Bank of England

Financial services trade restrictions and lending from an international financial centre

Staff Working Paper No. 1,022

April 2023

Simon Lloyd, Dennis Reinhardt and Rhiannon Sowerbutts

Bank of England

Staff Working Paper No. 1,022

Financial services trade restrictions and lending from an international financial centre

Simon Lloyd,[1] Dennis Reinhardt[2] and Rhiannon Sowerbutts[3]

Abstract

This paper examines how international lending of UK-based banks is affected by services trade restrictions on commercial banks applied abroad. Exploiting heterogeneity in banks' cross-border activities, we find evidence that banks without a local affiliate presence abroad cut back their non-bank lending to countries applying restrictions, and vice versa when restrictions are liberalised. On the other hand, banks with a local presence reduce their intragroup loans, but substitute for this by increasing direct cross-border lending to non-banks. These 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.

Key words: Services trade restrictions, commercial banking restrictions, cross-border bank lending, banks' business models.

JEL classification: F13, F34, F42, G18, G21.

---

(1) Bank of England. Email: simon.lloyd@bankofengland.co.uk
(2) Bank of England. Email: dennis.reinhardt@bankofengland.co.uk
(3) Bank of England. Email: rhiannon.sowerbutts@bankofengland.co.uk

1 Introduction

Over the last three decades, there has been a substantial increase in cross-border services trade. Between 2005 and 2017, trade in services expanded at an average rate of 5.4% per year—faster than the growth in goods trade (World Trade Organisation, 2019). A key component of this has been increases in cross-border financial flows, spurred by heightened financial market integration. According to latest estimates, financial-services trade comprises about one-fifth of overall global trade in services. However, for a few key international financial centres, where cross-border banking is particularly important, this figure is even larger. In the UK—a major international financial centre—foreign-owned branches and subsidiaries of commercial banking groups undertake their global activity in London (e.g. Beck, Lloyd, Reinhardt, and Sowerbutts, 2023). As a result, the cross-border claims of UK-based banks now totals over $5 trillion, having grown from around $2 trillion in 2000.

Despite the substantial increase in trade in services and commercial banks' cross-border flows, restrictions on services trade remain pervasive. Many of these are non-tariff in nature, and tend to be somewhat tighter than for other services sectors. Restrictions on financial services trade have not shown a trend decline in past decades either. According to the OECD Services Trade Restrictiveness Index (STRI)—which we use in our empirical analysis in this paper—19 countries, out of 48 in the database, recorded commercial banking services-trade restrictions in 2020 that were less restrictive (looser) compared to their 2014 levels, while 19 countries had higher (tighter) restrictions.

These trends in services trade and services-trade restrictions stand in contrast to trade in goods. Bilateral and multilateral goods trade agreements have resulted in tariff reductions and contributed to a substantial increase in world goods trade (e.g. Baier and Bergstrand, 2007). Barriers to trade in services have not been liberalised to the same degree as barriers to trade in goods (e.g. Joy, Lisack, Lloyd, Reinhardt, Sajedi, and Whitaker, 2018), motivating our specific focus on services in this paper. Miroudot, Sauvage, and Shepherd (2013) estimate that, over the 1995-2005 period, effective trade costs for goods fell by around 15%, while those for services remained roughly constant.

However, services trade differs substantially from trade in goods. Many services tend to be intangible, so do not cross borders in a physical sense. As a result, the majority of services-trade restrictions are in the form of non-tariff barriers—such as provision of licenses to operate. Trade in financial services, which we focus on here, can mainly be done in two different

ways: either by establishing a local presence where services are sold through a local subsidiary or branch—which can either be funded independently or via intragroup lending—or cross-border trade where financial services are provided directly from abroad. Each approach is subject to differing levels of restrictions and regulation. The UK is an ideal environment to study the effect of how changes in commercial banking restrictions affects financial-services lending. While the UK is a global centre for cross-border banking, many firms with a major UK presence also have a local presence, to differential degrees, in countries which have tightened or loosened services-trade restrictions.

In this paper we use the OECD STRI database for financial services (Rouzet, Nordås, Gonzales, Grosso, Lejárraga, Miroudot, and Ueno, 2014) and exploit the heterogeneity of UK-based banks' global presence to examine how changes in services-trade restrictions on commercial banking in countries that receive inflows from UK-based banks affect the provision of international lending by UK-based banks. Services-trade restrictions in the commercial banking sector encompass restrictions on the entry by foreign affiliates, barriers to competition, regulatory (in)transparency, restrictions to the movement of people, and other discriminatory measures. They thus relate to restrictions which make it more difficult for foreign affiliates to operate domestically, but importantly do not include restrictions to the cross-border provision of financial services.

To structure our analysis, we focus on two potentially competing effects. On the one hand, a tightening (loosening) of services-trade restrictions for commercial banks could increase (decrease) the costs associated with 'selling' their banking activities to the country which tightened restrictions. For instance, tighter (looser) restrictions could increase (decrease) the fixed costs of entering a market or influence the transaction costs of extending new credit to the country. As such, tighter (looser) services-trade restrictions are likely to be associated with a lower (larger) supply of cross-border credit from UK-based banks to receiving countries through their effect on intermediation costs.

On the other hand, banks may change the way they do their lending in response to restrictions, in particular the local from which they extend the lending, especially if they have lending relationships in the country that they deem to be important and profitable to preserve.[1] Many of the restrictions captured in the OECD STRI database apply to banks' activities within the country, but do not apply to direct lending from abroad. As a result banks could change the

---

[1]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.

way they lend to the same firms: following a tightening of services-trade restrictions abroad, a bank affiliate may change their lending patterns, substituting *from* lending to foreign firm locally via their foreign affiliate, who now faces tighter restrictions on its ability to do business *to* direct lending to the foreign firm from their international financial centre office, which is not subject to the restrictions tightened abroad. In other words, a tightening in restrictions could result in a shift from "local" to "global", more "arm's length" intermediation. By the same logic, a loosening in services-trade restrictions could result in the opposite shift: from arm's length to more local intermediation—which, given looser restrictions, could allow the banking group to benefit from local relationships and potentially improved terms such as better contract enforcement (e.g. Thakor and Boot, 2008; Beck, Ioannidou, and Schäfer, 2018b). The *location-of-lending effect* could work to offset the former *effect of intermediation costs*.

We test these competing hypotheses to assess the extent to which services-trade restrictions on commercial banking influence the supply of cross-border loans. We focus on the supply of credit from UK-based banks, given the UK's position as a major international financial centre, with over 250 banks from over 50 countries, and a major exporter of financial services. We use a confidential panel dataset of UK-based banks' cross-border lending (as used, e.g., in Forbes, Reinhardt, and Wieladek, 2017; Hills, Reinhardt, Sowerbutts, and Wieladek, 2017; Bussière, Hills, Lloyd, Meunier, Pedrono, Reinhardt, and Sowerbutts, 2021b), which allows for a rich specification of fixed effects to control for potential confounding factors, and combine it with the OECD STRI for the commercial banking sector for recipient countries.

We emphasise three key results. First, tighter (looser) services-trade restrictions in recipient countries are associated with lower (greater) non-bank lending growth by UK-based banks without an affiliate presence in the country implementing restrictions. This is consistent with the hypothesis implied by the effect of intermediation costs: that these restrictions increase the cost of exporting services to a country which tightens restrictions and so banks cut back on lending.

Second, and more interestingly, we examine the extent to which these outcomes are different for banks with an affiliate presence abroad, who can potentially adapt their cross-border bank-lending models in response to restrictions. In particular, we find that banks' with a local presence cut (increase) their intragroup loans to a country that tightens (loosens) restrictions—suggesting that they engage in less (more) "local" financial intermediation. At the same time, they increase (decrease) direct cross-border lending to non-banks. A formal test based on interaction terms confirms that banks with intragroup positions *vis-à-vis* recipient countries reduce

(increase) their overall non-bank cross-border lending to these regions by less when restrictions tighten (loosen) compared to banks without intragroup positions. When studying the effects tightenings and loosenings in services-trade restrictions separately, we find them both to have quantitatively similar and statistically significant effects. This provides evidence of banks shifting where they originate the lending, suggesting that, in the face of changes in services-trade restrictions, banks with a local presence adapt the way they originate lending in response to restrictions by lending direct to final borrowers—and vice versa for loosenings.

Third, we assess heterogeneity across the different types of services-trade restrictions captured in the OECD STRI: restrictions on foreign entry; barriers to competition; regulatory transparency; restrictions to the movement of people; and other discriminatory measures. Of these measures, we find factors that weigh on the intensive margin of banks' cross-border activities—in particular barriers to competition and other discriminatory measures to be the main drivers of our findings.[2] In contrast, tools which act on the extensive margin of cross-border bank lending have more limited impacts—but this partly reflects the fact that our data focuses on banks with a pre-existing presence.

Related Literature. This paper and our results contribute to three broad strands of literature. First, we contribute to a growing 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, which have fallen over the last three decades—restrictions on services trade remain pervasive (Miroudot et al., 2013), despite the growing role of services in world trade. We contribute to this literature by focusing on the specific impact of services-trade restrictions on commercial banks' business models and international lending decisions, highlighting novel evidence that 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 et al., 2017; Hills

---

[2]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) for a detailed description.

et al., 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 major 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 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 cross-border credit flows (via the higher cost of intermediation), as well as important—and potentially unintended—consequences for the composition of those flows (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. 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 its links with our key hypotheses, before Section 4 describes our results and findings. Section 5 concludes.

2   Data Description

We combine two datasets in our study. First, a confidential panel dataset of UK-based banks' cross-border asset and liability positions at quarterly frequency compiled by the Bank of England. Second, the OECD STRI dataset, focusing on restrictions on commercial-banking services trade specifically.[3]

Our cross-border banking dataset contains information on UK-based banks' cross-border

---

[3]To combine the annual STRI with our quarterly cross-border banking data, we assume the STRI value applies to each quarter within a calendar year.

lending up to 2019 Q3. The dataset includes information on aggregate cross-border lending, as well as a disaggregation 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 either at least £10 million in size. To alleviate the effect of outliers, we winsorise the dependent variable so that the growth rates lie within a $-100\%/+100\%$ range. Control variables are winsorised at the 2.5% level.[4]

The OECD database on services-trade restrictiveness records restrictions for a range of sectors in the economy—including the commercial banking sector, which comprises deposit-taking, lending and payment services.[5] The STRI contains indices that measure 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.[6] 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.

As our main focus is on changes in commercial-banking restrictions in receiving countries from the perspective of UK-based banks,[7] 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 coun-

---

[4]Furthermore, 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).

[5]See this OECD document for more details.

[6]We discuss the policy areas in greater detail in Section 4.3.

[7]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.

Figure 1: Changes in Commercial-Banking Services-Trade Restrictions by Country from 2015 to 2019
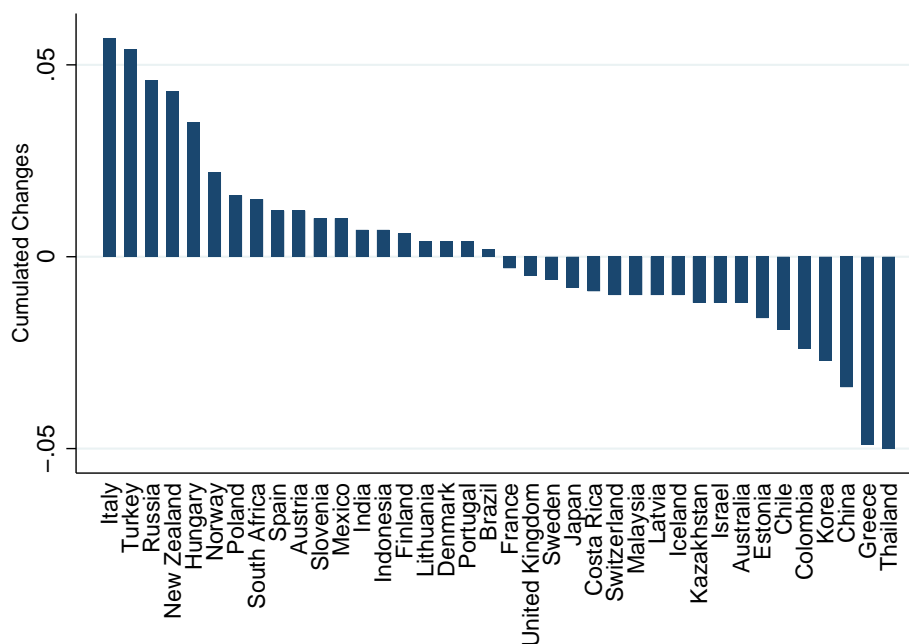
Notes: Cumulated changes from 2015 to 2019. *Source*: OECD and authors' calculations.

tries with commercial-banking services-trade restrictions being both tightened and loosened over the period.

Combining the two datasets, Figure 2 demonstrates how the cross-border bank lending by UK-based banks varies with respect to the commercial-banking services-trade restrictions in recipient countries. Using data for 2019, the Figure distinguishes between the share of intra-banking group lending—i.e. lending from the UK-based bank to its affiliate 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.[8]

Figure 2 shows that for receiving countries with low commercial-banking services-trade restrictions—i.e. looser services trade barriers, in the bottom 75th percentile—the share of intragroup and non-bank lending is roughly equal. On the other hand, countries with restrictions in the upper quartile—i.e. tighter barriers on commercial banks' services trade—see significant differences in the share of intragroup and non-bank lending share. The share of direct lending to non-banks is much higher than the share of lending done intragroup. The remainder of the paper attempts to establish whether changes in commercial-banking restrictions were indeed

---

[8]Shares are in total intragroup plus non-bank lending.

Figure 2: Share of Types of Bank Lending (Intragroup and Non-Bank) from UK-based Banks to Recipient Countries as a Function of Commercial-Banking Services-Trade Restrictions in 2019
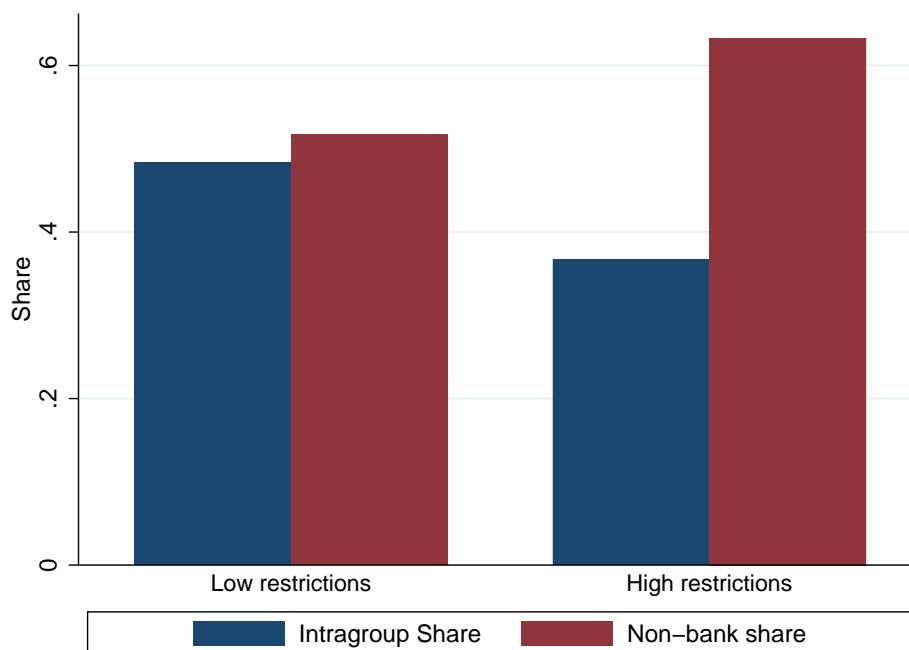
Notes: Chart calculates, for each bank and *vis-à-vis* position, the share of intragroup or non-bank lending in total intragroup + non-bank lending. This is then averaged by whether lending is to a country with commercial-banking restrictions in the lower 75th or upper 25th percentile of the distribution in 2019. *Source*: OECD, Bank of England and authors' calculations.

a causal driver behind those differences.

3 Empirical Framework and Hypotheses

In this section, we present our formal regression-based framework 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 intragroup or non-bank lending from a UK-based bank b to country c, denoted by $\Delta y_{b,c,t}$, and investigate how this depends on the changes in services-trade restrictions imposed by recipient-country c (albeit not specific to UK

services exports), denoted by $\Delta STRI_{c,t}$. Because of the granularity of our banking dataset, which contains information on banks that lend to multiple recipient countries in varying degrees, we are able to 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 focus on 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.   With these variable definitions, our non-interacted regression specification is:

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

where $\Delta y_{b,c,t}$ denotes either non-bank or intragroup lending growth. $\mathbf{x}_{c,t}$ 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, which capture features of receiving-country c that are time-invariant, such as geography and some institutional features. 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. Throughout, we report standard errors that are clustered at the bank-time level.

Using regression (1), we examine the determinants of the growth in different types of cross-border lending to form a complete picture of the impact of commercial-banking services-trade restrictions.

To estimate regression (1), we use the quarterly cross-border lending data for the period 2014 Q1 to 2019 Q4. We use the data cleaning and winsorisation procedures described in Section 2. 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.[9] 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 β_1 and β_2, which load on $\Delta STRI_{c,t}$ and $\Delta STRI_{c,t-4}$, respectively. $\Delta STRI_{c,t}$ and $\Delta STRI_{c,t-4}$ 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.

Our baseline hypothesis is that our point estimates for β_1 and β_2, and their sum, are negative: countries that have tightened (loosened) commercial-banking services-trade restrictions face a subsequent reduction (increase) in cross-border lending from UK-based banks. Services-trade restrictions place additional costs on UK-based banks' ability to export funds to the tightening country and so reduce banks' incentive to lend to the country.

Interacted Specification Accounting for Affiliate Presence in Recipient Countries. However, we also expect that some banks may be better able to avoid the restrictions than others or have more reason to maintain relationships may react differently. There is a considerable literature showing that banks with a more established presence in a country—for example, operating a subsidiary—react less to shocks (Cetorelli and Goldberg, 2012; De Haas and Van Horen, 2013) and 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 non-bank lending growth and 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. By dividing the sample into banks with and without an affiliate presence abroad, and analysing the response of different types of cross-border lending to services-trade restrictions, we seek to investigate the extent to which banks alter their lending composition in response to services-trade restrictions.

In our second specification, we formally test whether banks' responsiveness to changes in services-trade restrictions differs depending on whether the bank has an affiliate present in the receiving country. We do so by extending regression specification (1) using a dummy variable

---

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

$\mathbb{1}_{b,c,t}$ which takes the value unity when a bank b has an affiliate in receiving country c at time t, and zero otherwise.[10] 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 β_i and δ_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 β_i coefficients cannot be estimated due to multicollinearity, but inference on the interaction coefficients δ_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), δ_1 and δ_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 δ_1 and δ_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. The logic of the location-of-lending effect suggests that, for banks with an affiliate presence abroad, the sign of these interaction coefficients will differ depending on the type of cross-border lending captured in the dependent variable: intragroup lending vs. non-bank lending. We explore this further in light of the results presented in Section 4.

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.

---

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

Table 1: Summary Statistics for All Variables

Variable	Source	Mean	SD	P25	P75	Obs.
Δ Banking STRI	OECD	0	0.007	-0.03	0.04	22787
Intragroup Loans (gr.)	BIS IBS	0.01	0.44	-0.25	0.17	6693
Interbank Loans (gr.)	BIS IBS	0.02	0.50	-0.35	0.28	16140
Non-Bank Loans (gr.)	BIS IBS	0.0240	0.3090	-0.0960	0.0780	22787
Intragroup Dummy	BIS IBS	0.2660	0.4420	0.0000	1.0000	22787
GDP Growth (yoy, %)	IMF WEO	2.5510	1.9140	1.4620	3.1170	22787
Credit Growth (yoy, %)	BIS/IMF IFS[a]	-0.0060	0.0410	-0.0240	0.0200	22787
Inflation (yoy, %)	IMF WEO	1.7770	1.8660	0.6630	2.1770	22787
Intragroup Loans (Stock, £000s)	BIS IBS	2461931	7122548	-62311	80870000	5325
Non-Bank Loans (Stock, £000s)	BIS IBS	1840663	10250000	1	210900000	5325
Δ Rule of Law Estimate	WGI	-0.0220	0.0680	-0.2600	0.2290	22787
Δ Regulatory Quality Estimate	WGI	0.0090	0.1020	-0.2750	0.2840	22787
Δ Financial Openness	Chinn/Ito[b]	0.0000	0.0370	-0.2830	0.2830	21369
Fiscal Surplus/Deficit (%)	IMF WEO	-1.0740	2.7850	-8.9910	6.0220	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 using regression specifications (1) and (2). Our headline results are reported in Table 2.

First, we examine the effect of changes in services-trade restrictions on the direct cross-border lending growth of banks without an affiliate presence in the receiving country using regression specification (1), as shown in column (1). These banks, without intragroup positions, see a significant reduction in cross-border non-bank lending growth following a tightening of services-trade restrictions in receiving countries—and vice versa for a loosening. This is consistent with our hypothesis around the that a tightening in restrictions makes the country which tightened restrictions a less desirable environment to lend to. Contrary to this logic, however, the coefficient estimates in column (2) indicate that banks with intragroup positions in receiving countries see a significant increase in non-bank cross-border lending growth following a tightening of commercial-banking services-trade restrictions abroad—especially so after one year.

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 columns (3) and (4). The cross-border non-bank lending growth of UK-based banks

Table 2: Coefficient Estimates for Regressions (1) and (2)

	(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
$\Delta STRI_{c,t}$	-0.8372**	0.7307	-0.6981*		-1.7566*
	(0.4138)	(0.8896)	(0.3977)		(1.0467)
$\Delta STRI_{c,t-4}$	-0.3114	1.8978**	-0.1975		-1.7716*
	(0.4105)	(0.8650)	(0.3899)		(1.0101)
Sum	*-1.149***	*2.629***	*-0.896*		*-3.528***
p-value	*0.069*	*0.040*	*0.127*		*0.020*
$\Delta STRI_{c,t} \times \mathbb{1}_{b,c,t}$			0.6421	1.0895	
			(0.7261)	(0.7176)	
$\Delta STRI_{c,t-4} \times \mathbb{1}_{b,c,t}$			1.4599**	1.4465*	
			(0.7432)	(0.7536)	
Sum			*2.102***	*2.536****	
p-value			*0.024*	*0.006*	
$\mathbb{1}_{b,c,t}$			0.0025	0.0017	
			(0.0061)	(0.0060)	
Lagged GDP Growth	0.0007	0.0062	0.0015		0.0107
	(0.0021)	(0.0047)	(0.0019)		(0.0067)
Lagged Credit Growth	-0.0907	-0.5359**	-0.1548		-0.4767
	(0.1067)	(0.2549)	(0.0969)		(0.3297)
Lagged Inflation	0.0017	0.0061	0.0021		-0.0097
	(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	0.1526	0.2153	0.1197	0.1479	0.1818
Adj. R-squared	0.0288	0.0264	0.0214	0.0296	-0.0124
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.

with intragroup positions in receiving countries responds significantly differently to changes in services-trade restrictions abroad *vis-à-vis* UK-based banks without intragroup positions.

However, for a bank with a foreign affiliate, by definition, direct cross-border lending is not the only option. To get a fuller picture of their lending, we examine column (5), which focuses on the impact of commercial-banking services-trade restrictions on UK-based banks' intragroup lending growth using regression specification (1). The negative, and significant, coefficients indicate that a tightening of services-trade restrictions in receiving countries is associated with a reduction in intragroup lending growth from UK-based banks, even though their non-bank lending increases—and vice versa for loosenings.

The substitution in lending that we uncover for international banks (with affiliates abroad) in response to services-trade restrictions also appears to be economically significant. Taking into account the fact that, on average, the stock of intragroup loans and non-bank loans is of similar size across countries (see Table 1), the estimated coefficients in Table 2 imply that for the average cross-border relation, around half of the change in intragroup funding in response to changes services-trade restrictions in recipient countries is substituted by an opposing change in direct cross-border lending to non-banks.

This substitution, indicative of change 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 (5). When combined with the results in columns (3) and (4), 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 to a country—both because it is now easier to do business with that country, but also because it can encourage 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 con-

trast, following a tightening of restrictions, banks lend less from within the country and instead do it at "arm's length" 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 a Appendix A.

Excluding Banks Headquartered in Receiving Countries. Given the importance of intragroup positions for our results, we carry out a robustness exercise where we exclude UK-based banks b headquartered in receiving country c. For example, a bank headquartered in receiving countries may more readily be able to substitute lending towards non-bank lenders, following a tightening of services-trade restrictions, owing to their superior domestic information; additionally some of the restrictions may not apply to them or may even advantage them.

Table 5 reports a version of Table 2, where all banks headquartered in receiving countries have been excluded from our sample. Our headline results are robust to this exclusion. Intragroup 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).

Tightening vs. Loosening of Services Trade Restrictions. In Tables 6 and 7, we report the results of a robustness exercise where we consider only-tightening and only-loosening of commercial banking services-trade restrictions, respectively. This allows us to assess whether there are differences depending on the direction of change in trade restrictions.

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. Interestingly, however, column (5) of Tables 6 and 7 indicate that these differences are more marked, and only strongly significant, for services trade loos-

ening. In response to looser services-trade restrictions, banks with intragroup positions reduce their direct non-bank lending growth, and substitute it for intragroup lending.

Controlling for Additional Factors. In Table 8, 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.

Columns (1) and (2) show that our headline results for services-trade restrictions are robust to extending regressions (1) and (2) with an additional control for changes in the 'rule of law'—a quantitative assessment of the extent to which countries adhere to the rule of law in practice based on the Worldwide Governance Indicators (WGI).[11] Columns (3) and (4) accounts for changes in regulatory quality – an index that captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private-sector development (data also from WGI). Columns (5) and (6) demonstrate that our headline results are robust when controlling for changes in capital account openness (Chinn and Ito, 2006). Columns (7) and (8) includes a measure of net government lending/borrowing from the IMF's WEO database. As column (7) shows, larger fiscal surpluses or smaller deficits are associated with lower intragroup lending growth, but our main results are again robust. Column (9) expands our robustness checks with the macroeconomic controls we employ in the baseline—specifically: GDP growth, inflation and credit growth—by additionally interacting these terms with the intragroup dummy. These macroeconomic factors do not appear to be associated with any differential effects for banks with and without intragroup positions with regard to their lending growth to non-banks and the main results are robust. Finally, columns (10) and (11) demonstrate that our results are robust to alternative thresholds for intragroup exposures.[12]

Interbank Lending. We have not focused on lending to non-related banks given our interest in the direct substitution effects between local intermediation of credit to non-bank customers via affiliates and direct cross-border intermediation to non-bank customers. In this way, we can be confident that the substitution we uncover is happening *within* a banking group and so reflects an adaption of a bank's business model. Nevertheless, lending to non-related banks (i.e. interbank lending) could (in principle) be impacted by services-trade restrictions abroad as

---

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

[12]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%.

well as a range of other forces, including a general country effect (as we observe for non-bank lending of banks without affiliates). It may also potentially be affected by a decline in lending to the local affiliates of other foreign banks also affected by the regulations, as well as a change in lending to domestic banks (with the sign of the change again determined by general country effects vs. possible substitution effects). The results in Table 9 indicate no significant effect of restrictions on interbank lending growth across all UK-based banks, as well as no significant difference in non-bank lending by banks with or without affiliates.

4.3   Heterogeneity Across Types of Services Trade Restrictions

We now 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 areas, reflecting the characteristics of the sector and the policy environment in which it operates. 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.

Tables 3 and 4 report 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 in Tables 3 and 4: 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

Table 3: Coefficient Estimates for Regressions (1) and (2) Using Different Types of Banking Services Trade Restrictions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Restriction Type:	Restrictions on Foreign Entry			Restrictions on Movement of People			Barriers to Competition		
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
Bank Type:	with In-tragroup	with In-tragroup	with In-tragroup	with In-tragroup	with In-tragroup	with In-tragroup	with In-tragroup	with In-tragroup	with In-tragroup
$\Delta STRI_{c,t}$	-0.1589	-1.1221**		-3.6174	0.5812		-2.3576	0.5829	
	(1.3433)	(0.5484)		(4.9222)	(1.5771)		(2.4715)	(0.9289)	
$\Delta STRI_{c,t-4}$	1.1248	-0.6052		-7.0978	-1.2141		-4.8821**	0.1224	
	(1.4207)	(0.6806)		(4.4174)	(1.2599)		(2.1853)	(0.9276)	
Sum	0.966	-1.727*		-10.72	-0.633		-7.240*	0.705	
p-value	0.653	0.065		0.169	0.776		0.052	0.634	
$\Delta STRI_{c,t} \times \mathbb{1}_{b,c,t}$		1.3449	1.3957		1.3867	1.7034		1.7842	2.1236
		(1.0314)	(1.0262)		(3.2760)	(3.1799)		(1.6983)	(1.6662)
$\Delta STRI_{c,t-4} \times \mathbb{1}_{b,c,t}$		-0.6059	-0.4750		2.2195	1.5713		3.7192**	3.7545**
		(1.0246)	(1.0434)		(2.7846)	(2.8849)		(1.6070)	(1.6137)
Sum		0.739	0.921		3.606	3.2750		5.503**	5.878**
p-value		0.563	0.472		0.378	0.425		0.026	0.017
$\mathbb{1}_{b,c,t}$		0.0018	0.0012		0.0025	0.0020		0.0020	0.0014
		(0.0062)	(0.0060)		(0.0061)	(0.0059)		(0.0061)	(0.0059)
$f_{b,t}$	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
f_c and $\mathbf{x}_{c,t}$	Yes	Yes	N/A	Yes	Yes	N/A	Yes	Yes	N/A
$f_{c,t}$	No	No	N/A	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
R-squared	0.1811	0.1196	0.1480	0.1814	0.1195	0.1479	0.1817	0.1198	0.1482
Cluster	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) and (9), 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 4: Coefficient Estimates for Regressions (1) and (2) Using Different Types of Banking Services Trade Restrictions

	(10)	(11)	(12)	(13)	(14)	(15)
Restriction Type:	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
Bank Type:	with In-tragroup	with In-tragroup	with In-tragroup	with In-tragroup	with In-tragroup	with In-tragroup
$\Delta STRI_{c,t}$	-0.0952	-1.6277**		-0.6938	-1.3434	
	(1.7676)	(0.8282)		(3.2945)	(1.2634)	
$\Delta STRI_{c,t-4}$	-0.6469	0.3901		-6.1865*	0.1863	
	(2.0472)	(0.7635)		(3.6602)	(1.7546)	
Sum	-0.742	-1.238		-6.880	-1.157	
$p\text{-}value$	0.797	0.318		0.212	0.620	
$\Delta STRI_{c,t} \times \mathbb{1}_{b,c,t}$		-0.8578	-0.0531		3.0147	3.4676
		(1.3711)	(1.3718)		(2.2470)	(2.2168)
$\Delta STRI_{c,t-4} \times \mathbb{1}_{b,c,t}$		-0.1438	0.3506		6.0165**	6.6234***
		(1.4224)	(1.4087)		(2.3648)	(2.4396)
Sum		-1.002	0.298		9.031***	10.09***
$p\text{-}value$		0.611	0.877		0.006	0.003
$\mathbb{1}_{b,c,t}$		0.0024	0.0023		0.0026	0.0020
		(0.0062)	(0.0060)		(0.0061)	(0.0059)
$f_{b,t}$	Yes	Yes	Yes	Yes	Yes	Yes
f_c and $\mathbf{x}_{c,t}$	Yes	Yes	N/A	Yes	Yes	N/A
$f_{c,t}$	No	No	Yes	No	No	Yes
Obs.	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
Cluster	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 (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.

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 (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 by banks with offices in an international financial centre. For banks without an affiliate presence abroad, we show that tighter (looser) services restrictions abroad are associated with reductions (increases) in their cross-border lending growth from their UK-based office. This is consistent with the logic that services-trade restrictions can change the cost of cross-border intermediation.

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 other words, changes in services-trade restrictions do not just change the *quantity* lending to

a country, but also the *manner* in which it is done. 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.

References

AIYAR, S., C. W. CALOMIRIS, AND T. WIELADEK (2014): "Does Macro-Prudential Regulation Leak? Evidence from a UK Policy Experiment," *Journal of Money, Credit and Banking*, 46, 181–214.

AMITI, M., S. H. KONG, AND D. WEINSTEIN (2020): "The Effect of the U.S.-China Trade War on U.S. Investment," NBER Working Papers 27114, National Bureau of Economic Research, Inc.

BAIER, S. L. AND J. H. BERGSTRAND (2007): "Do free trade agreements actually increase members' international trade?" *Journal of International Economics*, 71, 72–95.

BANERJEE, R. N., L. GAMBACORTA, AND E. SETTE (2021): "The real effects of relationship lending," *Journal of Financial Intermediation*, 48.

BARATTIERI, A. (2014): "Comparative advantage, service trade, and global imbalances," *Journal of International Economics*, 92, 1–13.

BECK, T., H. DEGRYSE, R. DE HAAS, AND N. VAN HOREN (2018a): "When arm's length is too far: Relationship banking over the credit cycle," *Journal of Financial Economics*, 127, 174–196.

BECK, T., V. IOANNIDOU, AND L. SCHÄFER (2018b): "Foreigners vs. Natives: Bank Lending Technologies and Loan Pricing," *Management Science*, 64, 3792–3820.

BECK, T., S. LLOYD, D. REINHARDT, AND R. SOWERBUTTS (2023): "Macro-Financial Policy in an International Financial Centre: The United Kingdom Experience since the Global Financial Crisis," in *Macro-Financial Stability Policy in a Globalised World: Lessons from International Experience*, ed. by C. Borio, E. Robinson, and H. S. Shin, World Scientific.

BEVERELLI, C., M. FIORINI, AND B. HOEKMAN (2017): "Services trade policy and manufacturing productivity: The role of institutions," *Journal of International Economics*, 104, 166–182.

BOLTON, P., X. FREIXAS, L. GAMBACORTA, AND P. E. MISTRULLI (2016): "Relationship and Transaction Lending in a Crisis," *Review of Financial Studies*, 29, 2643–2676.

BORCHERT, I., B. GOOTIIZ, AND A. MATTOO (2014): "Policy Barriers to International Trade in Services: Evidence from a New Database," *The World Bank Economic Review*, 28, 162–188.

BUCH, C. M. AND L. S. GOLDBERG (2017): "Cross-Border Prudential Policy Spillovers: How Much? How Important? Evidence from the International Banking Research Network," *International Journal of Central Banking*, 13, 505–558.

BUSSIÈRE, M., J. CAO, J. DE HAAN, R. HILLS, S. LLOYD, B. MEUNIER, J. PEDRONO, D. REINHARDT, S. SINHA, R. SOWERBUTTS, AND K. STYRIN (2021a): "The interaction between macroprudential policy and monetary policy: Overview," *Review of International Economics*, 29, 1–19.

BUSSIÈRE, M., R. HILLS, S. LLOYD, B. MEUNIER, J. PEDRONO, D. REINHARDT, AND R. SOWERBUTTS (2021b): "Le Pont de Londres: Interactions between monetary and prudential policies in cross-border lending," *Review of International Economics*, 29, 61–86.

CETORELLI, N. AND L. GOLDBERG (2012): "Banking Globalization and Monetary Transmission," *Journal of Finance*, 67, 1811–1843.

CHINN, M. D. AND H. ITO (2006): "What matters for financial development? Capital controls, institutions, and interactions," *Journal of Development Economics*, 81, 163–192.

DE HAAS, R. AND N. VAN HOREN (2013): "Running for the Exit? International Bank Lending During a Financial Crisis," *Review of Financial Studies*, 26, 244–285.

FEDERICO, S., F. HASSAN, AND V. RAPPOPORT (2020): "Trade Shocks and Credit Reallocation," CEPR Discussion Papers 14792, C.E.P.R. Discussion Papers.

FORBES, K., D. REINHARDT, AND T. WIELADEK (2017): "The spillovers, interactions, and (un)intended consequences of monetary and regulatory policies," *Journal of Monetary Economics*, 85, 1–22.

GOPINATH, G. AND J. C. STEIN (2021): "Banking, Trade, and the Making of a Dominant Currency," *The Quarterly Journal of Economics*, 136, 783–830.

HILLS, R., D. REINHARDT, R. SOWERBUTTS, AND T. WIELADEK (2017): "International Banking and Cross-Border Effects of Regulation: Lessons from the United Kingdom," *International Journal of Central Banking*, 13, 404–433.

HOUSTON, J. F., C. LIN, AND Y. MA (2012): "Regulatory Arbitrage and International Bank Flows," Working Papers 152012, Hong Kong Institute for Monetary Research.

JOY, M., N. LISACK, S. LLOYD, D. REINHARDT, R. SAJEDI, AND S. WHITAKER (2018): "Mind the (current account) gap," Bank of England Financial Stability Papers 43, Bank of England.

MIROUDOT, S., J. SAUVAGE, AND B. SHEPHERD (2013): "Measuring the cost of international trade in services," *World Trade Review*, 12, 719–735.

NIEPMANN, F. AND T. SCHMIDT-EISENLOHR (2017): "International trade, risk and the role of banks," *Journal of International Economics*, 107, 111–126.

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.

REINHARDT, D. AND R. SOWERBUTTS (2015): "Regulatory arbitrage in action: evidence from banking flows and macroprudential policy," Bank of England working papers 546, Bank of England.

ROUZET, D., H. K. NORDÅS, F. GONZALES, M. G. GROSSO, I. LEJÁRRAGA, S. MIROUDOT, AND A. UENO (2014): "Services Trade Restrictiveness Index (STRI): Financial Services," OECD Trade Policy Papers 175, OECD Publishing.

THAKOR, A. V. AND A. BOOT, eds. (2008): *Handbook of Financial Intermediation and Banking*, no. 9780444515582 in Elsevier Monographs, Elsevier.

WORLD TRADE ORGANISATION (2019): *World Trade Report*.

Supplementary Appendix

A Robustness Analysis

Table 5: 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 In-tragroup	with In-tragroup	with In-tragroup	with In-tragroup	with In-tragroup
$\Delta STRI_{c,t}$		-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 6: Coefficient Estimates for Regressions (1) and (2) Focusing on Tightenings 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 In-tragroup	with In-tragroup	with In-tragroup	with In-tragroup	with In-tragroup
$\Delta STRI_{c,t}$		-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 7: 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 In-tragroup	with In-tragroup	with In-tragroup	with In-tragroup	with In-tragroup
$\Delta STRI_{c,t}$	-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 8: 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* (1.0171)		-2.1291** (1.0299)				
Sum / *p-value*	-3.631** / 0.017		-3.487** / 0.024		-3.639** / 0.018		-3.950** / 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 / *p-value*		2.580*** / 0.005		2.786*** / 0.003		2.892*** / 0.005		2.448*** / 0.009	2.584** / 0.016	2.650*** / 0.007	2.152** / 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.

Table 9: Coefficient Estimates for Regressions (1) and (2) Focusing on Interbank Lending

	(1)	(2)	(3)
Loan type:	to Interbank	to Interbank	to Interbank
$\Delta STRI_{c,t}$	-0.2087	0.2335	
	(0.6836)	(0.7823)	
$\Delta STRI_{c,t-4}$	0.1090	0.2078	
	(0.7032)	(0.7951)	
Sum	*-0.100*	*0.441*	
p-value	*0.924*	*0.705*	
$\Delta STRI_{c,t} \times \mathbb{1}_{b,c,t}$		-1.6159	-1.4223
		(1.2209)	(1.2116)
$\Delta STRI_{c,t-4} \times \mathbb{1}_{b,c,t}$		-0.3131	-0.5454
		(1.2976)	(1.2928)
Sum		*-1.929*	*-1.968*
p-value		*0.244*	*0.227*
$\mathbb{1}_{b,c,t}$		0.0142	0.0163
		(0.0118)	(0.0116)
Lagged GDP Growth	0.0054	0.0054	
	(0.0035)	(0.0035)	
Lagged Credit Growth	-0.5157**	-0.5128**	
	(0.2002)	(0.2000)	
Lagged Inflation	0.0077	0.0078	
	(0.0057)	(0.0057)	
$f_{b,t}$	Yes	Yes	Yes
f_c	Yes	Yes	N/A
$f_{c,t}$	No	No	Yes
Obs.	16,140	16,140	16,729
R-squared	0.1308	0.1310	0.1616
Adjusted R-squared	0.0170	0.0170	0.0182
Cluster	Bank-time	Bank-time	Bank-time

Notes: This table presents coefficient estimates from estimating equations (1) and (2). The dependent variable is cross-border interbank loan growth. In columns (2)-(3), 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.