# Financial-Services Trade Restrictions and Lending from an International Financial Centre[*]

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### Abstract

This paper examines how financial-service trade restrictions, applied abroad, affect the cross-border lending activities of banks in a major international financial centre. Banks with a local presence in the country which tightened restrictions change the structure of their lending: they cut back on their cross-border intragroup lending to their local affiliates, substituting this with direct cross-border lending to non-bank borrowers instead. In contrast, banks without a local presence reduce their lending. Our findings suggest that increasing services-trade restrictiveness may lead global banks to reshape their business model for cross-border lending. Services-trade restrictions that act on the intensive margin of lending, such as barriers to competition, appear to be the primary drivers of this substitution from "local" to "global" financial intermediation.

**JEL Codes**: F13, F34, F42, G18, G21.

**Key Words**: Services trade restrictions; Commercial banking restrictions; Cross-border bank lending; Banks' business models.

# 1  Introduction

Over the last three decades, heightened financial-market integration has spurred substantial increases in cross-border financial flows and services trade. By 2019, financial-services trade comprised almost one-fifth of overall global trade in services (World Trade Organisation, 2019). However, for a few key international financial centres (IFCs), this figure is even larger. This increase in services trade occurred despite significant restrictions (Miroudot, Sauvage, and Shepherd, 2013; Joy, Lisack, Lloyd, Reinhardt, Sajedi, and Whitaker, 2018). In contrast to goods-trade restrictions, which declined substantially in past decades (Baier and Bergstrand, 2007), services-trade barriers have not been liberalised to the same degree. According to the OECD Services Trade Restrictiveness Index (STRI) (Rouzet, Nordås, Gonzales, Grosso, Lejárraga, Miroudot, and Ueno, 2014) 19 countries (of 48 in the database) recorded commercial-banking services-trade restrictions by end-2019 that were less restrictive (looser) compared to their start-2015 levels, while another 19 countries had tighter restrictions. Moreover, restrictions on financial-services trade are somewhat tighter than for other services sectors, and are distinct from macroprudential policy measures.

In this paper, we ask: what is the impact of financial-services-trade restrictions, applied abroad, on the global operations of banks? To answer this, we combine a regulatory bank-level dataset—tracking the cross-border claims (by asset class) of over 250 UK-based banks' to over 50 countries—with the OECD STRI. Using this data, and controlling for a rich set of fixed effects (including those that control for time-variation in loan demand and other unobservable confounders), we assess how changes in services-trade restrictions in recipient countries impact different types of cross-border lending by UK-resident banks. Given the UK's role as the world's largest IFC—from which cross-border bank lending sums to over 2.5-times UK GDP, with many foreign-owned branches and subsidiaries of commercial-banking groups undertaking their global activities from London (e.g., Beck, Lloyd, Reinhardt, and Sowerbutts, 2023)—and a major exporter of financial services, our dataset provides a unique setting to answer our question.

We find that changes in services-trade restrictions in recipient countries do not significantly impact UK-resident banks' overall cross-border lending. However, we uncover heterogeneity and compositional shifts across banks—in particular, between banks *with* and *without* an affiliate presence in the country implementing restrictions—with important implications.

Our primary finding is that tighter (looser) services-trade restrictions in recipient countries are associated with greater (lower) cross-border lending growth to non-bank borrowers by UK-based banks *with* an affiliate presence in the country implementing restrictions. On the other hand, those same UK-resident banks cut (increase) their cross-border intragroup lending to the

country tightening (loosening) restrictions.[1] These compositional shifts indicate that services-trade restrictions can impact the manner in which global banks engage in cross-border lending to non-bank borrowers.[2] Tighter restrictions result in less "local" and more "global" (i.e., arms length from their IFC office) financial intermediation, as global banks seek to maintain lending relationships in countries that they deem to be important and profitable to preserve in spite of tighter restrictions associated with operating via affiliates abroad.[3] In setting up a foreign affiliate, global banks face fixed costs to creating new lending relationships—for example, in acquiring screening technologies for new foreign borrowers. Having paid these fixed costs, intermediation via local lending can, all else equal, benefit banking groups by offering improved contractual terms—for example, through better contract enforcement (e.g., Thakor and Boot, 2008; Beck, Ioannidou, and Schäfer, 2018b). However, our results suggest that higher services-trade restrictions appear to offset these benefits. Rather than cut ties with foreign borrowers altogether, thus foregoing the fixed costs paid to enter the foreign market, global banks instead reallocate their lending to maintain links.

In contrast, we find that tighter (looser) services-trade restrictions in recipient countries are associated with lower (greater) cross-border lending growth to non-bank borrowers by UK-based banks *without* an affiliate presence in the country implementing restrictions. For these banks, it is unlikely that they have paid the same fixed costs to set up cross-border lending relationships. So, as services-trade restrictions are tightened, the costs associated with intermediating funds across borders increase.

In turn, we assess heterogeneity across the different types of services-trade restrictions captured in the OECD STRI. We find factors that weigh on the intensive margin of banks' cross-border lending activities—in particular barriers to competition and other discriminatory measures to be the main drivers of our findings.[4] In contrast, tools which act on the extensive margin of bank lending (such as restrictions on foreign entry) have a more limited impact—reflecting the fact that our data focuses on banks with a pre-existing presence. We interpret the findings as being consistent with our interpretation that the compositional shifts we uncover impact how global banks go about their cross-border lending.

Although changes in services-trade restrictions do not appear to alter overall cross-border

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[1] Avdjiev, McGuire, and Wooldridge (2015) show how banks' intragroup position comprise a sizeable fraction of overall cross-border claims.

[2] Within this, there could also be compositional effects across borrowers. However, we are unable to test this within our dataset, which lacks detail on specific bank-borrower links.

[3] This preservation of relationship was well documented after the Global Financial Crisis (see, e.g., Bolton, Freixas, Gambacorta, and Mistrulli, 2016; Beck, Degryse, De Haas, and Van Horen, 2018a; Banerjee, Gambacorta, and Sette, 2021), but has been less studied in response to changes in regulation.

[4] Other discriminatory measures include: restrictions on foreign-exchange lending, a lack of compliance with international regulations/standards (including Basel regulations), discrimination in government procurement and other discriminatory taxes and subsidies (see Rouzet et al., 2014).

lending, the composition changes they induce can have implications for overall volatility. As Bussière, Hills, Lloyd, Meunier, Pedrono, Reinhardt, and Sowerbutts (2021b) argue, and verify empirically, cross-border lending decisions from IFC offices appear more responsive to regulation and global events than lending decisions from bank headquarters—which tend to be more long-term and relationship based. Therefore, any shift from "local" to "global" intermediation could be associated with greater volatility and sensitivity to shocks in recipient countries.

Moreover, while there are differences between macroprudential policies and the financial-services-trade restrictions we analyse, our findings suggest that lessons from the global institutional framework for macroprudential policy could be valuable for financial-services-trade restrictions which warrant further study.[5] For macroprudential policymakers, accountability frameworks have been developed (through national central banks and international fora, e.g., Bank for International Settlements) to offset their potential "unintended consequences" across borders (e.g., Reinhardt and Sowerbutts, 2015). Despite differences in their aim, our findings open the possibility that changes in financial-services trade restrictions can themselves have unintended consequences for overall volatility, but also domestic regulatory oversight. For example, shifts from "local" to "global" intermediation could, all else equal, limit the efficacy of domestic macroprudential policies. In comparison to macroprudential policies, accountability frameworks around services-trade restrictions are, at the current time, less well developed.

Alongside these broader implications, our results contribute to three strands of literature. First, we contribute to a developing literature assessing the role of services-trade restrictiveness and liberalisation in the world economy. To do this, we draw on data efforts by Borchert, Gootiiz, and Mattoo (2014) that have fed into the OECD's STRI. Like other papers (e.g., Barattieri, 2014; Beverelli, Fiorini, and Hoekman, 2017), our paper is in part motivated by the observation that—unlike restrictions on goods trade—restrictions on services trade remain pervasive (Miroudot et al., 2013), despite the growing role of services in world trade. We contribute to this literature with novel findings about the impact of services-trade restrictions on commercial banks' business models and international lending decisions, highlighting how changes in restrictions can influence the location from which global lending is originated.

Second, our work relates to a substantial literature assessing the impact of policy actions on cross-border banking (see, e.g., Buch and Goldberg, 2017; Bussière, Cao, de Haan, Hills, Lloyd, Meunier, Pedrono, Reinhardt, Sinha, Sowerbutts, and Styrin, 2021a), within which major contributions have focused on global operations of UK-based banks (e.g., Forbes, Reinhardt, and

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[5]Macroprudential policies tend to directly restrict the level and riskiness of lending (e.g., by limiting the number of new mortgages above a certain loan-to-value ratio). In contrast, financial-services restrictions are specifically focused on changing the production inputs of lending (e.g., hiring employees or banking licences) and are often explicitly aimed at shifting activity towards domestic banks, changing the composition of lending rather than impacting its overall level.

Wieladek, 2017; Hills, Reinhardt, Sowerbutts, and Wieladek, 2017). To date, much of this work has centred on monetary and macroprudential policy changes and how this changes banks' lending. Within this literature there are also contributions which show how banks adapt in the face of regulations (e.g., Houston, Lin, and Ma, 2012; Ongena, Popov, and Udell, 2013; Aiyar, Calomiris, and Wieladek, 2014; Reinhardt and Sowerbutts, 2015). Aiyar et al. (2014) in particular show that when the UK tightens capital regulations on a bank's subsidiary in the UK, the parent bank continues to lend to the UK via unregulated branches. We contribute to this literature by assessing the specific role of services-trade restrictions on banks' cross-border linkages. In particular, we find that services-trade restrictions can have significant effects on the composition of cross-border credit flows, with potential unintended consequences as banks shift their lending to/from locally-intermediated lending from/to arm's length lending.

Third, our analysis relates to a small, but growing, literature assessing the macroeconomic effects of trade-policy events (e.g., Amiti, Kong, and Weinstein, 2020), and the links between banking and trade (e.g., Claessens and van Horen, 2021). Although the causality goes in both directions, the extant literature offers a wide range of theoretical and empirical contributions that focus on identifying the causal relation from banking-sector constraints to international trade (e.g., Niepmann and Schmidt-Eisenlohr, 2017; Federico, Hassan, and Rappoport, 2020; Gopinath and Stein, 2021). In contrast, the objective of this paper is to test whether changes in services-trade restrictions have implications for the cross-border activities of banks.

The remainder of this paper is structured as follows. Section 2 introduces our banking and services-trade restrictiveness data. Section 3 outlines our empirical framework and hypotheses, before Section 4 describes our results and findings. Section 5 concludes.

## 2 Data Description

We describe the two datasets used in our study in turn.

**Bank-Level Dataset.**   Our bank-level dataset captures the cross-border asset and liability positions of UK-resident banks at quarterly frequency to 2019Q3. It is compiled by the Bank of England from regulatory filings and captures cross-border lending by UK-resident banks that sums to over 250% of UK GDP. Relative to other IFCs, the UK is the largest centre for cross-border banking. Within the BIS Locational Banking Statistics, into which this UK data contributes after aggregation, the cross-border claims of UK-resident banks reflect nearly one-fifth of all global cross-border banking claims—as Bippus, Lloyd, and Ostry (2023) document. Alongside its representativeness, the dataset also includes granular information on

cross-border lending capturing, amongst other things, a disaggregation of aggregate lending into intra-banking group loans across borders, interbank loans and loans to non-banks.

The raw lending data is volatile in its raw form. We therefore employ several cleaning techniques in order to only focus on quantitatively significant links, which may vary at the intensive margin between UK-based banks and receiving countries. Specifically, we keep only links for which cross-border lending is at least £10 million in size. To alleviate the effect of outliers, we winsorise the dependent variable so that the growth rates do not exceed 100% in absolute value.[6] Control variables are winsorised at the 2.5% level.[7] After cleaning, our dataset includes over 250 banks whose cross-border lending spans over 50 recipient countries.

**OECD Services-Trade Restrictiveness Index (STRI).** The OECD STRI database records restrictions for a range of sectors. Within this, we focus specifically on restrictions on commercial-banking services trade, which comprises deposit-taking, lending and payment services.[8]

The STRI measures most-favoured nation (MFN) services-trade restrictions in each destination country, though they do not account for any specific concessions or preferential trade agreements. For each country, the measured services-trade restrictions encompass five policy areas: the entry of foreign affiliates (which, e.g., include limiting foreign equity shares in local banks and restricting cross-border mergers), barriers to competition (which, e.g., include product-level regulations or having supervisory authorities that are not independent), regulatory (in)transparency, restrictions to the movement of people, and other discriminatory measures. They therefore relate to restrictions which can make it more difficult for foreign affiliates to operate domestically, but importantly do not include restrictions to the cross-border provision of financial services. The policy measures are grouped under these five policy areas and turned into an index using a scoring and weighting technique designed by the OECD.

The overall summary index ranges from 0 to 1—with 1 indicating a theoretical maximum in which an economy is completely closed to foreign banking services providers, and 0 meaning fully liberalised. Although an alternative database, the World Bank's 'Bank Regulation and Supervision' database (Barth, Caprio, and Levine, 2001) has some similar information on restrictions to foreign entry in the section on "entry requirements", the OECD STRI dataset that we use covers a wider range financial services restrictions, including those levied on both the intensive and extensive margins. The OECD's STRI is also updated on an annual basis, unlike the World Bank dataset which provides only periodic snapshots.[9] We use the OECD STRI from

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[6]We check in a robustness exercise that the main results are robust to a 200% threshold. Available on request.
[7]We only consider observations of bank-lending pairs if the absolute value of the stock of lending exceeds £1 million in the current or the preceding quarter (rather than include large percent changes relative to tiny stocks).
[8]See this OECD document for more details.
[9]To combine the annual STRI with our quarterly cross-border banking data, we assume the STRI value applies

2015Q1—its first available date—to 2019Q3—the last date at which bank-level data is available and, helpfully, prior to Covid-19, when numerous other factors weighed on cross-border bank lending.

As our focus is on changes in commercial-banking restrictions in receiving countries from the perspective of UK-based banks,[10] Figure 1 plots changes in these restrictions by country over the full sample period of 2015-2019. It shows that there is wide variation across countries with commercial-banking services-trade restrictions being both tightened and loosened over the period. Over the 2015-2019 period, Turkey saw the largest cumulative tightening in its financial-services-trade restrictions. The majority of these tightenings were associated with heightened restrictions on competition or the use of foreign currency, including restrictions on advertisements by foreign banks and restrictions on extending loans or taking deposits in foreign currency. At the other end of the spectrum, Greece and Thailand saw the largest cumulative loosening over the same period. In Greece, restrictions on extending loans or taking deposits in foreign currency were loosened in 2019, while in Thailand barriers to competition were reduced in 2015 when the Department of Business Development introduced a collateral registry with equal access for all lending institutions.

**Combined Data.** Combining the two datasets reveals some illustrative insights in relation how cross-border bank lending by UK-based banks varies with respect to the commercial-banking services-trade restrictions in recipient countries that set the stage for our formal empirical analysis. Accounting for recipient countries' restrictions, we compare the share of intra-banking group lending—i.e., lending from UK-based banks to affiliates in the receiving country—and the share of non-bank lending—i.e., lending from the UK-based bank to non-bank borrowers in receiving countries.[11]

For receiving countries with low commercial-banking services-trade restrictions in 2019—strictly, restrictions in the bottom 75th percentile—the share of intragroup and non-bank lending is roughly equal—48% and 52%, respectively. On the other hand, countries with restrictions in the upper quartile—i.e., tighter barriers on commercial banks' services trade in 2019—see significant differences in the share of intragroup and non-bank lending share—standing at 36% and 64%, respectively.

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to each quarter within a calendar year.

[10]The dataset captures commercial-banking services restrictions set by the receiving country overall. It does not isolate possible services-trade restrictions levied by receiving countries specifically on services exports from specific countries or groups of countries.

[11]Shares are in total intragroup plus non-bank lending. While our data does not distinguish between intragroup positions to subsidiaries or branches, Aldasoro, Caparusso, and Chen (2022) find that bank branches are the primary users of intergroup transfers. To the extent this is true in our data, then it suggests that our results are more relevant for lending channelled via branches. Nevertheless, in our empirical analysis, our measure of intragroup is primarily used as a proxy for the strength of affiliate presence.

Figure 1: Changes in Commercial-Banking Services-Trade Restrictions by Country from 2015 to 2019
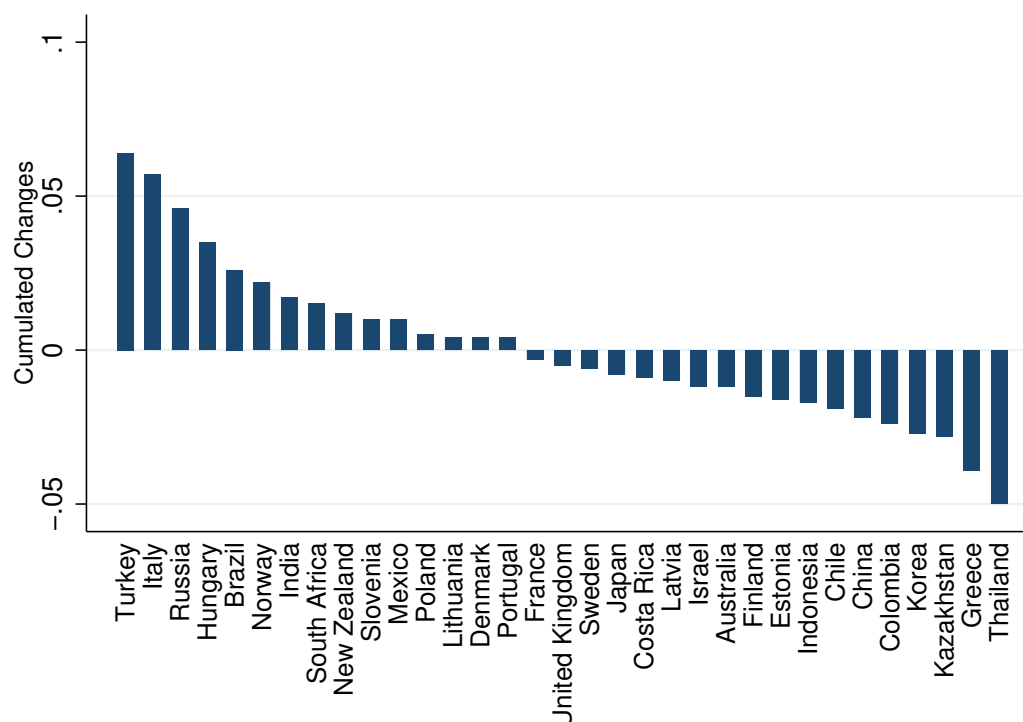


*Notes*: Cumulated changes from 2015 to 2019. *Source*: OECD and authors' calculations.

These illustrative aggregate patterns are also seen at country level. Focusing on the largest tightening in services trade in our dataset: in May 2018, Turkey tightened restrictions on commercial-banking services trade, limiting borrowing in foreign currency for Turkish residents without foreign-currency income, restricting advertising by foreign banks within Turkey, and introducing conditions on how soon export proceeds must be brought into Turkey. In the period prior to these changes, from 2014Q2 to 2018Q2, UK-based banks' cross-border lending to Turkey grew steadily. Annual average growth of intragroup lending was 0.7%, while lending to non-bank borrowers grew at annual average rates of 1.3% and 0.5%, respectively, for banks without and with intragroup positions. Following the tighter restrictions, however, lending patterns changed markedly. Intragroup lending by UK-based banks to Turkey fell an annual average rate of -15.6% from 2018Q3 to 2019Q3. Banks with intragroup positions instead saw their lending to non-banks in Turkey grow, at an annual rate of 4.1% over the same period, While banks without intragroup positions saw their lending to non-banks grow at 1.12%—similar to its pre-tightening rate.

Illustratively, at least, these data suggest that tighter restrictions are associated with more

direct lending to non-banks and less intragroup lending. In the remainder of this paper, we formally establish whether changes in commercial-banking restrictions were a factor driving the form of banks' international lending.

## 3   Empirical Framework and Hypotheses

We now present our regression setup for assessing the impact of commercial-banking services-trade restrictions on banks' cross-border operations. Consistent with the (potentially competing) ways in which banks could react to changes in restrictions—withdrawing (increasing) lending as the cost of financial intermediation increases (decreases) vs. switching the location from which their lending is originated to/from cross-border lending from/to locally-intermediated lending—we examine the two main ways in which a UK-based bank can channel funds to a country: to its affiliate based in the country (i.e., *intragroup lending*); or directly to borrowers (i.e., *non-bank lending*).

To do this, we focus on the time-$t$ quarterly growth of different lending types from a UK-based bank $b$ to country $c$, $\Delta y_{b,c,t}$, and investigate how this depends on the changes in services-trade restrictions imposed by recipient-country $c$ (albeit not specific to UK services exports), $\Delta STRI_{c,t}$. Because of the granularity of our banking dataset, which contains information on banks that lend to multiple recipient countries in varying degrees, we leverage variation in the cross-section to distinguish between the same banks' cross-border lending to a variety of receiving countries with differing policy actions on services-trade restrictions.

We use two empirical specifications. First, a non-interacted specification, in which we assume homogeneity in responses to changes in services-trade restrictions across banks, receiving countries and time. Second, an interacted specification, where we admit differences across banks—in particular, accounting for their differing intragroup links with receiving countries.

**Non-Interacted Specification.**   Our non-interacted regression allows us to examine the determinants of growth in different types of cross-border lending to form an overall picture of the impact of commercial-banking services-trade restrictions:

$$\Delta y_{b,c,t} = \beta_1 \Delta STRI_{c,t} + \beta_2 \Delta STRI_{c,t-4} + \boldsymbol{\gamma}' \mathbf{x}_{c,t} + f_{b,t} + f_c + \varepsilon_{b,c,t} \tag{1}$$

where $\mathbf{x}_{c,t}$ denotes a set of observable control variables that vary over time and across recipient countries—such as the evolution of macro-financial conditions in country $c$, which can affect the demand for credit in receiving countries. $f_c$ reflects receiving-country fixed effects,

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which capture features of receiving-country $c$ that are time-invariant,[12] such as geography and some institutional features, as well as pre-existing trade barriers. Because our explanatory variable of interest $\Delta STRI_{c,t}$ varies along two of the three dimensions in our dataset, we can include bank-time fixed effects $f_{b,t}$ in regression (1). These control for all observed and unobserved factors that vary by bank and across time, rendering any additional bank balance sheet controls—such as their capital and liquidity ratios—redundant in our regression. They also support identification by controlling for overall funding-model differences by absorbing the impact of overall intragroup positions. Throughout, we report standard errors that are clustered at the bank-time level.[13]

We estimate regression (1) using the quarterly cross-border lending data, described in Section 2, for the period 2014Q1-2019Q4. Within our set of observable controls $\mathbf{x}_{c,t}$, we include one-quarter lags of year-on-year GDP growth, credit growth and inflation in receiving country $c$.[14] We use year-on-year values to mimic the lag structure imposed by our services-trade restrictiveness data. In Section 4, we explore the robustness of results to possibly parallel changes to capital-account policies and institutional settings.

Our coefficients of interest are $\beta_1$ and $\beta_2$. They load on $\Delta STRI_{c,t}$ and $\Delta STRI_{c,t-4}$, respectively, which reflect the changes in commercial-banking services-trade restrictions in the current year—i.e., between $t-4$ to time $t$—and the previous 12-month period—i.e., between time $t-8$ and time $t-4$. This four-quarter transformation is necessary in view of the fact the OECD STRI data varies at an annual data frequency, but ensures that we still leverage quarterly variation in banks' cross-border lending.

Negative point estimates for $\beta_1$ and $\beta_2$, and their sum, indicate that countries that have tightened (loosened) commercial-banking services-trade restrictions face a subsequent reduction (increase) in cross-border lending from UK-based banks. Such findings are consistent with our hypothesis that services-trade restrictions can impact the cost of intermediating funds abroad by, for example, making it more expensive for UK-based banks to export funds to countries that tightening restrictions and so reduce banks' incentive to lend to the country.

**Interacted Specification Accounting for Affiliate Presence in Recipient Countries.** However, given the established banking relations (which can represent a fixed cost for global banks) and likely potential benefits of lending to a country, we also expect that some banks may have more incentive to maintain their lending in some form. For example, there is a considerable

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[12]We also check that our main results are robust to the inclusion of receiving-country-bank fixed effects. Results available on request.

[13]We also check that our main results are robust to alternative clustering at the receiving-country time dimension.

[14]In robustness analyses, we control for additional country factors that might co-move with services-trade restrictions, such as capital controls.

literature showing that banks with a more established presence in a country—e.g., those operating a subsidiary—react less to shocks (Cetorelli and Goldberg, 2012; De Haas and Van Horen, 2013). So we divide the sample into those with an affiliate presence (i.e., large intragroup lending) in the country and those without.

By estimating equation (1) for banks with and without an affiliate presence, we get a first impression on how banks' business models adapt in response to changes in services-trade restrictions abroad. In our second specification, we formally test whether banks' responsiveness to changes in services-trade restrictions differs significantly depending on whether the bank has an affiliate present in the receiving country. We do so by extending regression (1) using a dummy variable $\mathbb{1}_{b,c,t}$ which takes the value unity when a bank $b$ has an affiliate in receiving country $c$ at time $t$, and zero otherwise.[15] Our extended regression has the form:

$$\Delta y_{b,c,t} = \beta_1 \Delta STRI_{c,t} + \beta_2 \Delta STRI_{c,t-4} + \delta_1 \left( \Delta STRI_{c,t} \times \mathbb{1}_{b,c,t} \right) + \delta_2 \left( \Delta STRI_{c,t-4} \times \mathbb{1}_{b,c,t} \right)$$
$$+ \theta \mathbb{1}_{b,c,t} + \boldsymbol{\gamma}' \mathbf{x}_{c,t} + f_{b,t} + f_c + \varepsilon_{b,c,t} \tag{2}$$

where interaction terms have been added to account for potential differences in transmission whether a bank $b$ has an affiliate in country $c$ or not. We show results with two sets of fixed-effects specifications. First, as shown in equation (2), we estimate a version with receiving country fixed effects $f_c$, alongside the bank-time fixed effects $f_{b,t}$. This allows us to estimate the absolute effects of changes in services-trade restrictions for banks with and without affiliates abroad by jointly estimating $\beta_i$ and $\delta_i$ for $i = 1, 2$. Second, we estimate an alternative specification with country-time fixed effects $f_{c,t}$, alongside the bank-time fixed effects $f_{b,t}$. In this latter specification, the $\beta_i$ coefficients cannot be estimated due to multicollinearity, but inference on the interaction coefficients $\delta_i$ is tighter. In particular, the country-time fixed effects control for a vast rage of receiving country demand factors and provide the baseline for judging whether effects differ across the two groups of banks.

In regression (2), $\delta_1$ and $\delta_2$ capture the extent to which the responsiveness of cross-border lending growth to tighter services-trade restrictions differs when a bank has an affiliate abroad. If $\delta_1$ and $\delta_2$ take positive values, and $\hat{\beta}_i < 0$ for $i = 1, 2$, banks with affiliates abroad see smaller reductions in cross-border lending to countries that have tightened services-trade restrictions—and possibly increases in lending—compared to banks that do not.

Table 1 presents summary statistics for our variables. One noteworthy feature is that across banks which maintain both lending links to non-banks as well as affiliates, intragroup positions are on average somewhat larger than positions with non-banks.

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[15]The presence of an affiliate is measured by non-zero/non-missing intragroup data in current and preceding quarters.

Table 1: Summary Statistics for All Variables

| Variable | Source | Mean | SD | P25 | P75 | Obs. |
|---|---|---|---|---|---|---|
| Δ Banking STRI | OECD | 0.00 | 0.007 | -0.03 | 0.04 | 22787 |
| Intragroup Loans (gr.) | BIS IBS | 0.01 | 0.44 | -0.25 | 0.17 | 6693 |
| Non-Bank Loans (gr.) | BIS IBS | 0.024 | 0.309 | -0.096 | 0.078 | 22787 |
| Intragroup Dummy | BIS IBS | 0.266 | 0.442 | 0.000 | 1.000 | 22787 |
| GDP Growth (yoy, %) | IMF WEO | 2.551 | 1.914 | 1.462 | 3.117 | 22787 |
| Credit Growth (yoy, %) | BIS/IMF IFS[a] | -0.006 | 0.041 | -0.024 | 0.020 | 22787 |
| Inflation (yoy, %) | IMF WEO | 1.777 | 1.866 | 0.663 | 2.177 | 22787 |
| Intragroup Loans (Stock, £000s) | BIS IBS | 2461931 | 7122548 | 6037 | 1017558 | 5325 |
| Non-Bank Loans (Stock, £000s) | BIS IBS | 1840663 | 10250000 | 25475 | 674710 | 5325 |
| Intragroup Loans (Share in total cross-border loans) | BIS IBS | 0.470 | 0.387 | 0.049 | 0.875 | 5325 |
| Intragroup Loans (Share in total intragroup + non-bank cross-border loans) | BIS IBS | 0.416 | 0.376 | 0.030 | 0.805 | 5325 |

| Variable | Source | Mean | SD | Min | Max | Obs. |
|---|---|---|---|---|---|---|
| Δ Rule of Law Estimate | WGI | -0.022 | 0.068 | -0.260 | 0.229 | 22787 |
| Δ Regulatory Quality Estimate | WGI | 0.009 | 0.102 | -0.275 | 0.284 | 22787 |
| Δ Financial Openness | Chinn/Ito[b] | 0.000 | 0.037 | -0.283 | 0.283 | 21369 |
| Fiscal Surplus/Deficit (%) | IMF WEO | -1.074 | 2.785 | -8.991 | 6.022 | 22787 |

*Abbreviations*: BIS IBS = BIS International Banking Statistics; IMF WEO = IMF World Economic Outlook Database; IMF IFS = IMF International Financial Statistics; WGI = World Governance Indicators. [a]: Combine domestic credit variable (code: PBM770A) from BIS with corresponding variable (code: 22d) from IMF IFS. [b]: Use updated Chinn and Ito (2006) index to cover our sample period.

# 4 Results

## 4.1 Baseline Results

In this section, we describe our empirical results. Table 2 reports the results for regression (1). Column (1) shows that, following a change in commercial-banking services-trade restrictions abroad, the change in total loan growth (i.e., lending to banks and non-banks) for all banks (with and without intragroup positions) is negative, but insignificant.

Columns (2)-(3) focus on the cross-border lending growth of banks without an affiliate presence in the receiving country. Following a tightening of services-trade restrictions abroad, these banks also see a small, but insignificant decline in their total cross-border lending. However, their cross-border non-bank lending growth does decline significantly—and vice versa for a loosening. The summed coefficients indicate that a one standard deviation tightening in the OECD STRI is associated with an 0.8pp decline in cross-border lending growth to non-banks by banks without affiliates in recipient countries over two years. This is consistent with the hypothesis around the that a tightening in restrictions makes the country which tightened restrictions a less desirable environment to lend to.

Columns (4)-(6) paint a different picture for banks with an affiliate presence in the receiv-

Table 2: Coefficient Estimates for Regression (1)

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Bank Type | All | without Intragroup | | with Intragroup | | |
| Loan Type: | All Loans | All Loans | to Non-banks | All Loans | to Non-banks | to Intra-group |
| $\Delta STRI_{c,t}$ | -0.2260 | -0.3707 | -0.8372** | -0.2813 | 0.7307 | -1.7566* |
| | (0.4293) | (0.5169) | (0.4138) | (0.9266) | (0.8896) | (1.0467) |
| $\Delta STRI_{c,t-4}$ | -0.0092 | -0.4100 | -0.3114 | 0.2758 | 1.8978** | -1.7716* |
| | (0.4197) | (0.4968) | (0.4105) | (0.8856) | (0.8650) | (1.0101) |
| *Sum* | *-0.235* | *-0.781* | *-1.149** | *-0.005* | *2.629*** | *-3.528*** |
| *p-value* | *0.717* | *0.325* | *0.069* | *0.997* | *0.040* | *0.020* |
| Lagged GDP Growth | 0.0032 | 0.0013 | 0.0007 | 0.0103** | 0.0062 | 0.0107 |
| | (0.0022) | (0.0025) | (0.0021) | (0.0051) | (0.0047) | (0.0067) |
| Lagged Credit Growth | -0.1788* | -0.1419 | -0.0907 | -0.6191** | -0.5359** | -0.4767 |
| | (0.1084) | (0.1278) | (0.1067) | (0.2637) | (0.2549) | (0.3297) |
| Lagged Inflation | -0.0007 | 0.0017 | 0.0017 | -0.0042 | 0.0061 | -0.0097 |
| | (0.0033) | (0.0040) | (0.0031) | (0.0068) | (0.0062) | (0.0083) |
| $f_{b,t}$ | Yes | Yes | Yes | Yes | Yes | Yes |
| $f_c$ | Yes | Yes | Yes | Yes | Yes | Yes |
| $f_{c,t}$ | No | No | No | No | No | No |
| Obs. | 28,275 | 20,204 | 16,594 | 7,103 | 5,325 | 6,693 |
| R-squared | 0.1094 | 0.1372 | 0.1526 | 0.1998 | 0.2153 | 0.1818 |
| Adj. R-squared | 0.0230 | 0.0267 | 0.0288 | 0.0161 | 0.0264 | -0.0124 |

*Notes*: This table presents coefficient estimates from estimating equation (1) for different bank-type sub-samples ('Bank Type') and different loan-growth dependent variables ('Loan Type'). Standard errors are clustered by bank-time. Significance at the 10%, 5% and 1% denoted by *, ** and ***, respectively.

ing country, however. Although these banks' total lending also responds insignificantly to changes in services-trade restrictions, the coefficient estimates in column (5) show that their cross-border lending to non-bank borrowers actually *increases* when services-trade restrictions are tightening in recipient countries—in stark contrast to the result for banks without intragroup positions in column (3). The effects are also economically significant, with a one standard deviation tightening in the STRI being associated with an 1.84pp increase in cross-border lending growth to non-banks by banks with affiliates in recipient countries over two years. Column (6) clarifies that this compositional shift in global banks' balance sheets is met with a signficiant reduction in their cross-border intragroup lending when services-trade restrictions are tightened in recipient countries—a one standard deviation tightening being associated with a 2.47pp decrease in cross-border intragroup lending growth.

To formally test the differences between banks with and without intragroup positions, we employ regression specification (2) with interaction terms. These coefficient estimates are reported in Table 3. While the interaction coefficients for all cross-border lending—reported in columns (1) and (2)—continue to be insignificant, the cross-border non-bank lending growth

of UK-based banks with intragroup positions in receiving countries does respond significantly differently to changes in services-trade restrictions abroad *vis-à-vis* UK-based banks without intragroup positions—as the interaction coefficients in columns (3) and (4) depict.

This compositional shift in lending, to/from locally-intermediated lending from/to arm's length lending, also aligns with the manner in which the services-trade restrictions covered by the STRI database are applied. The restrictions apply to affiliates located within the country which is tightening services restrictions rather than to services which are imported from abroad. And so when trade restrictions are tightened it makes it harder for affiliates located within the country to undertake business. This can explain the reduction in intragroup lending growth seen in column (6) of Table 2. When combined with the results in columns (3) and (4) of Table 3, this suggests that banks with intragroup positions respond to tighter trade restrictiveness changes by adapting their business model and substituting lending by reducing (intragroup) funds to their local affiliate and increasing direct cross-border lending to non-bank borrowers instead. This is consistent with De Haas and Van Horen (2013) who show that banks with local affiliates seek to preserve lending relationships.

This substitution pattern also indicates that changing services-trade restrictions could have unintended consequences. Loosening restrictions can cause banks to shift their lending origination, both by making it easier to do business with that country, but also by encouraging banks to shift existing lending business towards locally-intermediated loans, which are likely to be easier to monitor and intermediate than arm's length lending. In contrast, following a tightening of restrictions, banks lend less from within the country and instead intermediate funds from abroad. These patterns could have a number of consequences for both oversight and stability in the receiving country as the source of lending changes and becomes more/less distant. And from the perspective of receiving-country policymakers, these changes could have unexpected effects on the potency of other domestic policy tools such as macroprudential instruments.

## 4.2 Robustness

In this section, we briefly summarise the robustness of our headline findings, the results of which are reported in an online Appendix A.

**Excluding Banks Headquartered in Receiving Countries.** We exclude banks $b$ headquartered in the receiving country $c$ to account for the possibility that they may either be less affected by restrictions or better able to adapt their lending. Table A1 reports results when excluding these banks from our sample. Our headline results are robust to this exclusion. Intra-

Table 3: Coefficient Estimates for Regression (2)

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Loan Type: | All Loans | | to Non-banks | |
| Regression: | Hybrid | Interaction | Hybrid | Interaction |
| $\Delta STRI_{c,t}$ | -0.2618 | | -0.6981* | |
| | (0.4755) | | (0.3977) | |
| $\Delta STRI_{c,t-4}$ | -0.3710 | | -0.1975 | |
| | (0.4650) | | (0.3899) | |
| *Sum* | *-0.633* | | *-0.896* | |
| *p-value* | *0.372* | | *0.127* | |
| $\Delta STRI_{c,t} \times \mathbb{1}_{b,c,t}$ | 0.0753 | -0.0042 | 0.6421 | 1.0895 |
| | (0.7828) | (0.7767) | (0.7261) | (0.7176) |
| $\Delta STRI_{c,t-4} \times \mathbb{1}_{b,c,t}$ | 1.2636 | 1.3905* | 1.4599** | 1.4465* |
| | (0.7916) | (0.7991) | (0.7432) | (0.7536) |
| *Sum* | *1.339* | *1.186* | *2.102*** | *2.536**** |
| *p-value* | *0.195* | *0.186* | *0.024* | *0.006* |
| $\mathbb{1}_{b,c,t}$ | 0.0105 | 0.0109 | 0.0025 | 0.0017 |
| | (0.0067) | (0.0066) | (0.0061) | (0.0060) |
| Lagged GDP Growth | 0.0032 | | 0.0015 | |
| | (0.0022) | | (0.0019) | |
| Lagged Credit Growth | -0.1848* | | -0.1548 | |
| | (0.1089) | | (0.0969) | |
| Lagged Inflation | -0.0007 | | 0.0021 | |
| | (0.0033) | | (0.0028) | |
| $f_{b,t}$ | Yes | Yes | Yes | Yes |
| $f_c$ | Yes | N/A | Yes | N/A |
| $f_{c,t}$ | No | Yes | No | Yes |
| Obs. | 28,275 | 29,189 | 22,787 | 23,458 |
| R-squared | 0.1096 | 0.1275 | 0.1197 | 0.1479 |
| Adj. R-squared | 0.0231 | 0.0248 | 0.0214 | 0.0296 |

*Notes*: This table presents coefficient estimates from estimating equation (2) for all banks using a with-Intragroup-position indicator, $\mathbb{1}_{b,c,t}$. The dependent variable is loan growth in columns (1) and (2) and loan growth to non-banks in columns (3) and (4). Standard errors are clustered by bank-time. Significance at the 10%, 5% and 1% denoted by *, ** and ***, respectively.

group lending growth falls (increases) in responses to tighter (looser) services-trade restrictions—see column (5). Non-bank lending growth responses are significantly different for banks with and without intragroup positions in receiving countries—see column (4).

**Excluding EU Recipient Countries.**   It is possible that the country-specific STRI may not account for differences in restrictions within the EU—of which the UK was a member in that period. So we carry out a robustness exercise in which we exclude EU-recipient countries from our sample. Table A2 reports the results, highlighting how we continue to see significant differences between banks with and without affiliates abroad.

**Tightening vs. Loosening of Services Trade Restrictions.**   In Tables A3 and A4, we consider tightening and loosening separately. Our headline results are invariant to the sign of the change. Tighter services-trade restrictions are associated with a significant reduction in intragroup lending growth, and looser restrictions with a significant increase. And while non-bank lending growth overall is unaffected by changes in services-trade restrictions, there are significant differences between banks with and without intragroup positions.

**Controlling for Additional Factors.**   In Table A5, we report the results of a range of other robustness exercises, including controlling for alternative policy changes and institutional thresholds, as well as alternative thresholds for intragroup lending. We examine changes in the rule of law in columns (1) and (2); changes in regulatory quality in columns (3) and (4);[16] changes in capital-account openness in columns (5) and (6) (Chinn and Ito, 2006); measures of government lending and borrowing (from the WEO database) in columns (7) and (8); interacting our macroeconomic controls with the intragroup dummy in column (9); and changing the threshold defining intragroup exposures in columns (10) and (11).[17]

## 4.3   Heterogeneity Across Types of Services Trade Restrictions

We also assess the different types of commercial banking services-trade restrictions by utilising the five policy areas under which the restrictions in the STRI database are organised: restrictions on foreign entry; barriers to competition; regulatory transparency; restrictions to the movement of people; and other discriminatory measures. In the commercial banking sector, the level of services-trade restrictiveness is mainly driven by the first three of these policy

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[16]See here for a more detailed summary of the World Governance Indicators.

[17]Specifically, in column (7), the intragroup dummy is equal to 1 if the share of intragroup loans in total loans is at least 1%. The corresponding threshold in column (8) is 5%.

areas. Given the financial stability risks associated with the banking sector, entry and competition restrictions have sometimes been used by authorities to retain control over its operations in the absence of effective prudential regulation.

Table 4 reports the results using regression specifications (1) and (2) for each of the five policy areas in turn, focusing on (i) the response of intragroup lending growth and (ii) the response of non-bank lending growth, distinguishing between banks with and without intragroup positions in receiving countries.

Among the five policy areas, we find two to be particularly significant: barriers to competition (columns (7)-(9)) and other discriminatory measures (columns (13)-(15)). In particular, we see that both of these measures have some negative association with UK-based banks' intragroup lending growth. We also uncover significant differences in the responsiveness of non-bank lending growth for banks with and without intragroup positions in receiving countries. These significant results are perhaps not surprising. 'Other discriminatory measures', for example, capture restrictions on foreign currency lending—an activity which is particularly important for foreign banks—and compliance with Basel regulations, meaning that foreign banks would have to comply with two different sets of regulation. Similarly, competition measures—such as regulation of the interest rate that can be charged on loans and exempting publicly controlled firms from competition law—can also make it more costly to do business within a country with corresponding effects on the business model of UK banks.

We do not find significant results for the other three policy areas—restrictions on foreign entry, restrictions on the movement of people, and regulatory transparency. In column (1), we find no significant effect of changes in restrictions on foreign entry on UK-based banks' intragroup lending growth. This is unsurprising given our focus on the intensive margin of banks' operations: by definition these banks have already established a presence in receiving countries, so changes in entry restrictions would not be expected to impact intragroup lending. Consistent with this, columns (2)-(3) indicate that these entry restrictions do not imply significant differences in the responses of non-bank lending growth for banks with and without intragroup positions.

Similarly, in columns (4)-(6), we do not uncover significant results for restrictions on the movement of people. Again, this is unsurprising, for two reasons. First, these restrictions are not a primary contributor to the commercial banking STRI—in part a function of expert judgement applied by the OECD when constructing the index. Second, because these restrictions tend to be on limitations of the length of stay of intra-office employees and suppliers. These limits tend to be measured in years, rather than days, and so are likely to be of limited effect on banks' ability to do business in receiving countries. Regulatory transparency—columns

Table 4: Coefficient Estimates for Regressions (1) and (2) Using Different Types of Banking Services Trade Restrictions

| Restriction Type: | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Restrictions on Foreign Entry | | | Restrictions on Movement of People | | | Barriers to Competition | | | Regulatory Transparency | | | Other Discriminatory Measures | | |
| Loan Type: | to Intra-group | to Non-banks | to Non-banks | to Intra-group | to Non-banks | to Non-banks | to Intra-group | to Non-banks | to Non-banks | to Intra-group | to Non-banks | to Non-banks | to Intra-group | to Non-banks | to Non-banks |
| Bank Type: | with Intragroup | with Intragroup | with Intragroup | with Intragroup | with Intragroup | with Intragroup | with Intragroup | with Intragroup | with Intragroup | with Intragroup | with Intragroup | with Intragroup | with Intragroup | with Intragroup | with Intragroup |
| $\Delta STRI_{c,t}$ | -0.1589 | -1.1221** | | -3.6174 | 0.5812 | | -2.3576 | 0.5829 | | -0.0952 | -1.6277** | | -0.6938 | -1.3434 | |
| | (1.3433) | (0.5484) | | (4.9222) | (1.5771) | | (2.4715) | (0.9289) | | (1.7676) | (0.8282) | | (3.2945) | (1.2634) | |
| $\Delta STRI_{c,t-4}$ | 1.1248 | -0.6052 | | -7.0978 | -1.2141 | | -4.8821** | 0.1224 | | -0.6469 | 0.3901 | | -6.1865* | 0.1863 | |
| | (1.4207) | (0.6806) | | (4.4174) | (1.2599) | | (2.1853) | (0.9276) | | (2.0472) | (0.7635) | | (3.6602) | (1.7546) | |
| Sum | 0.966 | -1.727* | | -10.72 | -0.633 | | -7.240* | 0.705 | | -0.742 | -1.238 | | -6.880 | -1.157 | |
| p-value | 0.653 | 0.065 | | 0.169 | 0.776 | | 0.052 | 0.634 | | 0.797 | 0.318 | | 0.212 | 0.620 | |
| $\Delta STRI_{c,t} \times \mathbb{1}_{b,c,t}$ | | 1.3449 | 1.3957 | | 1.3867 | 1.7034 | | 1.7842 | 2.1236 | | -0.8578 | -0.0531 | | 3.0147 | 3.4676 |
| | | (1.0314) | (1.0262) | | (3.2760) | (3.1799) | | (1.6983) | (1.6662) | | (1.3711) | (1.3718) | | (2.2470) | (2.2168) |
| $\Delta STRI_{c,t-4} \times \mathbb{1}_{b,c,t}$ | | -0.6059 | -0.4750 | | 2.2195 | 1.5713 | | 3.7192** | 3.7545** | | -0.1438 | 0.3506 | | 6.0165** | 6.6234*** |
| | | (1.0246) | (1.0434) | | (2.7846) | (2.8849) | | (1.6070) | (1.6137) | | (1.4224) | (1.4087) | | (2.3648) | (2.4396) |
| Sum | | 0.739 | 0.921 | | 3.606 | 3.250 | | 5.503** | 5.878** | | -1.002 | 0.298 | | 9.031*** | 10.09*** |
| p-value | | 0.563 | 0.472 | | 0.378 | 0.425 | | 0.026 | 0.017 | | 0.611 | 0.877 | | 0.006 | 0.003 |
| $\mathbb{1}_{b,c,t}$ | | 0.0018 | 0.0012 | | 0.0025 | 0.0020 | | 0.0020 | 0.0016 | | 0.0024 | 0.0023 | | 0.0026 | 0.0020 |
| | | (0.0039) | (0.0038) | | (0.0064) | (0.0063) | | (0.0044) | (0.0044) | | (0.0062) | (0.0060) | | (0.0061) | (0.0059) |
| $f_{b,t}$ | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| $f_c$ and $\times_{c,t}$ | Yes | Yes | N/A | Yes | Yes | N/A | Yes | Yes | N/A | Yes | Yes | N/A | Yes | Yes | N/A |
| $f_{c,t}$ | No | No | Yes | No | No | Yes | No | No | Yes | No | No | Yes | No | No | Yes |
| Obs. | 6,697 | 22,817 | 23,697 | 6,697 | 22,817 | 23,697 | 6,697 | 22,817 | 23,697 | 6,697 | 22,817 | 23,697 | 6,697 | 22,817 | 23,697 |
| R-squared | 0.1810 | 0.1198 | 0.1479 | 0.1815 | 0.1199 | 0.1483 | 0.1817 | 0.1200 | 0.1484 | 0.1810 | 0.1198 | 0.1479 | 0.1815 | 0.1199 | 0.1483 |
| Cluster | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time |

*Notes*: This table presents coefficient estimates from estimating equations (1) and (2) using specific types of banking services trade restrictions. The dependent variable is loan growth to the different sectors indicated in the top row. In columns (2), (3), (5), (6), (8), (9), (11), (12), (14) and (15), changes in services restrictions are interacted with a dummy, which is 1 if a bank has non-zero/non-missing intragroup positions in the current or preceding quarter. Standard errors are clustered by bank-time. Significance at the 10%, 5% and 1% denoted by *, **, and ***, respectively.

(10)-(12)—also does not appear to be significant driver of our findings. These restrictions are typically focused on barriers to licensing, so again are not likely to impact banks' business models along the intensive margin.

## 5 Conclusion

In this paper, we have examined the impact of changes in services-trade restrictions abroad on international bank lending from banks in an IFC. For banks without an affiliate presence abroad, tighter (looser) services-trade restrictions abroad are associated with reductions (increases) in their cross-border lending growth from their UK office.

However, for banks with affiliates abroad, we exploit heterogeneity in banks' cross-border exposures to uncover novel evidence of business-model adaption and changes in the location from which lending is originated in response to changes in services-trade restrictions. In response to tighter services-trade restrictions abroad, we find that these these banks cut their intragroup loans, but, at the same time, substitute for this by increasing their direct cross-border lending to non-banks. As such, tighter services-trade restrictions appear to lead global banks to reshape their business model for cross-border lending, leading to substitution from "local" to "global" financial intermediation. On the other hand, and by the same logic, looser services-trade restrictions appear to have the opposite effect, stimulating a shift from "global", and more arm's length, to "local" intermediation. The primary driving force behind our results are restrictions on competition within a country—such as favouring state owned banks—and restrictions on foreign-exchange lending—which are more likely to particularly affect the business activities of foreign banks.

These shifts in the location from which lending is originated in response to changes in services-trade restrictions raise important questions for future research, In particular the extent to which shifts to/from local from/to global financial intermediation can yield unintended consequences for domestic policy autonomy and oversight. For instance, to the extent local intermediation is easier for domestic regulators to oversee, there may be benefits to increasing services-trade openness and benefiting endogenously from the shift from global to local intermediation that our results suggest.

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# Supplementary Appendix

# A  Robustness Analysis

Table A1: Coefficient Estimates for Regressions (1) and (2) when Excluding Banks from Countries Implementing Restrictions

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Loan Type: | to Non-banks | to Non-banks | to Non-banks | to Non-banks | to Intra-group |
| Bank Type: | w/o Intragroup | with Intragroup | with Intragroup | with Intragroup | with Intragroup |
| $\Delta STRI_{c,t}$ | -0.8570** | 0.9478 | -0.6870* | | -1.5337 |
| | (0.4142) | (0.9817) | (0.4007) | | (1.1551) |
| $\Delta STRI_{c,t-4}$ | -0.2678 | 1.2566 | -0.1747 | | -2.0887* |
| | (0.4109) | (0.9530) | (0.3946) | | (1.1085) |
| *Sum* | *-1.125** | *2.204* | *-0.862* | | *-3.622*** |
| *p-value* | *0.076* | *0.120* | *0.149* | | *0.029* |
| $\Delta STRI_{c,t} \times \mathbb{1}_{b,c,t}$ | | | 0.8178 | 1.1918 | |
| | | | (0.7965) | (0.7764) | |
| $\Delta STRI_{c,t-4} \times \mathbb{1}_{b,c,t}$ | | | 0.9647 | 1.0420 | |
| | | | (0.8230) | (0.8206) | |
| *Sum* | | | *1.782** | *2.234*** | |
| *p-value* | | | *0.076* | *0.023* | |
| $\mathbb{1}_{b,c,t}$ | | | 0.0005 | -0.0002 | |
| | | | (0.0072) | (0.0070) | |
| Lagged GDP Growth | 0.0008 | 0.0045 | 0.0017 | | 0.0083 |
| | (0.0021) | (0.0049) | (0.0019) | | (0.0076) |
| Lagged Credit Growth | -0.0892 | -0.5862** | -0.1931* | | -0.3911 |
| | (0.1070) | (0.2723) | (0.0991) | | (0.3592) |
| Lagged Inflation | 0.0012 | 0.0040 | 0.0010 | | -0.0124 |
| | (0.0031) | (0.0070) | (0.0029) | | (0.0092) |
| $f_{b,t}$ | Yes | Yes | Yes | Yes | Yes |
| $f_c$ | Yes | Yes | Yes | N/A | Yes |
| $f_{c,t}$ | No | No | No | Yes | No |
| Obs. | 16,499 | 4,303 | 21,277 | 21,948 | 5,429 |
| R-squared | 0.1532 | 0.2033 | 0.1209 | 0.1513 | 0.1803 |
| Adjusted R-squared | 0.0294 | 0.0318 | 0.0205 | 0.0298 | -0.00350 |
| Cluster | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time |

*Notes*: This table presents coefficient estimates from estimating equation (1) in columns (1), (2) and (5) and equation (2) in columns (3) and (4). The dependent variable is loan growth to the different sectors indicated in the top row. In column (2), the sample contains only observations for banks which have non-zero/non-missing intragroup positions in the current or preceding quarter. Column (1) uses the remainder of the sample. In columns (3) and (4), changes in services restrictions are interacted with a dummy, which is 1 if a bank has non-zero/non missing intragroup positions in the current or preceding quarter. Standard errors are clustered by bank-time. Significance at the 10%, 5% and 1% denoted by *, ** and ***, respectively.

Table A2: Coefficient Estimates for Regressions (1) and (2) when Excluding Lending to EU

| | | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|---|
| Loan Type: | | to Non-banks | to Non-banks | to Non-banks | to Non-banks | to Intra-group |
| Bank Type: | | w/o In-tragroup | with In-tragroup | with In-tragroup | with In-tragroup | with In-tragroup |
| $\Delta STRI_{c,t}$ | | -0.6947 | 1.1873 | -0.4294 | | -2.0822 |
| | | (0.5608) | (1.0276) | (0.5289) | | (1.3372) |
| $\Delta STRI_{c,t-4}$ | | -0.0903 | 1.2979 | -0.0719 | | -2.6581* |
| | | (0.5563) | (1.1035) | (0.5119) | | (1.3629) |
| | *Sum* | *-0.785* | *2.485* | *-0.501* | | *-4.740**\* |
| | *p-value* | *0.373* | *0.131* | *0.526* | | *0.022* |
| $\Delta STRI_{c,t} \times \mathbb{1}_{b,c,t}$ | | | | 0.9975 | 1.3656 | |
| | | | | (0.8562) | (0.8824) | |
| $\Delta STRI_{c,t-4} \times \mathbb{1}_{b,c,t}$ | | | | 1.4176 | 1.3621 | |
| | | | | (0.9211) | (0.9497) | |
| | *Sum* | | | *2.415**\* | *2.728**\* | |
| | *p-value* | | | *0.035* | *0.019* | |
| $\mathbb{1}_{b,c,t}$ | | | | -0.0023 | -0.0026 | |
| | | | | (0.0095) | (0.0094) | |
| $f_{b,t}$ | | Yes | Yes | Yes | Yes | Yes |
| $f_c$ | | Yes | Yes | Yes | N/A | Yes |
| $f_{c,t}$ | | No | No | No | Yes | No |
| Obs. | | 5,965 | 2,669 | 9,417 | 9,417 | 3,403 |
| R-squared | | 0.2364 | 0.2603 | 0.1830 | 0.2223 | 0.2346 |
| Adjusted R-squared | | 0.0127 | 0.0259 | 0.0076 | 0.0165 | -0.0155 |
| Cluster | | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time |

*Notes*: This table presents coefficient estimates from estimating equation (1) in columns (1), (2) and (5) and equation (2) in columns (3) and (4). The dependent variable is loan growth to the different sectors indicated in the top row. In column (2), the sample contains only observations for banks which have non-zero/non-missing intragroup positions in the current or preceding quarter. Column (1) uses the remainder of the sample. In columns (3) and (4), changes in services restrictions are interacted with a dummy, which is 1 if a bank has non-zero/non missing intragroup positions in the current or preceding quarter. Standard errors are clustered by bank-time. Significance at the 10%, 5% and 1% denoted by *, ** and ***, respectively.

Table A3: Coefficient Estimates for Regressions (1) and (2) Focusing on Tightenings of Services Trade Restrictions Only

| | | (1) to Non-banks w/o Intragroup | (2) to Non-banks with Intragroup | (3) to Non-banks with Intragroup | (4) to Non-banks with Intragroup | (5) to Intra-group with Intragroup |
|---|---|---|---|---|---|---|
| Loan Type: | | | | | | |
| Bank Type: | | | | | | |
| $\Delta STRI_{c,t}$ | | -0.2508 | 1.1713 | -0.0637 | | -2.4852 |
| | | (0.5475) | (1.2609) | (0.5209) | | (1.6457) |
| $\Delta STRI_{c,t-4}$ | | -0.2402 | 3.3635** | -0.0233 | | -2.7104* |
| | | (0.5555) | (1.3063) | (0.5199) | | (1.6228) |
| | Sum | -0.491 | 4.535** | -0.087 | | -5.196** |
| | p-value | 0.592 | 0.027 | 0.917 | | 0.049 |
| $\Delta STRI_{c,t} \times \mathbb{1}_{b,c,t}$ | | | | 0.1639 | 0.7199 | |
| | | | | (0.9179) | (0.9212) | |
| $\Delta STRI_{c,t-4} \times \mathbb{1}_{b,c,t}$ | | | | 1.8076* | 1.7511* | |
| | | | | (1.0114) | (1.0294) | |
| | Sum | | | 1.972 | 2.471* | |
| | p-value | | | 0.125 | 0.057 | |
| $\mathbb{1}_{b,c,t}$ | | | | -0.0005 | -0.0020 | |
| | | | | (0.0065) | (0.0064) | |
| Lagged GDP Growth | | 0.0009 | 0.0076 | 0.0018 | | 0.0104 |
| | | (0.0021) | (0.0047) | (0.0019) | | (0.0067) |
| Lagged Credit Growth | | -0.1109 | -0.4500* | -0.1573 | | -0.5894* |
| | | (0.1089) | (0.2512) | (0.0974) | | (0.3265) |
| Lagged Inflation | | 0.0017 | 0.0057 | 0.0019 | | -0.0080 |
| | | (0.0031) | (0.0063) | (0.0028) | | (0.0084) |
| $f_{b,t}$ | | Yes | Yes | Yes | Yes | Yes |
| $f_c$ | | Yes | Yes | Yes | N/A | Yes |
| $f_{c,t}$ | | No | No | No | Yes | No |
| Obs. | | 16,594 | 5,325 | 22,787 | 23,458 | 6,693 |
| R-squared | | 0.1524 | 0.2156 | 0.1196 | 0.1477 | 0.1817 |
| Adjusted R-squared | | 0.0286 | 0.0268 | 0.0212 | 0.0295 | -0.0126 |
| Cluster | | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time |

*Notes*: This table presents coefficient estimates from estimating equation (1) in columns (1), (2) and (5) and equation (2) in columns (3) and (4). The dependent variable is loan growth to the different sectors indicated in the top row. In column (2), the sample contains only observations for banks which have non-zero/non-missing intragroup positions in the current or preceding quarter. Column (1) uses the remainder of the sample. In columns (3) and (4), changes in services restrictions are interacted with a dummy, which is 1 if a bank has non-zero/non missing intragroup positions in the current or preceding quarter. Standard errors are clustered by bank-time. Significance at the 10%, 5% and 1% denoted by *, ** and ***, respectively.

Table A4: Coefficient Estimates for Regressions (1) and (2) Focusing on Loosenings of Services Trade Restrictions Only

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Loan Type: | to Non-banks | to Non-banks | to Non-banks | to Non-banks | to Intra-group |
| Bank Type: | w/o Intragroup | with Intragroup | with Intragroup | with Intragroup | with Intragroup |
| $\Delta STRI_{c,t}$ | -1.8983*** | 1.2151 | -1.6893** | | -1.9714 |
| | (0.7021) | (1.3693) | (0.6756) | | (1.6174) |
| $\Delta STRI_{c,t-4}$ | -0.5755 | 1.0428 | -0.4307 | | -1.9509 |
| | (0.7716) | (1.4572) | (0.7291) | | (1.6814) |
| *Sum* | *-2.474**￼* | *2.258* | *-2.120**￼* | | *-3.922*￼* |
| *p-value* | *0.027* | *0.274* | *0.044* | | *0.093* |
| $\Delta STRI_{c,t} \times \mathbb{1}_{b,c,t}$ | | | 1.7000 | 2.1458* | |
| | | | (1.1895) | (1.1851) | |
| $\Delta STRI_{c,t-4} \times \mathbb{1}_{b,c,t}$ | | | 1.4332 | 1.4621 | |
| | | | (1.2514) | (1.2942) | |
| *Sum* | | | *3.133**￼* | *3.608**￼* | |
| *p-value* | | | *0.046* | *0.023* | |
| $\mathbb{1}_{b,c,t}$ | | | 0.0076 | 0.0076 | |
| | | | (0.0065) | (0.0064) | |
| Lagged GDP Growth | 0.0005 | 0.0052 | 0.0011 | | 0.0120* |
| | (0.0021) | (0.0046) | (0.0019) | | (0.0067) |
| Lagged Credit Growth | -0.0410 | -0.5612** | -0.1255 | | -0.4341 |
| | (0.1079) | (0.2646) | (0.0985) | | (0.3359) |
| Lagged Inflation | 0.0008 | 0.0050 | 0.0012 | | -0.0102 |
| | (0.0031) | (0.0062) | (0.0028) | | (0.0083) |
| $f_{b,t}$ | Yes | Yes | Yes | Yes | Yes |
| $f_c$ | Yes | Yes | Yes | N/A | Yes |
| $f_{c,t}$ | No | No | No | Yes | No |
| Obs. | 16,594 | 5,325 | 22,787 | 23,458 | 6,693 |
| R-squared | 0.1528 | 0.2146 | 0.1197 | 0.1478 | 0.1814 |
| Adjusted R-squared | 0.0290 | 0.0255 | 0.0214 | 0.0295 | -0.0129 |
| Cluster | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time |

*Notes*: This table presents coefficient estimates from estimating equation (1) in columns (1), (2) and (5) and equation (2) in columns (3) and (4). The dependent variable is loan growth to the different sectors indicated in the top row. In column (2), the sample contains only observations for banks which have non-zero/non-missing intragroup positions in the current or preceding quarter. Column (1) uses the remainder of the sample. In columns (3) and (4), changes in services restrictions are interacted with a dummy, which is 1 if a bank has non-zero/non missing intragroup positions in the current or preceding quarter. Standard errors are clustered by bank-time. Significance at the 10%, 5% and 1% denoted by *, ** and ***, respectively.

Table A5: Coefficient Estimates for Regressions (1) and (2) Controlling for Parallel Policy Changes and Other Robustness

| Controlling for: | (1) Rule of Law | (2) Rule of Law | (3) Regulatory Quality | (4) Regulatory Quality | (5) Capital Account Openness | (6) Capital Account Openness | (7) Fiscal Surplus/Deficit | (8) Fiscal Surplus/Deficit | (9) Other Macro | (10) 1% Threshold | (11) 5% Threshold |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Loan Type: Bank Type: | to Intra. w. Intra. | to Non-b. w. Intra. | to Intra. w. Intra. | to Non-b. w. Intra. | to Intra. w. Intra. | to Non-b. w. Intra. | to Intra. w. Intra. | to Non-b. w. Intra. | to Non-b. w. Intra. | to Non-b. w. Intra. | to Non-b. w. Intra. |
| $\Delta STRI_{c,t}$ | -1.7235 (1.0515) | | -1.7209 (1.0598) | | -1.8774* (1.0674) | | -1.8204* (1.0630) | | | | |
| $\Delta STRI_{c,t-4}$ | -1.9074* (1.0158) | | -1.7665* (1.0204) | | -1.7618* (1.1171) | | -2.1291** (1.0299) | | | | |
| *Sum* | -3.631** | | -3.487** | | -3.639** | | -3.950** | | | | |
| *p-value* | 0.017 | | 0.024 | | 0.018 | | 0.011 | | | | |
| $\Delta STRI_{c,t} \times \mathbb{1}_{b,c,t}$ | | 1.1350 (0.7183) | | 1.3714* (0.7376) | | 1.4445* (0.8195) | | 1.0524 (0.7176) | 1.0929 (0.8120) | 1.0154 (0.7660) | 0.8119 (0.8629) |
| $\Delta STRI_{c,t-4} \times \mathbb{1}_{b,c,t}$ | | 1.4455* (0.7534) | | 1.4150* (0.7542) | | 1.4479* (0.7635) | | 1.3951* (0.7796) | 1.4912* (0.7800) | 1.6344** (0.7836) | 1.3397 (0.8245) |
| *Sum* | | 2.580*** | | 2.786*** | | 2.892*** | | 2.448*** | 2.584** | 2.650*** | 2.152** |
| *p-value* | | 0.005 | | 0.003 | | 0.005 | | 0.009 | 0.016 | 0.007 | 0.041 |
| $\mathbb{1}_{b,c,t}$ | | 0.0047 (0.0066) | | -0.0006 (0.0061) | | 0.0002 (0.0061) | | 0.0003 (0.0068) | 0.0019 (0.0105) | -0.0048 (0.0059) | -0.0079 (0.0062) |
| Lagged GDP Growth | 0.0110 (0.0068) | | 0.0109 (0.0067) | | 0.0085 (0.0072) | | 0.0105 (0.0067) | | | | |
| Lagged Credit Growth | -0.3891 (0.3289) | | -0.4548 (0.3322) | | -0.3895 (0.3303) | | -0.2861 (0.3394) | | | | |
| Lagged Inflation | -0.0099 (0.0084) | | -0.0096 (0.0084) | | -0.0101 (0.0085) | | -0.0125 (0.0086) | | | | |
| $\Delta RoL_{c,t}$ | -0.1833* (0.1018) | | | | | | | | | | |
| $\Delta RoL_{c,t-4}$ | -0.0259 (0.0968) | | | | | | | | | | |
| $\Delta RoL_{c,t} \times \mathbb{1}_{b,c,t}$ | | 0.0753 (0.0752) | | | | | | | | | |
| $\Delta RoL_{c,t-4} \times \mathbb{1}_{b,c,t}$ | | 0.0454 (0.0797) | | | | | | | | | |
| $\Delta RegQual_{c,t}$ | | | -0.0053 (0.0665) | | | | | | | | |
| $\Delta RegQual_{c,t-4}$ | | | 0.0304 (0.0766) | | | | | | | | |
| $\Delta RegQual_{c,t} \times \mathbb{1}_{b,c,t}$ | | | | 0.0662 (0.0495) | | | | | | | |
| $\Delta RegQual_{c,t-4} \times \mathbb{1}_{b,c,t}$ | | | | 0.0940* (0.0566) | | | | | | | |
| $\Delta FinOp_{c,t}$ | | | | | -0.0405 (0.1856) | | | | | | |
| $\Delta FinOp_{c,t-4}$ | | | | | -0.0456 (0.1853) | | | | | | |
| $\Delta FinOp_{c,t} \times \mathbb{1}_{b,c,t}$ | | | | | | 0.2170 (0.1324) | | | | | |
| $\Delta FinOp_{c,t-4} \times \mathbb{1}_{b,c,t}$ | | | | | | -0.1710 (0.1198) | | | | | |
| $FiscSurp_{c,t}$ | | | | | | | -0.0030 (0.0111) | | | | |
| $FiscSurp_{c,t-4}$ | | | | | | | -0.0178* (0.0098) | | | | |
| $FiscSurp_{c,t} \times \mathbb{1}_{b,c,t}$ | | | | | | | | -0.0009 (0.0048) | | | |
| $FiscSurp_{c,t-4} \times \mathbb{1}_{b,c,t}$ | | | | | | | | -0.0001 (0.0050) | | | |
| $\Delta GDP_{c,t-4} \times \mathbb{1}_{b,c,t}$ | | | | | | | | | 0.0016 (0.0027) | | |
| $\Delta Credit_{c,t-4} \times \mathbb{1}_{b,c,t}$ | | | | | | | | | 0.0581 (0.1312) | | |
| $Infl_{c,t-4} \times \mathbb{1}_{b,c,t}$ | | | | | | | | | -0.0018 (0.0030) | | |
| $f_{b,t}$ | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| $f_c$ | Yes | N/A | Yes | N/A | Yes | N/A | Yes | N/A | N/A | N/A | N/A |
| $f_{c,t}$ | No | Yes | No | Yes | No | Yes | No | Yes | Yes | Yes | Yes |
| Obs. | 6,693 | 23,458 | 6,693 | 23,458 | 6,434 | 22,009 | 6,693 | 23,458 | 22,779 | 23,458 | 23,458 |
| R-squared | 0.1823 | 0.1480 | 0.1819 | 0.1481 | 0.1841 | 0.1523 | 0.1827 | 0.1479 | 0.1490 | 0.1479 | 0.1478 |
| Cluster | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time | Bank-time |

*Notes*: Coefficient estimates from estimating equations (1) and (2). Dependent variable is loan growth to the different sectors indicated in the top row. Standard errors clustered by bank-time. Significance at the 10%, 5% and 1% denoted by *, ** and ***, respectively.