivasan, 2011, Lending relationships and loan contract terms, *Review of Financial Studies* 24, 1141–1203.

Bord, V., and J. Santos, 2012, The rise of the originate-to-distribute model and the role of banks in financial intermediation, FRBNY Economic Policy Review, July.

Buchak, G., G. Matvos, T. Piskorski, and A. Seru, 2018, Fintech, regulatory arbitrage, and the rise of shadow banks, *Journal of Financial Economics* 130, 453–483.

Dell'Ariccia, G., and R. Marquez, 2006, Competition among regulators and credit market integration, *Journal of Financial Economics* 79, 401–430.

Demirgüç-Kunt, A., and E. Detragiache, 2002, Does deposit insurance increase banking system stability? An empirical investigation, *Journal of Monetary Economics* 49, 1373–1406.

Diamond, D., 1984, Financial intermediation and delegated monitoring, *Review of Economic Studies* 51, 393–414.

Djankov, S., C. McLiesh, and A. Shleifer, 2007, Private credit in 129 countries, *Journal of Financial Economics* 84, 299–329.

Frame, W., A. Mihov, and L. Sanz, 2020, Foreign investment, regulatory arbitrage and the risk of U.S. financial institutions, *Journal of Financial and Quantitative Analysis* 55, 955–988.

Gao, J., and Y. Jang, 2020, What drives global lending syndication? Effects of cross-country capital regulation gaps, *Review of Finance*, doi: 10.1093/rof/rfaa019, 1–41.

Giannetti, M., and L. Laeven, 2012, The flight home effect: evidence from the syndicated loan market during financial crises, *Journal of Financial Economics* 104, 23–43.

Giannetti, M., and Y. Yafeh, 2012, Do cultural differences between contracting parties matter? Evidence from syndicated bank loans, *Management Science* 58, 365–383.

Goodhart, C., 2002, The organizational structure of banking supervision, *Economic Notes* 31, 1–31.

Gustafson, M., I. Ivanov, and R. Meisenzahl, 2021, Bank monitoring: Evidence from syndicated loans, *Journal of Financial Economics* 139, 452–477.

Horáková, M., and A. Jordan, How countries supervise their banks, insurers and securities markets, Risk Books, various issues.

Houston, J., C. Lin, and Y. Ma, 2012, Regulatory arbitrage and international bank flows, *Journal of Finance* 67, 1845–1895.

International Monetary Fund, 2015, Global financial stability report on navigating monetary policy challenges and managing risks, Washington, D.C.

Irani, R., R., Iyer, R. Meisenzahl, and J. Peydró, 2020, The rise of shadow banking: evidence from capital regulation, *Review of Financial Studies*, doi: 10.1093/rfs/hhaa106, 1–55.

Karolyi, G., and A. Taboada, 2015, Regulatory arbitrage and cross-border acquisitions, *Journal of Finance* 70, 2395–2450.

Laeven, L., and A. Popov, 2022, Carbon taxes and the geography of fossil lending, ECB Working Paper Series 2762.

McFadden, D., 1974, Conditional logit analysis of qualitative choice behavior. In Frontiers in Econometrics, ed. P. Zarembka, New York: Academic Press, 105–42.

Melitz, J., and F. Toubal, 2014, Native language, spoken language, translation and trade, *Journal of International Economics* 93, 351–363.

Morrison, A., and L. White, 2009, Level playing fields in international financial regulation, *Journal of Finance* 64, 1099–1142.

Ongena, S., A. Popov, and G. Udell, 2013, "When the cat's away the mice will play": does regulation at home affect bank risk-taking abroad?, *Journal of Financial Economics* 108, 727–750.

Schwert, M., 2018, Bank capital and lending relationships, *Journal of Finance* 73, 787–830.

Silva, A., 2019, Strategic liquidity mismatch and financial sector stability, forthcoming in *Review of Financial Studies* 32, 4696–4733.

Sufi, A., 2007, Information asymmetry and financing arrangements: evidence from syndicated loans, *Journal of Finance* 62, 629–668.

World Bank, 2019, Global Financial Development Report, Bank Regulation and Supervision a Decade After the Global Financial Crisis, Washington DC.

Figures and tables

FIGURE 1. Total volume of cross-border syndicated loans provided by banks

This graph shows the total US dollar value of syndicated loans of which the borrower and the parent bank of the lender are located in different countries in billions of US dollars. The graph excludes loans for which the exact loan allocation between lenders is not available.

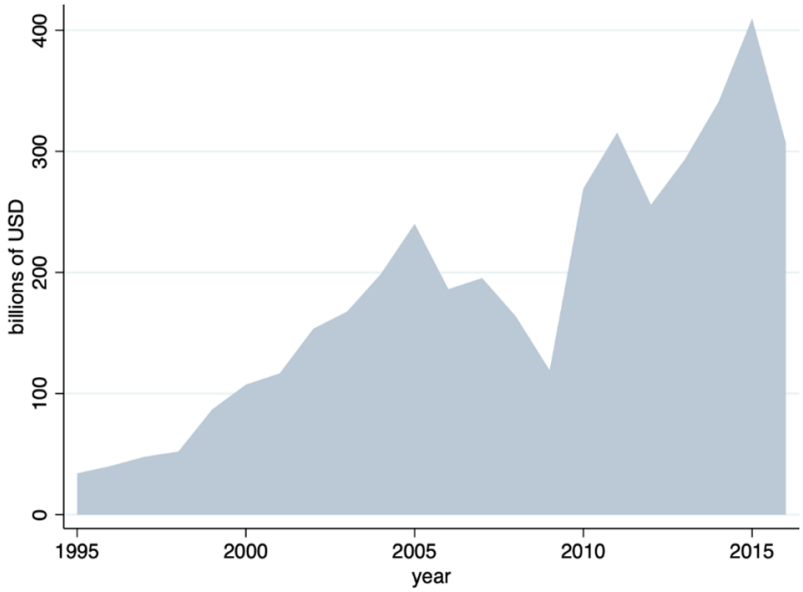

FIGURE 2. Fraction of cross-border syndicated loan volume provided by foreign bank subsidiaries

This graph shows the ratio of cross-border loan volume provided by foreign subsidiaries relative to the total volume of cross-border syndicated loans.

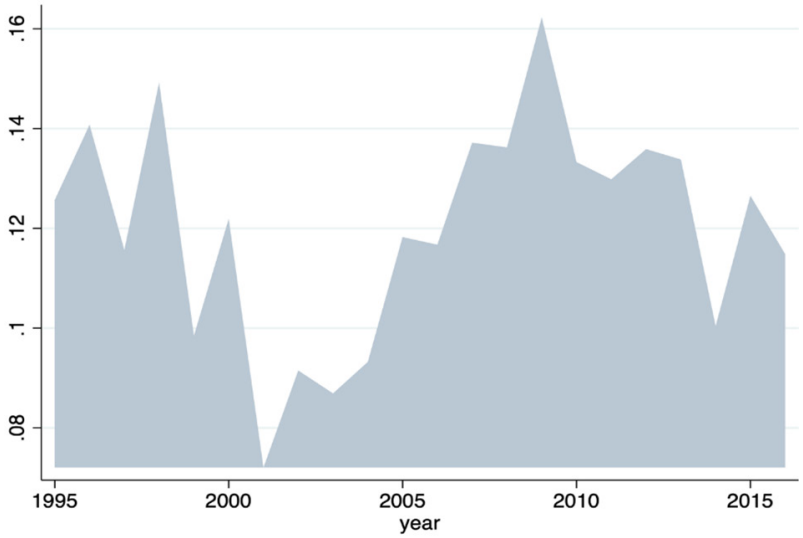

FIGURE 3. Fraction of "arbitraged" cross-border syndicated loan volume

This graph shows the volume of cross-border loans provided by foreign subsidiaries located in countries with less stringent capital regulation than in the parent bank's country divided by the total volume of cross-border syndicated loans.

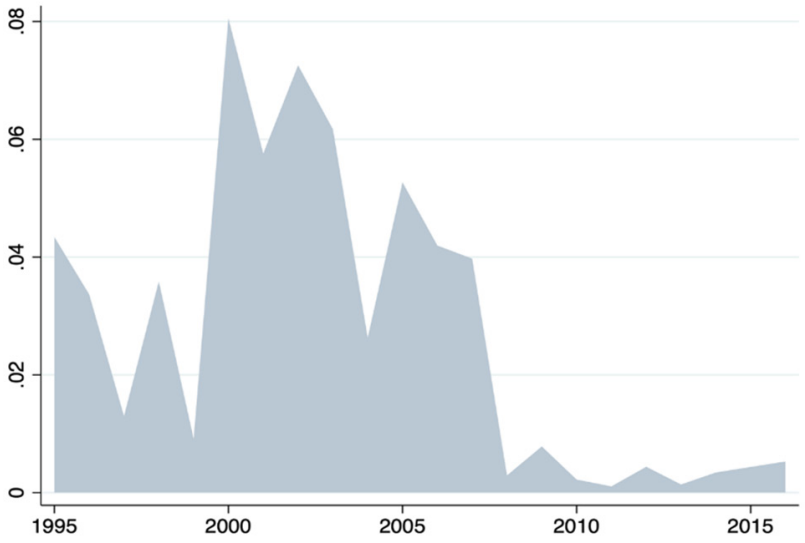

FIGURE 4. The effect of capital regulation on the location of loan origination by year

This graph shows point estimates and corresponding 95% confidence intervals of the coefficients of interactions of Capital regulation with a set of dummy variables indicating calendar years in which loans in the sample were originated. The regression is analogous to regression 1 in Table 3 except that it includes interactions of a set of year dummy variables separately with Capital regulation, Overall activity restrictions, Official supervisory power, and Monitoring. The horizontal axis shows the year of the loan origination.

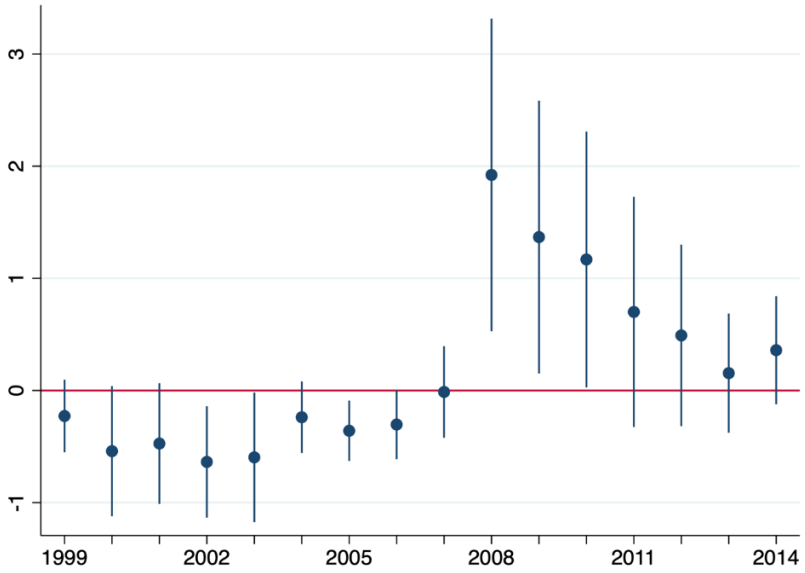

FIGURE 5. Mean, 10th and 90th percentile of the capital regulation index

This graph shows the mean value, and 10th and 90th percentiles of the capital regulation index for all countries in the World Bank Regulation and Supervision Survey.

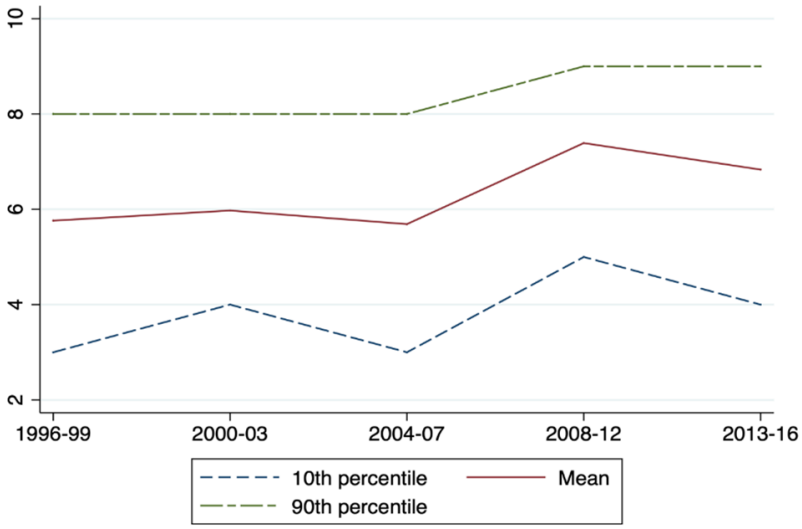

TABLE 1. Descriptive statistics

In Panel A the sample and variables correspond to origination location regressions of Tables 2–5. In Panel B the sample and variables correspond to the foreign subsidiary loan share regressions in Table 6. See Table A1 in the Appendix for variable definitions.

Panel A	Observations	Mean	SD	Min	Max
Origination location	1179135	0.182	0.386	0	1
Capital regulation	1179135	6.323	1.949	2	10
Tier 1 capital ratio	1037273	0.138	0.124	0.0471	1.498
Total capital ratio	1037258	0.200	0.218	0.0700	1.815
Borrower E/A	584530	0.340	0.193	0.0269	0.942
Borrower Z–score	441985	1.460	0.965	−6.869	5.029
Borrower ROA	58 4276	0.0567	0.0759	−0.609	0.332
Domestic	1179135	0.0618	0.241	0	1
Borrower rated	574561	0.590	0.492	0	1
Cultural distance (borrower—entity)	338759	1.370	0.867	0	4.434
Cultural distance (borrower—parent)	465670	1.548	0.870	0.127	4.371
Accounting (borrower)	1062451	75.03	5.999	56	85
Low transparency (entity)	1179135	0.106	0.308	0	1
Specialization	277782	1.023	0.560	0	8.307
Supervisory staff	905221	1.176	0.248	1	1.632
Overall activity restrictions	1179135	6.235	1.889	3	11
Official supervisory power	1179135	10.69	2.359	5	15.50
Monitoring	1179135	8.203	1.631	4	11
Creditor rights	1179135	1.733	1.141	0	4
Information sharing	1179135	4.934	1.322	0	6
Time to enforce contracts	1179135	534.3	222.1	216	1440
Rule of law	1179135	1.288	0.601	−0.668	2.029
Log real GDP per capita	1179135	10.33	0.604	8.940	11.43
Log population	1179135	17.45	1.147	14.50	19.58
IR	1037496	0.0336	0.0515	0.000500	4.003
Log distance (borrower—entity)	1179135	7.830	2.255	0	9.896
Log distance (parent—entity)	1179135	6.348	3.155	0	9.829
Common spoken language (borrower—entity)	1179135	0.477	0.369	0	1
Common spoken language (borrower—parent)	1179135	0.497	0.305	0	1
Common spoken language (parent—entity)	1179135	0.563	0.343	0	1

TABLE 1. (Continued)

Panel B	Observations	Mean	SD	Min	Max
Foreign subsidiary share	2127	0.0955	0.239	0	1
Capital regulation (borrower)	4991	6.096	1.860	2	10
Capital regulation (lender)	4991	6.538	1.387	3	9
Overall activity restrictions (borrower)	4991	7.158	1.939	3	12
Overall activity restrictions (lender)	4991	6.028	1.952	3	10
Official supervisory power (borrower)	4991	11.00	2.473	4	16
Official supervisory power (lender)	4991	10.13	2.332	5.385	14.50
Monitoring (borrower)	4991	8.200	1.390	4	11
Monitoring (lender)	4991	8.732	1.421	6	11
Creditor rights (borrower)	4991	1.937	1.038	0	4
Information sharing (borrower)	4991	3.857	2.026	0	6
Time to enforce contracts (borrower)	4991	612.0	307.8	120	1510
Time to enforce contracts (lender)	4991	421.2	79.25	120	570
Concentration (borrower)	4991	76.31	17.69	23.18	100
Government bank ownership (borrower)	4991	16.75	20.71	0	95.78
Rule of law (borrower)	4991	0.615	0.962	–1.676	2.014
Rule of law (lender)	4991	1.603	0.192	1.065	1.983
Log real GDP per capita (borrower)	4991	9.478	1.204	5.683	11.43
Log real GDP per capita (lender)	4991	10.68	0.207	10.25	11.43
Log population (borrower)	4991	16.99	1.456	14.42	21.00
Log population (lender)	4991	17.78	1.132	15.23	19.56
Log distance	4991	8.417	1.037	5.162	9.851
Common spoken language	4991	0.305	0.293	0	1.000

TABLE 2. Regulation and the location of loan origination

In both panels the dependent variable is origination location which is a dummy variable that equals 1 if an international banking group originates a loan in a particular bank establishment country, and zero otherwise. The estimation implements a conditional logit model. Independent variables capture characteristics of possible location alternatives. Tier 1 capital ratio is the consolidated Tier 1 regulatory capital ratio of the parent bank. Total capital ratio is the consolidated total regulatory capital ratio of the parent bank. Borrower E/A is the borrower's equity to assets ratio. Borrower Z-score is Altman's Z-score calculated for the borrower. Borrower ROA is the borrower's pre-tax income over assets. All borrower and lender variables based on accounting data are for the year before the loan origination. Detailed variable definitions can be found in Table A1 in the Appendix. In Panel B several controls for potential origination locations are replaced by country dummies indicating potential origination locations. In all regressions the sample period is 1999–2014. Standard errors are clustered at the banking group level. *, **, and *** denote significance at 10%, 5%, and 1%.

Panel A	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Capital regulation	−0.119**	−0.510***	−0.397***	−0.143*	−0.133**	−0.125**
	(−2.29)	(−4.15)	(−3.59)	(−1.79)	(−2.00)	(−2.12)
Capital regulation * Tier 1 capital ratio		2.632***				
		(5.20)				
Capital regulation * Total capital ratio			1.429***			
			(3.94)			
Capital regulation * Borrower E/A				0.131		
				(1.38)		
Capital regulation * Borrower Z score					0.0243*	
					(1.74)	
Capital regulation * Borrower ROA						0.513***
						(3.80)
Overall activity restrictions	−0.223	−0.107	−0.134	−0.146	−0.130	−0.146
	(−1.54)	(−0.76)	(−0.94)	(−1.10)	(−0.91)	(−1.10)
Official supervisory power	−0.000188	0.0139	−0.00653	−0.0250	−0.0328	−0.0263
	(−0.00)	(0.18)	(−0.09)	(−0.31)	(−0.41)	(−0.33)
Monitoring	−0.0814	−0.0822	−0.0809	−0.0348	−0.0243	−0.0335
	(−0.70)	(−0.68)	(−0.65)	(−0.30)	(−0.20)	(−0.29)
Creditor rights	0.174	0.392*	0.385	0.120	0.162	0.122
	(0.84)	(1.69)	(1.63)	(0.55)	(0.76)	(0.56)
Information sharing	−0.608**	−0.512	−0.500	−0.583**	−0.614**	−0.585**
	(−2.31)	(−1.63)	(−1.59)	(−1.98)	(−2.06)	(−1.98)
Time to enforce contracts	0.00533	0.00448	0.00498	0.00399	0.00330	0.00400
	(1.52)	(1.23)	(1.41)	(0.96)	(0.73)	(0.97)

TABLE 2. (Continued)

Panel A	(1)	(2)	(3)	(4)	(5)	(6)
Rule of law	4.324***	3.522***	3.489***	4.151***	3.847***	4.134***
	(3.27)	(2.69)	(2.62)	(3.32)	(3.12)	(3.29)
Log real GDP per capita	5.474***	6.755***	7.215***	4.695***	4.715***	4.735***
	(3.31)	(3.94)	(4.07)	(2.79)	(2.74)	(2.81)
Log population	1.615***	1.466***	1.532***	1.383***	1.291**	1.387***
	(3.23)	(2.95)	(3.05)	(2.80)	(2.45)	(2.80)
Log distance (borrower—entity)	−0.483***	−0.491***	−0.493***	−0.531***	−0.552***	−0.530***
	(−4.24)	(−3.94)	(−3.98)	(−4.10)	(−3.69)	(−4.10)
Log distance (parent—entity)	−0.605***	−0.631***	−0.623***	−0.601***	−0.582***	−0.600***
	(−7.29)	(−7.47)	(−7.32)	(−7.58)	(−7.57)	(−7.57)
Common spoken language (borrower—entity)	1.293	1.183	1.204	1.588	1.749	1.587
	(1.42)	(1.21)	(1.24)	(1.57)	(1.47)	(1.58)
Common spoken language (parent—entity)	2.538**	3.169***	3.418***	2.230**	2.237**	2.236**
	(2.47)	(3.24)	(3.03)	(2.36)	(2.52)	(2.38)
Observations	1179135	1037273	1037258	584530	441985	584276
Pseudo R-squared	0.885	0.885	0.884	0.886	0.875	0.886

TABLE 2. (Continued)

Panel B	(1)	(2)	(3)	(4)	(5)	(6)
Capital regulation	−0.107* (−1.66)	−0.418*** (−5.84)	−0.415*** (−5.92)	−0.138 (−1.52)	−0.132* (−1.70)	−0.121* (−1.68)
Capital regulation * Tier 1 capital ratio		2.144*** (3.08)				
Capital regulation * Total capital ratio			1.663*** (2.72)			
Capital regulation * Borrower E/A				0.123 (1.29)		
Capital regulation * Borrower Z score					0.0221 (1.43)	
Capital regulation * Borrower ROA						0.469*** (3.22)
Overall activity restrictions	−0.214** (−2.58)	−0.139* (−1.72)	−0.147* (−1.88)	−0.157* (−1.68)	−0.162 (−1.63)	−0.158* (−1.67)
Official supervisory power	0.0518 (0.67)	0.0619 (0.79)	0.0535 (0.70)	0.0291 (0.36)	0.0214 (0.26)	0.0278 (0.34)
Monitoring	−0.124 (−0.94)	−0.124 (−0.95)	−0.124 (−0.93)	−0.0950 (−0.71)	−0.0782 (−0.57)	−0.0940 (−0.71)
Log distance (borrower—entity)	−0.377*** (−5.07)	−0.384*** (−4.87)	−0.384*** (−4.91)	−0.394*** (−5.04)	−0.401*** (−4.84)	−0.394*** (−5.02)
Log distance (parent—entity)	−0.646*** (−7.33)	−0.682*** (−6.72)	−0.680*** (−6.74)	−0.633*** (−8.19)	−0.627*** (−8.46)	−0.633*** (−8.18)
Common spoken language (borrower—entity)	0.171 (0.27)	0.0935 (0.14)	0.0820 (0.13)	0.207 (0.32)	0.198 (0.28)	0.210 (0.33)
Common spoken language (parent—entity)	3.110** (2.21)	2.934** (2.07)	2.947** (2.09)	3.311*** (2.86)	3.261*** (2.70)	3.301*** (2.86)
Observations	1279975	1122959	1122944	633398	478136	633124
Pseudo R-squared	0.893	0.891	0.891	0.893	0.884	0.893
Location country FE	Y	Y	Y	Y	Y	Y

TABLE 3. Regulatory arbitrage, borrower transparency and bank financial statement transparency

In both panels the dependent variable is origination location which is a dummy variable that equals 1 if an international banking group originates a loan in a particular bank establishment country, and zero otherwise. The estimation implements a conditional logit model. Domestic is a dummy variable indicating that the borrower is located in the same country as the lending establishment. Borrower rated is a dummy variable indicating that the borrower has a rating issued by either Standard & Poor's, Moody's or Fitch Ratings. Cultural distance (borrower—entity) is the Euclidean distance between the cultures of the country of the borrower and the potential loan origination country based on indices measuring traditional and survival values. Cultural distance (borrower—parent) is the Euclidean distance between the cultures of the country of the borrower and the country of the parent bank based on indices measuring traditional and survival values. Common spoken language (borrower—entity) is the probability that a pair of people at random from country of the borrower and the potential loan origination country understand one another in some language. Common spoken language (borrower—parent) is the probability that a pair of people at random from the country of the borrower and the country of the parent bank understand one another in some language. Accounting (borrower) is an index of accounting standards in the borrower country in 1993. Higher values indicate more disclosure in firms' annual reports. Specialization is the ratio of value added produced by the 2-digit SIC industry of the borrower relative to GDP in the potential loan origination country in a given year, relative to its mean across all potential loan origination countries for a given loan. Detailed variable definitions can be found in Table A1 in the Appendix. Both panels include as controls Overall activity restrictions, Official supervisory power, and Monitoring for the potential origination location. Panel A includes additional controls for potential origination locations. Panel B includes country dummies for potential origination locations. Both panels include bilateral control variables capturing the geographic distance between and extent of a common language spoken in the countries of the potential lending entities, parent banks and borrowers, except for regressions 1 and 2 in both panels, which exclude Log distance (borrower—entity). The sample excludes loans to borrowers located in the country of the parent bank. In all regressions the sample period is 1999–2014. Standard errors are clustered at the banking group level. *, **, and *** denote significance at 10%, 5%, and 1%.

Panel A	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
Domestic	3.700***	2.423**								
	(4.88)	(2.46)								
Capital regulation * Domestic		0.184**								
		(2.07)								
Capital regulation * Borrower rated			−0.0624***							
			(−2.98)							
Capital regulation * Cultural distance (borrower—entity)				0.237***						
				(3.55)						
Cultural distance (borrower—entity)				−1.824***						
				(−7.36)						
Capital regulation * Cultural distance (borrower—parent)					0.288***					
					(3.18)					

TABLE 3. (Continued)

Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Capital regulation * Common spoken language (borrower—entity)						−0.203*				
						(−1.92)				
Common spoken language (borrower—entity)	1.412	1.386	1.396	2.600	2.225	2.584***	1.303	1.737	1.128	1.134
	(1.58)	(1.58)	(1.46)	(1.08)	(1.13)	(2.63)	(1.46)	(1.60)	(1.28)	(1.28)
Capital regulation * Common spoken language (borrower—parent)							−0.139			
							(−0.53)			
Capital regulation * Accounting (borrower)								−0.00373		
								(−0.29)		
Low transparency (entity)										
Capital regulation * Low transparency (entity)										
Specialization									0.186**	−0.0708
									(2.39)	(−0.20)
Capital regulation * Specialization										0.0373
										(0.79)
Capital regulation	−0.124**	−0.189***	−0.0548	−0.203	−0.337**	0.00441	−0.0194	0.172	−0.145***	−0.181***
	(−2.44)	(−3.23)	(−1.04)	(−1.63)	(−2.21)	(0.05)	(−0.10)	(0.17)	(−2.75)	(−3.74)
Observations	1179135	1179135	574561	338759	465670	1179135	1179135	1062451	266716	266716
Pseudo R-squared	0.881	0.882	0.886	0.842	0.874	0.886	0.886	0.879	0.880	0.880

TABLE 3. (Continued)

Panel B	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Domestic	3.004***	2.312***								
	(4.96)	(2.72)								
Capital regulation * Domestic		0.101								
		(1.17)								
Capital regulation * Borrower rated			−0.0753***							
			(−3.97)							
Capital regulation * Cultural distance (borrower—entity)				0.137*						
				(1.82)						
Cultural distance (borrower—entity)				−1.833***						
				(−3.54)						
Capital regulation * Cultural distance (borrower—parent)					0.251***					
					(2.90)					
Capital regulation * Common spoken language (borrower—entity)						−0.136				
						(−1.41)				
Common spoken language (borrower—entity)	0.200	0.222	0.0922	0.374	0.995	1.116	0.247	0.378	−0.00417	0.00498
	(0.30)	(0.34)	(0.15)	(0.30)	(0.80)	(1.53)	(0.40)	(0.57)	(−0.01)	(0.01)
Capital regulation * Common spoken language (borrower—parent)							−0.313*			
							(−1.83)			
Capital regulation * Accounting (borrower)								−0.00393		
								(−0.37)		
Low transparency (entity)										
Capital regulation * Low transparency (entity)										
Specialization									0.135**	−0.218
									(2.01)	(−0.68)
Capital regulation * Specialization										0.0514
										(1.13)
Capital regulation	−0.104*	−0.141**	−0.0473	−0.262**	−0.370***	−0.0276	0.116	0.194	−0.143**	−0.193**
	(−1.65)	(−1.97)	(−0.72)	(−2.43)	(−2.59)	(−0.31)	(0.81)	(0.24)	(−2.11)	(−2.50)
Observations	1279975	1279975	622316	338759	494050	1279975	1279975	1151138	286189	286189
Pseudo R-squared	0.891	0.891	0.893	0.854	0.883	0.893	0.894	0.888	0.889	0.889
Location county FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

TABLE 4. Regulatory arbitrage, borrower transparency and bank financial statement transparency: robustness

In both panels the dependent variable is origination location which is a dummy variable that equals 1 if an international banking group originates a loan in a particular bank establishment country, and zero otherwise. The estimation implements a conditional logit model. Domestic is a dummy variable indicating that the borrower is located in the same country as the lending establishment. Borrower rated is a dummy variable indicating that the borrower has a rating issued by either Standard & Poor's, Moody's or Fitch Ratings. Cultural distance (borrower—entity) is the Euclidean distance between the cultures of the country of the borrower and the potential loan origination country based on indices measuring traditional and survival values. Cultural distance (borrower—parent) is the Euclidean distance between the cultures of the country of the borrower and the country of the parent bank based on indices measuring traditional and survival values. Common spoken language (borrower—entity) is the probability that a pair of people at random from country of the borrower and the potential loan origination country understand one another in some language. Common spoken language (borrower—parent) is the probability that a pair of people at random from the country of the borrower and the country of the parent bank understand one another in some language. Accounting (borrower) is an index of accounting standards in the borrower country in 1993. Higher values indicate more disclosure in firms' annual reports. Low transparency (entity) is a dummy variable indicating that the Financial Statement Transparency index in Barth et al. (2013) has a value lower than five in the potential loan origination country. Specialization is the ratio of value added produced by the 2-digit SIC industry of the borrower relative to GDP in the potential loan origination country in a given year, relative to its mean across all potential loan origination countries for a given loan. Detailed variable definitions can be found in Table A1 in the Appendix. Both panels include as controls Overall activity restrictions, Official supervisory power, and Monitoring for the potential origination location. Panel A includes additional controls for potential origination locations. Panel B includes country dummies for potential origination locations. Both panels include bilateral control variables capturing the geographic distance between and extent of a common language spoken in the countries of the potential lending entities, parent banks and borrowers, except for regressions 2 and 3 in both panels, which exclude Log distance (borrower—entity). The sample excludes loans to borrowers located in the country of the parent bank. In all regressions the sample period is 1999–2014. Standard errors are clustered at the banking group level. *, **, and *** denote significance at 10%, 5%, and 1%.

Panel A	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
Domestic		3.829***	2.962***								
		(5.45)	(3.21)								
Capital regulation * Domestic			0.125								
			(1.42)								
Capital regulation * Borrower rated				−0.0623***							
				(−2.68)							
Capital regulation * Cultural distance (borrower—entity)					0.265***						
					(3.17)						
Cultural distance (borrower—entity)					−2.213***						
					(−5.21)						
Capital regulation * Cultural distance (borrower—parent)						0.267**					
						(2.45)					
Capital regulation * Common spoken language (borrower—entity)							−0.138				
							(−1.20)				
Common spoken language (borrower—entity)	1.268	1.333	1.317	1.375	2.130	2.067	2.145*	1.276	1.723	1.180	1.186
	(1.21)	(1.42)	(1.40)	(1.28)	(0.97)	(0.98)	(1.93)	(1.23)	(1.38)	(1.20)	(1.21)

TABLE 4. (Continued)

Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Capital regulation * Common spoken language (borrower—parent)								−0.195			
								(−0.78)			
Capital regulation * Accounting (borrower)									−0.00537		
									(−0.37)		
Specialization										0.147*	−0.151
										(1.82)	(−0.47)
Capital regulation * Specialization											0.0429
											(0.98)
Low transparency (entity)	2.230**	2.132*	1.679	2.055**	2.417	0.233	1.688	2.481***	2.413***	2.372***	2.297**
	(2.39)	(1.92)	(1.37)	(2.45)	(0.48)	(0.07)	(1.49)	(2.60)	(2.73)	(2.59)	(2.49)
Capital regulation * Low transparency (entity)	0.0470	0.0645	0.121	0.00402	−0.00167	0.216	0.115	0.0106	0.00608	0.0202	0.0323
	(0.29)	(0.31)	(0.54)	(0.03)	(−0.00)	(0.48)	(0.63)	(0.07)	(0.04)	(0.16)	(0.26)
Capital regulation	−0.00683	−0.0107	−0.0693	0.0456	−0.206	−0.310**	0.0604	0.139	0.406	−0.0230	−0.0659
	(−0.11)	(−0.18)	(−0.92)	(0.69)	(−1.46)	(−2.19)	(0.66)	(0.67)	(0.36)	(−0.36)	(−0.96)
Observations	1179135	1179135	1179135	574561	338759	465670	1179135	1179135	1062451	266716	266716
Pseudo R-squared	0.890	0.886	0.886	0.889	0.846	0.876	0.890	0.890	0.884	0.885	0.885

TABLE 4. (Continued)

Panel B	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Domestic		3.124***	2.817***								
		(5.87)	(3.60)								
Capital regulation * Domestic			0.0451								
			(0.48)								
Capital regulation * Borrower rated				−0.0758***							
				(−3.83)							
Capital regulation * Cultural distance (borrower—entity)					0.167*						
					(1.96)						
Cultural distance (borrower—entity)					−2.170***						
					(−3.92)						
Capital regulation * Cultural distance (borrower—parent)						0.261***					
						(3.31)					
Capital regulation * Common spoken language (borrower—entity)							−0.0740				
							(−0.67)				
Common spoken language (borrower—entity)	0.132	0.161	0.167	0.0429	0.217	0.792	0.646	0.209	0.328	0.00248	0.0106
	(0.21)	(0.26)	(0.27)	(0.07)	(0.18)	(0.64)	(0.76)	(0.33)	(0.47)	(0.00)	(0.02)
Capital regulation * Common spoken language (borrower—parent)								−0.357**			
								(−2.32)			
Capital regulation * Accounting (borrower)									−0.00732		
									(−0.60)		
Specialization										0.145**	−0.240
										(2.26)	(−0.81)
Capital regulation * Specialization											0.0552
											(1.34)
Low transparency (entity)	1.432	0.123	0.146	0.117	0.586*	1.346***	0.143	0.0227	0.0545	0.0700	0.0870
	(1.32)	(0.81)	(0.88)	(0.98)	(1.68)	(3.80)	(0.97)	(0.17)	(0.47)	(0.58)	(0.73)
Capital regulation * Low transparency (entity)	0.103	1.383	1.185	0.910	−2.504	−8.759***	1.094	1.983*	1.708	1.677	1.563
	(0.84)	(1.17)	(0.91)	(1.03)	(−1.03)	(−3.53)	(0.86)	(1.79)	(1.64)	(1.31)	(1.20)
Capital regulation	−0.0261	−0.0231	−0.0452	0.0144	−0.193	−0.332**	0.00807	0.241	0.533	−0.0506	−0.106
	(−0.33)	(−0.30)	(−0.48)	(0.18)	(−1.57)	(−2.44)	(0.09)	(1.61)	(0.57)	(−0.61)	(−1.04)
Observations	1279975	1279975	1279975	622316	338759	494050	1279975	1279975	1151138	286189	286189
Pseudo R-squared	0.896	0.893	0.893	0.894	0.856	0.885	0.896	0.896	0.891	0.892	0.892
Location country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

TABLE 5. Regulation and the location of loan origination before and after the financial crisis

In both panels the dependent variable is origination location which is a dummy variable that equals 1 if an international banking group originates a loan in a particular bank establishment country, and zero otherwise. The estimation implements a conditional logit model. Post is a dummy variable signalling the period 2007–2014. Supervisory staff is a measure of the change in the number of staff involved in the supervision of banks in the country where the banking group is headquartered between the 1999–2006 and 2007–2014 periods. Tier 1 capital ratio is the consolidated Tier 1 regulatory capital ratio of the parent bank. Total capital ratio is the consolidated total regulatory capital ratio of the parent bank. Detailed variable definitions can be found in Table A1 in the Appendix. Both panels include as controls Overall activity restrictions, Official supervisory power, and Monitoring for the potential origination location. Panel A includes additional controls for potential origination locations. Panel B includes country dummies for potential origination locations. Both panels include bilateral control variables capturing the geographic distance between and extent of a common language spoken in the countries of the potential lending entities, parent banks and borrowers. The sample excludes loans to borrowers located in the country of the parent bank. In all regressions the sample period is 1999–2014. Standard errors are clustered at the banking group level. *, **, and *** denote significance at 10%, 5%, and 1%.

Panel A	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Capital regulation	−0.288***	−0.313***	−0.918***	−1.163***	−1.215***	−1.287***	−1.486***	−1.531***
	(−4.31)	(−4.54)	(−3.03)	(−4.48)	(−3.16)	(−3.45)	(−10.51)	(−9.23)
Post * Capital regulation	0.293***	0.289***		−0.211			−0.258	−0.232
	(3.20)	(3.59)		(−0.75)			(−0.81)	(−0.77)
Post * Log distance (borrower—entity)		0.0205						
		(0.21)						
Post * Log distance (parent—entity)		0.0582						
		(0.54)						
Capital regulation * Supervisory staff			0.623***	0.910***	0.550*	0.658**	0.875***	0.952***
			(2.63)	(3.21)	(1.72)	(2.19)	(4.39)	(5.34)
Capital regulation * Tier 1 capital ratio					2.518***		2.547***	
					(2.85)		(2.95)	
Capital regulation * Total capital ratio						1.571***		1.581***
						(2.68)		(2.74)
Log distance (borrower—entity)	−0.489***	−0.494***	−0.372***	−0.370***	−0.377***	−0.374***	−0.376***	−0.373***
	(−4.03)	(−3.60)	(−5.75)	(−5.74)	(−4.92)	(−4.91)	(−4.94)	(−4.92)
Log distance (parent—entity)	−0.621***	−0.647***	−0.802***	−0.801***	−0.850***	−0.846***	−0.847***	−0.844***
	(−6.91)	(−5.07)	(−10.60)	(−10.57)	(−10.42)	(−10.24)	(−10.30)	(−10.16)
Observations	1179135	1179135	905221	905221	775103	775103	775103	775103
Pseudo R-squared	0.886	0.886	0.894	0.894	0.893	0.894	0.893	0.894

TABLE 5. (Continued)

Panel B	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Capital regulation	−0.245**	−0.260**	−0.644**	−0.538*	−0.610**	−0.653**	−0.641**	−0.693**
	(−2.53)	(−2.51)	(−2.30)	(−1.85)	(−2.05)	(−2.27)	(−2.39)	(−2.49)
Post * Capital regulation	0.237*	0.228**		0.105			−0.0340	−0.0422
	(1.94)	(2.08)		(0.33)			(−0.10)	(−0.13)
Post * Log distance (borrower—entity)		−0.0188						
		(−0.28)						
Post * Log distance (parent—entity)		0.0116						
		(0.14)						
Capital regulation * Supervisory staff			0.399**	0.270	0.199	0.236	0.238	0.285
			(2.02)	(0.87)	(1.00)	(1.19)	(0.74)	(0.88)
Capital regulation * Tier 1 capital ratio					1.522**		1.532***	
					(2.51)		(2.73)	
Capital regulation * Total capital ratio						1.154**		1.162**
						(2.42)		(2.53)
Log distance (borrower—entity)	−0.378***	−0.370***	−0.305***	−0.305***	−0.310***	−0.310***	−0.310***	−0.310***
	(−5.06)	(−4.48)	(−5.30)	(−5.31)	(−4.84)	(−4.86)	(−4.85)	(−4.86)
Log distance (parent—entity)	−0.651***	−0.651***	−0.810***	−0.812***	−1.081***	−1.082***	−1.081***	−1.081***
	(−7.37)	(−5.94)	(−7.98)	(−8.01)	(−7.08)	(−6.99)	(−7.14)	(−7.05)
Observations	1279975	1279975	996492	996492	851740	851740	851740	851740
Pseudo R-squared	0.893	0.894	0.898	0.898	0.896	0.896	0.896	0.896
Country location FE	Y	Y	Y	Y	Y	Y	Y	Y

TABLE 6. Regulation and the foreign subsidiary share of cross-border loans

In all regressions the dependent variable is the ratio of the dollar value of loans provided by subsidiaries to the dollar value of all loans. Regressions 1 and 3 are OLS regressions. In regression 2 the regulatory variables and the monitoring variable are instrumented by their sample means excluding the pertinent country, a dummy variable indicating that the central bank supervises banks for prudential purposes, and the 5-year moving average of the Gini coefficient measuring income inequality in the borrower country. Log real GDP per capita (borrower, lender, third country) and Log population (borrower, lender, third country) are included but not reported. Detailed variable definitions can be found in Table A1 in the Appendix. The sample period is 1995–2016. Borrower country, lender country and time fixed effects are included. In all regressions standard errors are clustered at the borrower country level. *, **, and *** denote significance at 10%, 5%, and 1%.

	OLS (1)	IV (2)	OLS (3)
Capital regulation (lender)	0.0281***	0.0294***	0.0366***
	(3.00)	(2.93)	(2.67)
Overall activity restrictions (lender)	0.00835	0.0103	−0.000880
	(0.68)	(0.63)	(−0.05)
Official supervisory power (lender)	0.0115*	0.00971	0.0103
	(1.88)	(1.50)	(1.38)
Monitoring (lender)	−0.0218**	−0.0198	−0.0189*
	(−2.06)	(−1.64)	(−1.71)
Time to enforce contracts (lender)	0.00766***	0.0118**	−0.00155
	(4.17)	(2.36)	(−0.36)
Rule of law (lender)	−0.0587	−0.0640	0.159
	(−0.51)	(−0.53)	(1.06)
Capital regulation (borrower)	−0.000974	−0.00148	−0.00201
	(−0.23)	(−0.28)	(−0.43)
Overall activity restrictions (borrower)	0.00499	0.00391	0.00391
	(0.73)	(0.51)	(0.47)
Official supervisory power (borrower)	−0.00190	0.0000700	−0.00158
	(−0.55)	(0.02)	(−0.39)
Monitoring (borrower)	0.00912	0.00825	0.0126
	(1.16)	(0.93)	(1.33)
Creditor rights (borrower)	0.185**	0.153***	0.223***
	(2.54)	(3.59)	(2.69)
Information sharing (borrower)	0.00985	0.0135	0.0101
	(0.65)	(0.76)	(0.54)
Time to enforce contracts (borrower)	−0.000544***	−0.000563**	−0.000676***
	(−3.04)	(−2.65)	(−3.22)
Rule of law (borrower)	0.0226	0.0260	0.0228
	(0.50)	(0.50)	(0.42)
Concentration (borrower)	−0.000455	−0.000640	−0.000618
	(−0.58)	(−0.79)	(−0.71)
Government bank ownership (borrower)	0.000541	0.000103	0.000827
	(0.32)	(0.06)	(0.42)
Log distance	−0.00668	−0.00360	−0.00979
	(−0.80)	(−0.40)	(−0.75)

TABLE 6. (Continued)

	OLS (1)	IV (2)	OLS (3)
Common spoken language	−0.0261	−0.0259	−0.0262
	(−0.49)	(−0.42)	(−0.43)
Capital regulation (third country)			0.0142
			(1.10)
Overall activity restrictions (third country)			0.00745
			(0.59)
Official supervisory power (third country)			0.00313
			(0.34)
Monitoring (third country)			0.0175
			(1.00)
Creditor rights (third country)			0.0347
			(1.06)
Information sharing (third country)			−0.0208
			(−0.68)
Time to enforce contracts (third country)			0.000525*
			(1.96)
Rule of law (third country)			−0.0920
			(−0.83)
Observations	2122	1907	1853
Adjusted R-squared	0.111	0.098	0.111
Overid. test (p value)		0.835	
Underid. test (p value)		0.000	
Borrower country FE	Y	Y	Y
Lender country FE	Y	Y	Y
Year FE	Y	Y	Y

Appendix

TABLE A1. Variable definitions and data sources

Variable	Definition	Source
Origination location	Dummy variable that equals 1 if an international banking group originates a loan in a particular bank establishment country, and zero otherwise.	Dealscan
Capital regulation	Index measuring the stringency in determining minimum capital adequacy and initial capital stringency in borrower or lender country, with higher values indicating greater stringency.	World Bank Regulation and Supervision Survey (Barth et al., 2006)
Tier 1 capital ratio	Consolidated Tier 1 regulatory capital ratio of the parent bank in the year before the loan origination (or in the year of the loan in Table 3).	Bankscope
Total capital ratio	Consolidated Total regulatory capital ratio of the parent bank in the year before the loan origination (or in the year of the loan in Table 3).	Bankscope
Leverage	Consolidated total liabilities to total assets of the parent bank in the year of the loan origination.	Bankscope
Z-score	Natural logarithm of (Total equity + ROA)/(Standard deviation of ROA) for a banking group. The standard deviation of Return on average assets (ROA) is calculated using a rolling window of three years.	Bankscope
Stock volatility	The annualized standard deviation of the daily returns for a banking group.	Thomson Reuters Refinitiv
Asset volatility	The annual volatility of the assets of a banking group. This measure is estimated using Merton's model, assuming an average maturity of 1 year for total liabilities, and using the 1-year Treasury rates as a proxy for the risk free rate.	Thomson Reuters Refinitiv, Bankscope, Datastream
Distance-to-default	The distance-to-default measure of a banking group calculated using Merton's model as given by $\frac{\ln\left(\frac{V}{D}\right)+\left(r-\frac{s^2}{2}\right)T}{s\sqrt{T}}$, where V denotes the value of the bank's assets, D is the face value of outstanding debt, r is the risk-free rate, and s is the volatility of the value of assets.	Thomson Reuters Refinitiv, Bankscope, Datastream
MES (5%)	A bank's marginal expected shortfall of a banking group based on Acharya et al. (2017). MES is the negative of the average daily stock market return of a bank in a year conditional on the local Datastream banking sector index experiencing one of its 5% lowest returns in the same year.	Thomson Reuters Refinitiv, Datastream
Covar (5%)	Adrian and Brunnermeier's (2016) ΔCoVaR of a banking group, which is a bank's contribution to systemic risk, measured as the difference between the value at risk (VaR) of the financial system conditional on the bank experiencing one of its 5% lowest weekly returns in a year and the VaR of the financial system conditional on the bank experiencing its median return in the same year, averaged over the year.	Thomson Reuters Refinitiv, Datastream

TABLE A1. (Continued)

Variable	Definition	Source
Borrower E/A	Ratio of equity to assets of the borrower in the year before the loan origination.	Worldscope
Borrower Z-score	Altman's Z-score of the borrower in the year before the loan origination calculated as (1.2 * Working capital + 1.4 * Retained earnings + 3.3 * Earnings before taxes + 0.999 * Net sales)/Total assets.	Worldscope
Borrower ROA	Ratio of pre-tax income to assets of the borrower in the year before the loan origination.	Worldscope
Domestic	Dummy variable indicating that the borrower is located in the same country as the lending establishment.	Dealscan
Borrower rated	Dummy variable indicating that the borrower has a rating issued by either Standard & Poor's, Moody's or Fitch Ratings.	Thomson Reuters Refinitiv
Cultural distance (borrower—entity)	Euclidean distance between the cultures of the country of the borrower and the potential loan origination country based on indices measuring traditional and survival values.	World Values Survey
Cultural distance (borrower—parent)	Euclidean distance between the cultures of country of the borrower and the country of the parent bank based on indices measuring traditional and survival values.	World Values Survey
Accounting (borrower)	Index of accounting standards in a borrower country in 1993. Higher values indicate more disclosure in firms' annual reports.	CIFAR
Low transparency (entity)	Dummy variable indicating that the Financial Statement Transparency index in Barth et al. (2013) has a value lower than five in a lender country	World Bank Regulation and Supervision Survey (Barth et al., 2013)
Speciallization	The ratio of value added produced by the 2-digit SIC industry of the borrower relative to GDP in the potential loan origination country in a given year, relative to its mean across all potential loan origination countries for a given loan.	UNIDO Industrial Statistics database
Supervisory staff	A measure of the change in the number of staff involved in the supervision of banks in the country where the banking group is headquartered. It takes the value of one for the years 1999–2006. For the years 2007 to 2014 it is the average number of supervisory staff in bank regulatory agencies in the country where the banking group is headquartered over the 2007–2014 period divided by the average number of supervisory staff over the 1999–2006 period.	How countries supervise their banks, insurers and securities markets (Horáková and Jordan, various issues)
Overall activity restrictions	Index of the extent to which banks can engage in securities, insurance and real estate activities in borrower or lender country, with higher values indicating more restrictions.	World Bank Regulation and Supervision Survey (Barth et al., 2006)

TABLE A1. (Continued)

Variable	Definition	Source
Official supervisory power	Index of the power of the supervisory authorities to take specific actions to prevent and correct problems in banks in borrower or lender country, with higher values indicating greater power.	World Bank Regulation and Supervision Survey (Barth et al., 2006)
Monitoring	An index measuring the strength of private monitoring incentives in borrower or lender country, with higher values indicating more private supervision. The index measures whether certified audit is required; the top ten banks are all rated by international credit rating agencies; no explicit deposit insurance scheme exists in the country; the income statement includes accrued or unpaid interest or principal on nonperforming loans and whether banks are required to produce consolidated financial statements; off-balance sheet items are disclosed to the public, banks must disclose risk management procedures to the public, and subordinated debt is allowable (required) as a part of regulatory capital.	World Bank Regulation and Supervision Survey (Barth et al., 2006)
Creditor rights	Index measuring the strength of creditor rights in borrower or lender country, with higher values indicating stronger creditor rights.	Djankov et al. (2007)
Information sharing	Index measuring rules affecting the scope, accessibility, and quality of credit information available through public or private credit registries in borrower or lender country. The index ranges from 0 to 8, with higher values indicating the availability of more credit information, from either a public registry or a private bureau, to facilitate lending decisions.	Doing Business Database
Time to enforce contracts	Index measuring the time required to resolve a commercial dispute, calculated as the average number of calendar days from the filing of the lawsuit in court until the final determination and, in appropriate cases, payment, in borrower or lender country. Higher values indicate easier contract enforcement.	Doing Business Database
Rule of law	Index capturing perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence in borrower or lender country, with higher values indicating a stronger rule of law.	World Governance Indicators
Log real GDP per capita	Natural logarithm of GDP per capita measured at constant 2010 US dollar prices in borrower or lender country.	World Development Indicators
Log population	Natural logarithm of the total population in borrower or lender country.	World Development Indicators

TABLE A1. (Continued)

Variable	Definition	Source
IR	Central bank policy rate or the discount rate in the country where a banking establishment is located in the month of the loan origination.	International Financial Statistics
Log distance	Natural logarithm of 1 plus the geographic distance between the capital cities of the borrower and lender countries measured in kilometres.	http://techslides.com/list-of-countries-and-capitals
Log distance (borrower-entity)	Natural logarithm of 1 plus the geographic distance between the capital cities of the potential loan origination country and the country of the borrower measured in kilometres.	http://techslides.com/list-of-countries-and-capitals
Log distance (parent-entity)	Natural logarithm of 1 plus the geographic distance between the capital cities of the potential loan origination country and the country of the parent bank measured in kilometres.	http://techslides.com/list-of-countries-and-capitals
Common spoken language	The probability that a pair of people chosen at random from the borrower and lender countries understand one another in some language.	Melitz and Toubal (2014)
Common spoken language (borrower–entity)	The probability that a pair of people chosen at random from country of the borrower and the potential loan origination country understand one another in some language.	Melitz and Toubal (2014)
Common spoken language (borrower–parent)	The probability that a pair of people chosen at random from the country of the borrower and the country of the parent bank understand one another in some language.	Melitz and Toubal (2014)
Common spoken language (parent–entity)	The probability that a pair of people chosen at random from the country of the parent bank and the potential loan origination country understand one another in some language.	Melitz and Toubal (2014)
Foreign subsidiary share	The ratio of the US dollar value of syndicated loans provided by foreign subsidiaries relative to the US dollar value of all syndicated loans aggregated either at the level of the borrower country, the lender country, or the borrower country-lender country pair.	Dealscan
Concentration	Assets of the five largest banks as a share of total commercial banking assets in borrower or lender country.	Global Financial Development Report
Government bank ownership	The proportion of banking assets in government owned banks (where a bank is considered government owned if 50% or more of the shares are controlled by the government) in borrower or lender country.	World Bank Regulation and Supervision Survey (Barth et al., 2006)

TABLE A2. Geographic coverage of lending entities in the sample

The second column shows the number of distinct countries where lending entities in our sample are located. The third column shows the total number of OECD countries on each continent, and the last column shows the fraction of OECD countries with at least one lending entity in our sample.

Continent	Number of OECD Countries		Fraction of OECD Countries in Sample
	In Sample	Total	
Asia	2	3	67%
Europe	19	25	76%
North-America	3	3	100%
Oceania	2	2	100%
South-America	1	1	100%
Total	27	34	79%

TABLE A3. Geographic coverage of borrowers in the sample

The second column shows the number of distinct countries where borrowers in our sample are located. The third column shows the total number of borrower countries in Dealscan on each continent, and the last column shows the fraction of countries in Dealscan with at least one borrower in our sample.

Continent	Number of Countries		Fraction of Countries in Sample
	In Sample	Total	
Africa	32	47	68%
Asia	43	48	90%
Europe	41	45	91%
North America	19	20	95%
Oceania	4	5	80%
South America	12	12	100%
Total	151	177	85%

TABLE A4. Total syndicated loan amounts by largest lender and borrower countries

This table provides information on the largest lender countries, their most significant borrower countries, and the countries where their most active foreign subsidiaries are located. Columns 1 and 2 show the main lender\countries and the total amounts of cross-border syndicated loans provided by banking groups headquartered in these countries during the 1995–2016 period. Columns 3 and 4 show the total amount of syndicated loans provided to a given borrower country during the 1995–2016 period. Columns 5 and 6 show the total amount of syndicated loans provided by subsidiaries located in a given country during the 1995–2016 period. All loan amounts are in constant 2016 US dollars reflecting the US GDP deflator.

Lender Country	Total Lending in Billions of USD	Borrower Country	Total Lending to Borrower Country in Billions of USD	Country of Foreign Subsidiary	Total Lending Through Country of Foreign Subsidiary in Billions of USD
(1)	(2)	(3)	(4)	(5)	(6)
UK	1,290	US	674	US	118
		France	76	Hong Kong	9
		Spain	66	France	6
France	955	US	408	Netherlands	53
		Spain	78	US	42
		UK	65	Switzerland	13
Japan	891	US	455	US	100
		Australia	63	China	5
		UK	41	Singapore	3
Germany	665	US	363	US	39
		UK	81	Luxembourg	6
		France	40	Austria	4
US	480	UK	78	UK	16
		France	39	Hong Kong	12
		Netherlands	35	Australia	6

TABLE A5. Correlation between regulatory arbitrage and banking group risk

Column 2 shows correlations between the risk measures of a banking group in column 1 and the fraction of cross-border loans provided by foreign subsidiaries in countries with lower values of Capital regulation than the country where the banking group is headquartered. Columns 3 to 7 show descriptive statistics for the risk measures in column 1. The sample includes banks and years included in regression 1 of Table 2. *, **, and *** denote significance at 10%, 5%, and 1%.

Bank Risk Measure (1)	Correlation (2)	Observations (3)	Mean (4)	SD (5)	Min (6)	Max (7)
Z-score	−0.119**	385	3.405	0.810	1.454	5.000
Stock volatility	0.161***	369	0.326	0.188	0.101	1.457
Asset volatility	−0.0293	369	0.0254	0.0198	0.000168	0.134
Distance-to-default	−0.141***	369	4.110	2.112	−0.327	10.49
MES (5%)	0.189***	387	0.0395	0.0260	−0.000216	0.181
Covar (5%)	0.257***	387	0.0135	0.00557	0.000132	0.0289

TABLE A6. Regulation and the location of loan origination: robustness checks

The dependent variable is origination location which is a dummy variable that equals 1 if an international banking group originates a loan in a particular bank establishment country, and zero otherwise. The estimation implements a conditional logit model. Independent variables capture characteristics of possible location alternatives. Detailed variable definitions can be found in Table A1 in the Appendix. In all regressions the sample period is 1999–2014. In regressions 1–2 the sample excludes borrowers in the parent bank country. In regression 3 the sample excludes borrowers in the parent bank country and in foreign countries with no subsidiaries. In regression 2 the sample includes only Term A loans which are fully amortizing loans that are more likely to be held on bank balance sheets. Standard errors are clustered at the banking group level. *, **, and *** denote significance at 10%, 5%, and 1%.

	Excluding Borrowers in Parent Bank Country		Excluding Borrowers in Parent Bank Country and in Foreign Countries with No Subsidiaries	Full Sample
	Monetary Policy	Term A Loans	Baseline	Baseline
	(1)	(2)	(3)	(4)
Capital regulation	−0.122**	−0.124**	−0.193**	−0.141**
	(−2.57)	(−2.05)	(−2.15)	(−2.43)
Overall activity restrictions	−0.215	−0.252*	−0.633***	−0.308*
	(−1.41)	(−1.67)	(−3.08)	(−1.94)
Official supervisory power	−0.00529	0.0405	0.0998	0.0156
	(−0.07)	(0.55)	(1.01)	(0.18)
Monitoring	−0.0783	−0.156	−0.357*	−0.0932
	(−0.66)	(−1.05)	(−1.95)	(−0.70)
IR	3.975			
	(0.47)			
Creditor rights	0.182	0.201	0.535	0.238
	(0.87)	(0.91)	(1.55)	(1.00)
Information sharing	−0.609**	−0.466	−1.071***	−0.695**
	(−2.31)	(−1.63)	(−2.84)	(−2.47)
Time to enforce contracts	0.00533	0.00773***	0.0127***	0.00687**
	(1.55)	(2.72)	(4.26)	(2.28)
Rule of law	4.279***	4.387**	6.110***	4.688***
	(3.21)	(2.14)	(4.67)	(3.04)

TABLE A6. (Continued)

	Excluding Borrowers in Parent Bank Country		Excluding Borrowers in Parent Bank Country and in Foreign Countries with No Subsidiaries	Full Sample
	Monetary Policy	Term A Loans	Baseline	Baseline
	(1)	(2)	(3)	(4)
Log real GDP per capita	5.628***	7.289***	10.89***	6.240***
	(3.56)	(3.96)	(3.40)	(3.32)
Log population	1.616***	2.149***	3.197***	2.003***
	(3.28)	(4.79)	(4.70)	(3.98)
Log distance (borrower—entity)	−0.480***	−0.345***	−0.590***	−0.276***
	(−4.38)	(−4.14)	(−7.50)	(−3.36)
Log distance (parent—entity)	−0.604***	−0.687***	−0.567***	−0.558***
	(−7.28)	(−7.04)	(−4.22)	(−6.56)
Common spoken language (borrower—entity)	1.259	0.657	0.120	0.255
	(1.46)	(0.76)	(0.29)	(0.35)
Common spoken language (parent—entity)	2.622***	2.019	8.670***	3.280**
	(2.69)	(1.23)	(3.03)	(2.40)
Observations	1037496	53915	288261	1855017
Pseudo R-squared	0.877	0.838	0.944	0.914