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financial centre: the United Kingdom  
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## Abstract

We describe the macroprudential and monetary policy environment in the United Kingdom (UK). We highlight the UK's position as an international financial centre, and the implications for inward and outward spillover effects of monetary and prudential policy actions. These spillovers pose particular opportunities and challenges for policymakers, and we explain how they have motivated specific developments to the Bank of England's modelling framework. We also present novel empirical evidence that monetary policy actions in the UK have outward spillover effects through cross-border lending that can, in part, be mitigated by macroprudential actions in receiving countries.

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# Macro-financial policy in an international financial centre: the United Kingdom experience since the global financial crisis\*

Thorsten Beck,<sup>+</sup> Simon Lloyd,<sup>♦</sup> Dennis Reinhardt<sup>♦</sup> and Rhiannon Sowerbutts<sup>♦</sup>

September 23, 2021

## Abstract

We describe the macroprudential and monetary policy environment in the United Kingdom (UK). We highlight the UK's position as an international financial centre, and the implications for inward and outward spillover effects of monetary and prudential policy actions. These spillovers pose particular opportunities and challenges for policymakers, and we explain how they have motivated specific developments to the Bank of England's modelling framework. We also present novel empirical evidence that monetary policy actions in the UK have outward spillover effects through cross-border lending that can, in part, be mitigated by macroprudential actions in receiving countries.

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# 1. Introduction

In the years following the Global Financial Crisis (GFC), policy authorities in the United Kingdom (UK) have drawn on a range of tools to help maintain financial and monetary stability – the combination of which we henceforth refer to as ‘macro-financial stability’. As in many other countries, these tools were not used prior to the GFC in the UK, and great effort has gone into understanding their transmission mechanisms in the last decade.

The framework for financial stability, in particular, has been overhauled since the GFC, with a host of reforms – including the creation of a resolution regime for banks, structural reforms to the banking sector and the development of the prudential policy toolkit – being undertaken. For this chapter, the most relevant reform has been the creation of a Financial Policy Committee (FPC) of the Bank of England to oversee the stability of the financial system as a whole, thus taking a systemic view. Alongside this, powers of individual bank supervision, which were previously based in a separate institution, were moved to the Bank of England’s Prudential Regulation Authority (PRA).

Focusing on the Bank’s financial stability objective, the FPC sets macroprudential policy in the UK. To date, their primary policy tool has been the countercyclical capital buffer (CCyB). The FPC sets the UK CCyB rate so that banks and certain investment firms hold an amount of capital in proportion to their UK real-sector exposures. The FPC has also used tools in the housing market to limit the build-up of aggregate debt. Recent years have seen innovations to the CCyB – in particular, the issuance of forward guidance on the CCyB from March 2020 in the context of the Covid-19 (Covid) pandemic emergency measures.

While the institutional setup for monetary policy has not undergone such a marked overhaul since the GFC, the Bank’s Monetary Policy Committee (MPC) has gone beyond traditional short-term policy rates – which first reached historically low levels in March 2009 and, in more recent years, have been lowered further. The ‘unconventional’ monetary policy tools used by the MPC encompass purchases of government bonds on the secondary market, corporate bond purchases and forward guidance about the future path of the monetary policy rate.

These macroprudential and monetary policy tools are set against the backdrop of the UK as an International Financial Centre (IFC), hosting major financial activities, with a significant share performed by foreign international banking groups. The UK’s position as an IFC, with links to the rest of the world, creates opportunities and challenges for the macro-financial policy framework. On the one hand, changes to the global economic environment could affect the UK economy and UK financial stability through UK-based banks’ exposures to vulnerable economies, as well as broader macroeconomic spillovers, such as trade and asset prices. On the other hand, the economic events in the UK can generate spillovers to the rest of the world and, in turn, spillbacks that influence the UK.

With such a global reach, the safety and openness of the world economy, and international financial stability more broadly, are of primary importance for UK macro-financial stability. In the years after the GFC, the preservation of this ‘public good’ has required a commitment to institution building both internationally and domestically (Bailey, 2021). The global Financial Stability Board (FSB), with a mandate to promote international financial stability underpinned by strong regulation, has been supported by other standard-setting bodies – including the Basel Committee for banks, IOSCO for markets, the IAIS for insurance, and the CPMI for payment and markets infrastructure. In addition to contributions to these global bodies, the Bank of England has sought to develop its own modelling tools to account for the influence of global conditions on the UK’s macro-financial outlook when setting its policy tools.

The backdrop of global interconnectedness leaves open the possibility that UK policy tools, such as its monetary and macroprudential measures, could interact with similar tools used elsewhere. For example, a policy action in the UK, with the aim of improving financial-sector resilience domestically, may have additional effects abroad that could, in turn, spill back to the UK – amplified or dampened by policy actions abroad. These global policy interactions are the subject of a nascent academic literature, to which our work contributes.

In this chapter, we survey the UK’s macro-financial policy framework, discussing how the UK’s position as an IFC has influenced its policymaking framework and analysing the relevance of global policy interactions. We do so, first, by outlining the UK’s recent experience in deploying macroprudential and monetary policies to maintain domestic financial and price stability – in particular in the years following the GFC up to the Covid pandemic. We then discuss the modelling tools that have been developed to help analyse risks arising from international spillovers and spillbacks. We then provide novel evidence to assess the spillover effects of UK policies through UK banks’ cross-border lending, and study how UK policies interact with other policies enacted abroad.

Formally, we study how changes in UK monetary policy can generate spillovers through UK-based banks’ external lending. Tighter UK monetary policy is associated with a sizeable reduction in cross-border lending from the UK. However, we find that this spillover is materially offset by prudential policy actions in destination countries, helping to insulate them partially from these spillovers.

The remainder of this chapter is structured as follows. In section 2, we discuss the institutional and political economy background for monetary and macroprudential policies in the UK. Specifically, we discuss the role of MPC, FPC and PRA in policymaking and their interaction (including through overlapping committee membership). In section 3, we focus on the UK’s role as an IFC, with a large number of cross-border bank subsidiaries and branches and a high share of cross-border lending. Section 4 offers a literature survey on the global spillover effects of monetary and prudential policy actions. Section 5 presents empirical evidence on the outward spillover effects of UK monetary policy actions and the role of prudential policy in mitigating their impact. Section 6 concludes.

## 2. Monetary and macroprudential policy in the UK

This section describes the institutional framework within which the Bank of England sets macroprudential and monetary policy, highlighting some of the institutional changes within the supervisory architecture and major policy actions taken by the Bank's Committees since the GFC.

While the capital of the Bank is held by the Treasury Solicitor on behalf of HM Treasury it is usually considered to be an operationally independent Central Bank, free from everyday government interference. This has been reinforced in the Bank of England Act 1998, which defines the Bank's objectives. The Act covers, amongst other things, the Bank's monetary and financial stability objectives.

In relation to monetary policy, the Bank has a mandate to maintain price stability – currently defined as targeting consumer price index inflation at 2%. With relation to financial policy, the FPC is charged with contributing to UK financial stability primarily by identifying, monitoring and taking action to remove or reduce systemic risks with a view to protecting and enhancing the resilience of the UK financial system. In addition, for both monetary and financial policy, the Bank has a secondary objective to support the economic policy of the UK government, including its objectives for growth and employment.

The functions that underpin these objectives are principally, but not entirely, discharged by the MPC and the FPC – which we focus on in this chapter – as well as the PRA. While the PRA took over microprudential supervision from the Financial Services Authority (FSA) in 2012, the FPC focuses on macroprudential oversight. Although each Committee is independent of one another, there is significant overlap in membership and all three are chaired by the Governor of the Bank of England. This institutional structure, and array of available policy tools for financial stability, was formed after the GFC in the context of the Basel III process. The Bank forms part of the Basel Committee of Bank Supervision and the FSB.

The institutional structure provides for independent decision structures and processes across monetary, macroprudential and microprudential policies, in line with arguments that:

- (i) consolidating responsibilities in one institution can help to avoid coordination failure and account for the interdependence of the policies;
- (ii) monetary policy authorities can benefit from supervisory information when forming monetary policy decisions; and
- (iii) supervisors can benefit from the independence and reputation of the central bank in a consolidated structure.

Other countries (e.g., some of the Nordic countries) have independent monetary and prudential authorities, based on arguments that:

- (i) the reputation of the central bank and, in turn, its credibility and effectiveness could be negatively impacted by damages to the reputation of the supervisor following bank failures; and

- (ii) there could be distortions in decision making, such as deviation from the optimal conduct of monetary policy in an attempt to preserve the stability of financial institutions.

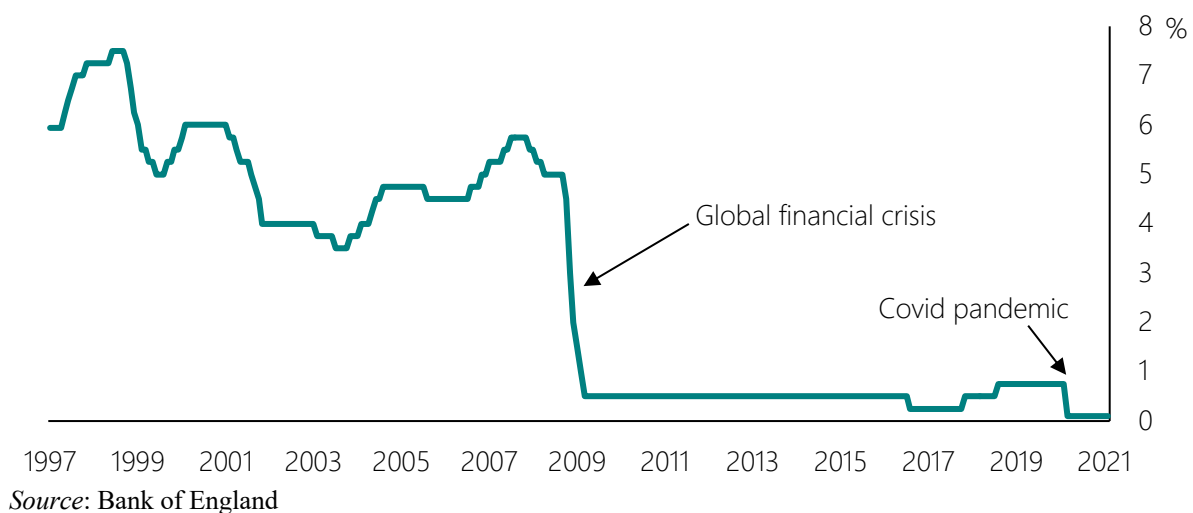
Having separate Committees with individual policymaking responsibilities, like the Bank, can help to address this second concern.<sup>1</sup>

## Monetary policy

The MPC was founded in 1997 and granted operational responsibility to set policy instruments to achieve its inflation target by the Chancellor of the Exchequer. The Committee comprises nine members – the Governor, the three Deputy Governors for Monetary Policy, Financial Stability, and Money and Banking, the Chief Economist and four external members appointed directly by the Chancellor. A non-voting representative from HM Treasury attends the MPC’s policy meetings as an observer.

There are eight scheduled MPC meetings each year, though additional meetings can be held at any time if warranted. The MPC sets the Bank’s monetary policy tools, by majority vote, at these meetings. Bank staff brief the Committee on the latest data and analysis on the economy – including an assessment of the global economy and the channels through which global events might spill over to the UK – ahead of their policy decision.<sup>2</sup> In its early years, the Committee voted solely on the level of the Bank of England base rate (Bank Rate). **Figure 1** plots the path of Bank Rate since the MPC’s creation in mid-1997. While there have been changes to the monetary framework over the years, in the current system Bank Rate determines the interest rate paid to commercial banks with accounts at the Bank of England. In turn, a change in Bank Rate can transmit to the macroeconomy by influencing other interest rates in the economy and thus altering incentives for households and businesses to consume and invest.<sup>3</sup>

**Figure 1** – UK official Bank Rate history



<sup>1</sup> For a comprehensive discussion and literature survey, see Ampudia et al. (2019).

<sup>2</sup> The MPC has met eight times a year since 2015, but prior to this it met more frequently.

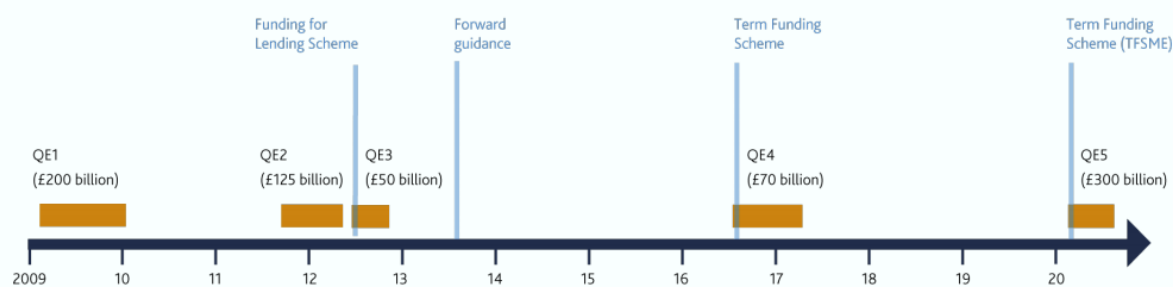
<sup>3</sup> The ‘monetary transmission mechanism’, which summarises how changes in Bank rate can influence the macroeconomy, is described in Bank of England (1999).



As was the case in other major advanced economies, the GFC motivated innovations to the UK’s monetary policy framework in order to achieve the MPC’s remit. As Figure 1 shows, the MPC cut Bank Rate significantly. In March 2009, it reached the then historical low level of 0.5%, spurring the development of ‘unconventional’ monetary policies aimed at providing additional monetary stimulus by lowering long-term interest rates when the short-term policy rate was at, or close to, its effective lower bound.

Quantitative easing (QE) – large-scale purchases of financial assets financed by the creation of central bank reserves – was a major component of the Bank’s unconventional policy toolkit, first introduced in March 2009. The MPC made £200bn of asset purchases during 2009-2010, with UK government bonds (gilts) making up the vast majority of assets purchased. These gilts were purchased on secondary bond markets, predominantly from dealers acting on behalf of non-bank private sector institutions such as insurance companies and pension funds. **Figure 2** summarises subsequent rounds of QE enacted by the Bank, including additional purchases in August 2016 following the EU withdrawal referendum.

**Figure 2** – A timeline of Bank of England unconventional monetary policies



Source: Bailey, Bridges, Harrison, Jones and Mankodi (2020)

In response to the economic disruption from the Covid pandemic, the MPC extended its QE programme further from March 2020. This accompanied a Bank Rate cut to 0.1%, a new historical low, as well as coordinated policy action by the FPC – discussed in **Box 2**. At the start of 2021, the total stock of assets purchased as part of the Bank’s QE programme stood at £745bn, including both government and corporate bonds.

## Macroprudential policy

With primary responsibility for protecting and enhancing the resilience of the UK financial system to systemic risks, the Bank’s FPC has powers to set a range of macroprudential tools, including powers of recommendation to reduce risks to financial stability.<sup>4</sup> The Committee was formed in the aftermath of the GFC, modelled on the MPC, as part of a new system of regulation to improve financial stability after the crisis. The FPC normally has thirteen members. Six of them are Bank of England staff: the Governor, four Deputy Governors, and

<sup>4</sup> Formally, the FPC has powers of direction in respect of sectoral capital requirements for UK firms, a leverage ratio requirement for UK firms, loan-to-value and debt-to-income limits for UK mortgages on owner-occupied properties, and loan-to-value and cover ratio limits for UK mortgages on buy-to-let properties.

the Executive Director for Financial Stability Strategy and Risk, five external members, the Chief Executive of the Financial Conduct Authority (FCA), and one non-voting member from HM Treasury.

An interim FPC first met on a quarterly basis in June 2011, although the Committee was granted its powers in 2013 following amendments made to the Bank of England Act 1998 by the Financial Services Act 2012. Like the MPC, the FPC is briefed by Bank staff – on, amongst other things, the key systemic risks to the UK, including an assessment of global risks and the channels through which these might spillover to the UK – ahead of their policy decision.

Since 2016, the FPC has set a CCyB rate for the UK, with the primary objective of ensuring that the banking system is able to withstand stress without restricting essential services, such as the supply of credit, to the real economy. The FPC’s task is not to achieve resilience at any cost.<sup>5</sup> The buffer is therefore intended to be varied – both up and down – in line with systemic risk in the banking system. By increasing the CCyB when risks are judged to be increasing, banks have an additional cushion of capital with which to absorb potential losses, enhancing their resilience and helping to ensure the stable provision of financial intermediation services. When credit conditions weaken, the CCyB can be reduced to free-up capital for banks, mitigating a potential contraction in the supply of lending to households and businesses. The FPC aims to act early and change the CCyB gradually, thus reducing its economic costs in terms of lending. Banks will, in general, have twelve months after the FPC decides to increase the buffer before the higher must be used for calculating institution specific capital buffers. A decision to decrease the CCyB, on the other hand, takes effect immediately.

The CCyB applies to all banks, building societies and investment firms (other than those exempted by the FCA) incorporated in the UK on their relevant UK exposures and is applied at both individual entity and consolidated group levels. Reciprocity provisions apply also to internationally active banks in jurisdictions that have implemented the Basel III regulatory standards. At the same time, the Bank of England reciprocates other countries’ CCyB rates on UK banks’ foreign exposures.

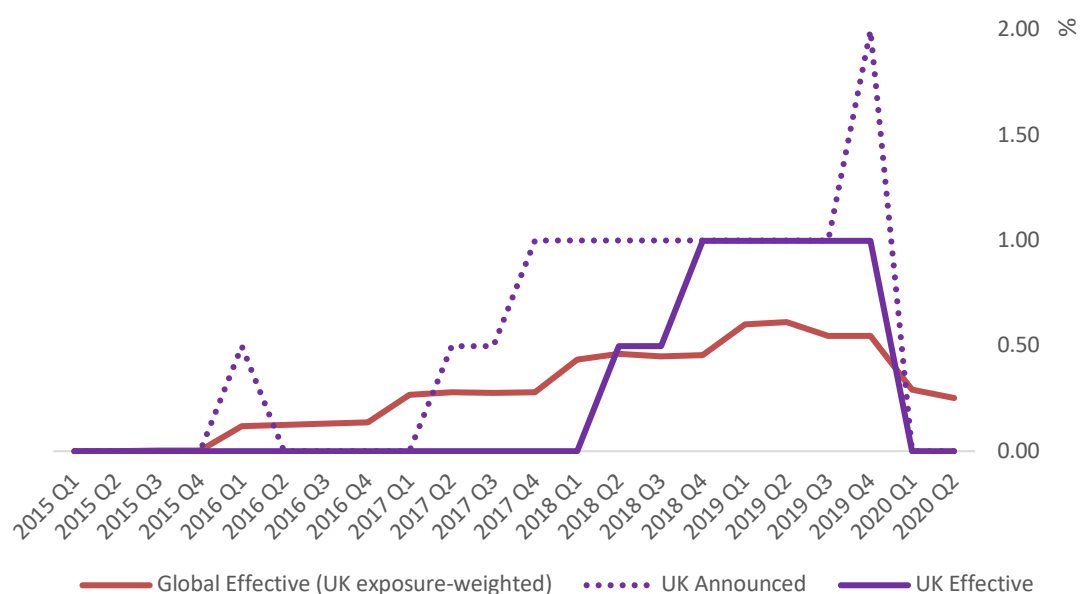
**Figure 3** presents a history of the announced and effective UK CCyB rate in a global context.<sup>6</sup> The countercyclical nature of the buffer has been demonstrated on two occasions in the UK. First, following the UK referendum, the planned 0.5 percentage point increase in the rate was reversed in July 2016, with the announced rate returning to 0%. In June 2017, the FPC raised the UK CCyB rate from 0% to 0.5% and in November 2017 to 1%. In December 2019, a further increase to 2% (effective December 2020) was announced. In March 2020, however, the FPC decided to reduce the rate to zero, as part of a coordinated package of pandemic crisis measures adopted by the Bank of England (see **Box 2**).

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<sup>5</sup> Its actions should not, in the provisions of the Financial Services Act 2012, have “a significant adverse effect on the capacity of the financial sector to contribute to the growth of the UK in the medium or long term”.

<sup>6</sup> Owing to a 1-year implementation lag, not all of the announced UK CCyB rate announcements have applied in practice.

**Figure 3 – The UK CCyB rate in global context**



Notes: Effective CCyB rates. Source: ESRB, HKMA, BIS, national authorities’ websites. Information up to 2020 Q2. The global (excluding the UK) effective rate are foreign CCyB’s weighted by UK-owned banks consolidated exposures to the non-bank non-financial sector in foreign countries.

The UK CCyB rate only applies to relevant UK credit exposures. This means that an increase in the UK CCyB does not fully pass through to an increase in capital requirements. The particularly international nature of the UK banking system means that a 1% increase in the UK CCyB rate leads to an increase of around 0.4% in capital requirements on average. There is obviously considerable heterogeneity for individual banks in the UK with some – particularly the small building societies – being very UK focused while other UK banks are much more globally focused.

In addition to the countercyclical capital buffer the FPC has also recommended measures on mortgages. Notably an affordability test for mortgages based on an interest rate stress and a portfolio limit of 15% on the number of mortgages that can be extended at a loan-to-income ratio of 4.5 or greater.

In addition to formal powers such as the CCyB and its LTI limits, the FPC has also been active in a number of areas through its regular communications, and coordination with other Committees and regulators. For example, in July 2016, the FPC and MPC held a joint meeting on the leverage ratio in July 2016 (discussed in **Box 1**), and coordinated their responses to the Covid pandemic in 2020 (see **Box 2**). More recently, the FPC has been working closely with the FCA, HM Treasury and counterparts in the FSB to develop common approaches to enhance the resilience of the non-bank financial system.

***Box 1: Changes to the leverage ratio: an example of macroprudential and monetary policy interaction***

Since 2015 the FPC has had powers of direction over the leverage ratio. This included a minimum leverage ratio, a leverage ratio buffer for systemically important banks and a countercyclical leverage ratio buffer.

At its meeting on 1 July 2016, following the referendum on leaving the European Union, the FPC agreed in principle that central bank reserves should be excluded from the measure of exposures used to calculate banks' leverage ratios.

The FPC had been reviewing the leverage ratio and considered that there was a potential macroeconomic cost to including central bank reserves in the leverage ratio because it could affect the ability of the banking system to cushion shocks and draw on central bank liquidity facilities. In addition, in circumstances where central bank balance sheets expanded, for example via quantitative easing, regulatory leverage requirements could effectively tighten.

In the market turmoil after the referendum this issue became more relevant. Central bank reserves could have increased as a result of the Bank's additional indexed long-term repo operations – which gave banks the ability to exchange certain less liquid assets for liquidity from central bank reserves, or if banks had chosen to use their pre-positioned collateral to take advantage the Bank's additional liquidity facilities. In addition, future decisions by the MPC (who had not yet been able to meet) over the expansion of QE could also lead to an increase in reserves. All of these could have led to a tightening in the leverage ratio constraint for banks via an increase in reserves.

However, announcing this exclusion of central bank reserves from the leverage ratio could have been interpreted as a signal of the future path of monetary policy. While there is considerable overlap between members of the FPC and MPC, monetary policy is not in the FPC's remit. Ahead of their policy announcement on 12 July 2016, the FPC scheduled an additional joint meeting with the MPC on 6 July 2016 to discuss the issue. The decision was taken to exclude the discussion on central bank reserves from the original FPC Record – published on 12 July 2016 – and in its Financial Stability Report – published on the same date. Instead, the decision was published after the MPC's decisions were announced on 4 August 2016.

## **Bank supervision**

The Bank supervises individual banks through the PRA. The PRA's general objective is to promote the safety and soundness of PRA-regulated firms, and in advancing that objective the PRA must seek to ensure that firms carry out their business in a way which avoids any adverse effect on the stability of the UK financial system, and seek to minimise such an impact from a firm's failure. The PRA has a secondary objective to facilitate, insofar as reasonably possible,

effective competition in the markets for services provided by PRA-authorized persons in carrying on regulated activities.

The Prudential Regulation Committee of the PRA consists of the Governor of the Bank of England, Deputy Governors for Financial Stability, Markets and Banking, and Prudential Regulation, the Chief Executive of the FCA, a member appointed by the Governor with the approval of the Chancellor, and five other external members appointed by the Chancellor.

***Box 2: Coordinated policy actions to respond to Covid-19 shock in 2020***

While the three committees take decisions independently, the overlap in membership allows close coordination in crisis times, such as in March 2020, when the three committees took a number of complementary policy actions to address the economic fall-out from the Covid-19 pandemic. Specifically, the MPC reduced the Bank Rate by 50 basis points to 0.25% and introduced a new Term Funding scheme with additional incentives for Small and Medium-sized Enterprises, financed by the issuance of central bank reserves. The FPC reduced the UK countercyclical capital buffer rate to 0% of banks' exposures to UK borrowers with immediate effect (from previously 1% and reversing a further increase to 2% scheduled for December 2020). At the time, the FPC also provided 'forward-guidance' that it expected to maintain the 0% rate for at least 12 months, so that any subsequent increase would not take effect until March 2022 at the earliest. Finally, the PRA set out expectations that all elements of banks' capital and liquidity buffers can be drawn down as necessary to support the economy, while at the same time banks should not increase dividends or other distributions, such as bonuses, in response to these policy actions.

The joint announcement of these decisions by the three committees signalled to markets that the different authorities are cognisant of the impending risks of the pandemic for the economy and a certain element of 'whatever it takes' in their response. It also reassured observers of a common and coordinated policy response that clearly takes into account the interactions of prudential and monetary policy actions.

The joint response by the different policy committees of the Bank of England mirrors that of other authorities. For example, the Governing Council of the ECB announced additional longer-term refinancing operations and more favourable terms for the targeted longer-term refinancing operations, starting in June 2020, additional asset purchases and a continued commitment to extraordinarily low interest rates the same day as the Supervisory Board of the ECB announced that banks under its direct supervision can fully use capital and liquidity buffers, including Pillar 2 Guidance.

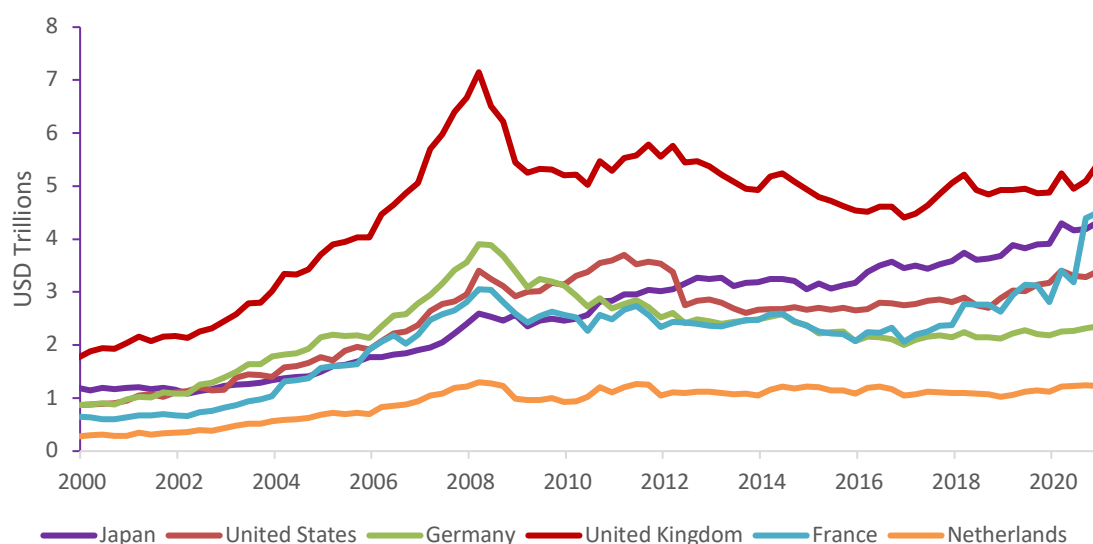
### **3. The UK's position as an international financial centre**

While the decisions of the MPC and FPC are made within their respective remits, the UK's position as a major IFC is an important feature of the environment in which the Committees

set their policy tools. The UK financial services industry – spanning financial institutions and associated professional services – is a particularly sizeable component of the UK economy, both in terms of GDP contribution (6.9% in 2019) as in terms of total assets (five times GDP).

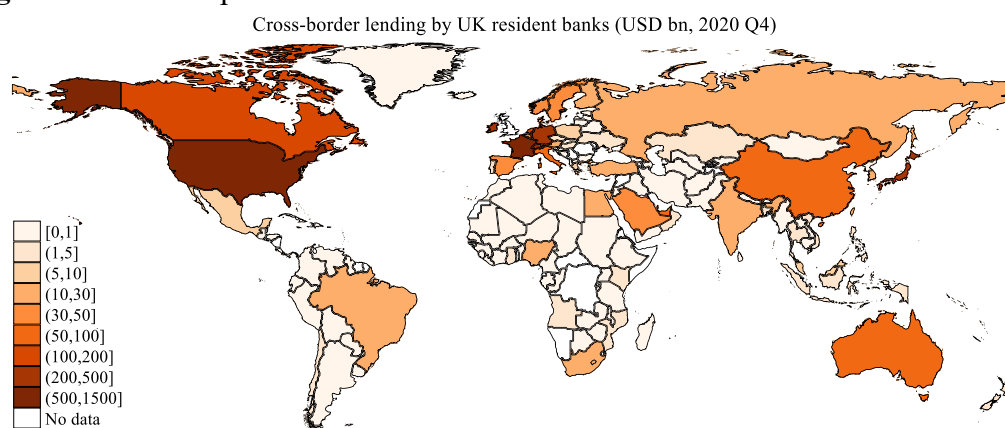
The UK’s role as an IFC means that it is highly connected with the rest of the world. These connections also go beyond service trade linkages. The UK is host to over 200 international banks, and UK-based banks – spanning foreign branches and subsidiaries – have over \$5 trillion in cross-border claims. The UK stands out amongst other international banking hubs with the highest cross-border claims (**Figure 4**), and the cross-border lending of UK-based banks spans a wide range of countries (**Figure 5**). In addition, almost 50% of assets are held by foreign-owned banks, compared to less than 20% in the US or 4% in Japan. These foreign affiliates undertake a multitude of different activities, in particular investment banking and trading, but also cross-border lending.

**Figure 4** – Total cross-border claims of major international financial centres



Source: Bank for International Settlements International Banking Statistics.

**Figure 5** – Heat map of UK-based banks’ cross-border claims



Source: Bank for International Settlements International Banking Statistics.

## **Quantifying spillovers**

In light of these sizeable, and in many cases growing, interconnections for the UK economy, it is unsurprising that a large body of work has been developed seeking to quantify the influence of spillovers to the UK. Regardless of the transmission channel studied, a key take-away is that foreign events can have significant spillover effects to the UK economy and financial system.

Focusing on the contribution of global developments, Cesa-Bianchi, Dickinson, Kösem, Lloyd and Manuel (2021) find that around half of the variation in UK economic activity, and almost all variation in a summary measure of UK financial market conditions, can be explained by global shocks over the period 1997-2019. This is consistent with the notion of a ‘global financial cycle’ (Miranda-Agrippino and Rey, 2020), characterised by cross-country co-movement in asset prices and international financial flows. Consistent with this, Cesa-Bianchi and Sokol (2017) demonstrate that an adverse US financial shock, which triggers a sharp and persistent contraction in the US economy, can quickly transmit internationally, leading to an increase in credit spreads and a slowdown in economic activity in the UK.

Turning to shocks emanating from specific countries, Gilhooly et al. (2018) quantify the spillover effects that could emanate from a slowdown in the Chinese economy. Their modelling encompasses trade and financial linkages, and considers how amplification mechanisms – which could plausibly operate in the event of a particularly large shock – could further increase the impact on the UK from an economic crisis within China.

Given its global nature, the UK banking sector offers an additional, and distinct, channel for cross-border spillovers, with particular consequences for macro-financial stability. Hills et al. (2019) examine the effects of US and euro area monetary policy on banks’ lending in the UK, establishing evidence for both a bank funding and bank portfolio channel in the UK. Similarly, Forbes et al. (2017) show that increases in microprudential capital requirements in the UK can reduce international bank lending, and this effect can be amplified by some unconventional monetary policies.

In addition, the international nature of UK-based banks creates the opportunity for domestic, or foreign, events to have onward spillovers via the UK, creating potential spillbacks for the UK economy and financial system. Bussière et al. (2020b) study the influence of euro-area monetary policy on UK-based banks’ cross-border lending, capturing both inward spillovers from Europe to the UK and onward spillovers from the UK. They demonstrate that tighter euro-area monetary policy can significantly reduce cross-border lending by French-owned affiliates in the UK.

## **Accounting for spillovers in the macro-financial modelling toolkit**

In light of the wealth of evidence documenting the influence of cross-border interlinkages on the UK economy, a range of tools have been developed to account for them within the macro-financial toolkit. Indeed, the UK’s role as an IFC is an important feature of the Bank’s financial

stability strategy. The global importance of the UK financial system means the actions of the UK authorities contribute to domestic, as well as international, financial stability – with the latter potentially spilling back to the UK economy. Therefore, the UK’s institutions and markets must be a source of strength for the global system and able to be relied on by others, with standards of resilience needing to reflect this.

As part of its broader framework for financial stability, the FPC distinguishes between risks which are ‘crystalising’ – or likely to crystalise – in the short term versus ‘vulnerabilities’ which build up in the longer term and could amplify the effects of any shock to the financial system (Brazier, 2019). In order to assess resilience to a risk crystalising, the Bank has developed a stress-testing framework (Bank of England, 2015). The Bank’s Annual Cyclical Scenario (ACS) examines the potential impact of a hypothetical adverse scenario on the health of the banking system and individual institutions within it. In doing so, the ACS allows the FPC and PRA to assess the banking sector’s resilience to a range of adverse shocks and ensure they are adequately capitalised, not just to withstand those shocks, but also support the real economy if a stress does materialise.<sup>7</sup>

In part, motivated by evidence that global variables predict domestic financial crises and economic downturns (see Cesa-Bianchi et al., 2019 and Bluwstein et al., 2020 for recent examples), the ACS has been tailored to account for the influence of global factors on the UK. The overall stress test is constructed from country and region-specific profiles, which contribute to an overall world profile. These profiles can then influence the UK stress through a range of macro-financial spillover channels.

The first stage of the stress test involves ‘risk assessment’, gauging vulnerabilities in each region (Fisher and Rachel, 2016). The severity of the stress-test scenario for each region is then adapted to reflect its risk assessment. For a country where economic or financial vulnerabilities are judged to be more elevated, the stress scenario is thus more severe, reflecting the higher probability of a larger downturn.

In the second stage of the stress-test build, country-specific and regional profiles are combined to form an overall global scenario. At this stage, profiles can be decomposed to distinguish between domestic shocks and shocks emanating from abroad. This decomposition accounts for a range of spillover channels, including trade and financial linkages, and reflects differential linkages between countries (see, for example, Dieppe et al., 2017).

By modelling these spillover channels in the stress-test scenario, the FPC can examine the effect of bank losses emanating from domestic shocks and those emanating from foreign risks. As an example, **Figure 6** summarises the decomposition of the UK GDP hit in the 2019 ACS. The larger externally-generated fraction reflects two things: first, the UK’s exposure to foreign shocks, in part due to its position as an international financial centre; second, the severity of

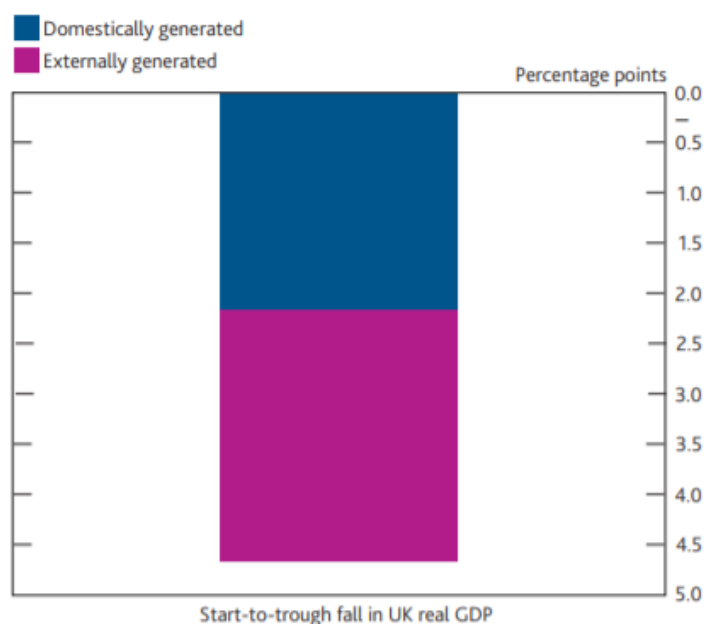
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<sup>7</sup> Owing the challenges from Covid, the Bank’s ACS was paused in 2020 and ‘Desktop’ and ‘Reverse’ stress tests were used instead – although the underlying frameworks are similar.



domestically generated GDP hits in other countries, in particular those with a higher risk assessment.

**Figure 6 – Decomposition of UK GDP stress in 2019 Annual Cyclical Scenario**



Source: “[Key elements of the 2019 stress test](#)” (Bank of England, 2019).

The FPC can then respond to these UK and global risks by using the results from the stress tests as an input into its setting of the UK CCyB rate, while the PRA can use these results to set bank-specific capital buffers.

Additional modelling tools have been developed to monitor vulnerabilities at a quarterly frequency. In a speech entitled “The Grand Unifying Theory (and practice) of Macroprudential Policy”, Carney (2020) characterises the ‘policy problem’ for the FPC’s setting of macroprudential policy as minimising the following loss function  $L$ :

$$\min_{\rho_t} L \equiv E_t \left[ \sum_{i=0}^T \beta^i (f(G@R_{t+i}) - \phi y_{t+i}) \right]$$

where  $\rho_t$  denotes the set of macroprudential policy tools set at time  $t$ ,  $E_t$  is the expectations operator that probability weights all future states of the world conditional on information available at time  $t$ ,  $\beta$  is the discount factor, and  $T$  is the FPC’s time horizon.

The FPC’s primary objective is captured by the first term, a function of  $G@R_t$ , ‘GDP-at-Risk’. GDP-at-Risk measures tail risks in the economy, summarising GDP growth outturns associated with a particular point in the distribution of GDP growth – typically the 5<sup>th</sup> percentile following Adrian et al. (2019). Reflecting this, the FPC seeks to set policy by, in part, minimising some function  $f(\cdot)$ , where  $f'(\cdot) > 0$ , of GDP-at-Risk.

The secondary objective of the Committee is summarised in the second term, where  $\phi > 0$  and  $y_t$  is the central GDP forecast. Alongside minimising GDP-at-Risk, the Committee must trade-off the potential economic costs of its policy actions in its overall policy setting. These trade-offs are typically intertemporal too. For example, a decision to increase the CCyB might be associated with short-term economic costs, in the form of reduced bank lending, but longer-term benefits for macro-financial stability, in the form of reduced macro-financial vulnerabilities and thus ‘lower’ GDP-at-Risk.<sup>8</sup>

GDP-at-Risk is not directly observed, so it is important that the FPC can accurately estimate it over time in order effectively minimise the specified loss function. Aikman et al. (2019) outline the Bank’s approach to estimating GDP-at-Risk and find that credit booms and property price booms can pose material downside risks to GDP growth at horizons of three to five years. They further show that such downside risks can be partially mitigated by increase the capitalisation of the banking system.

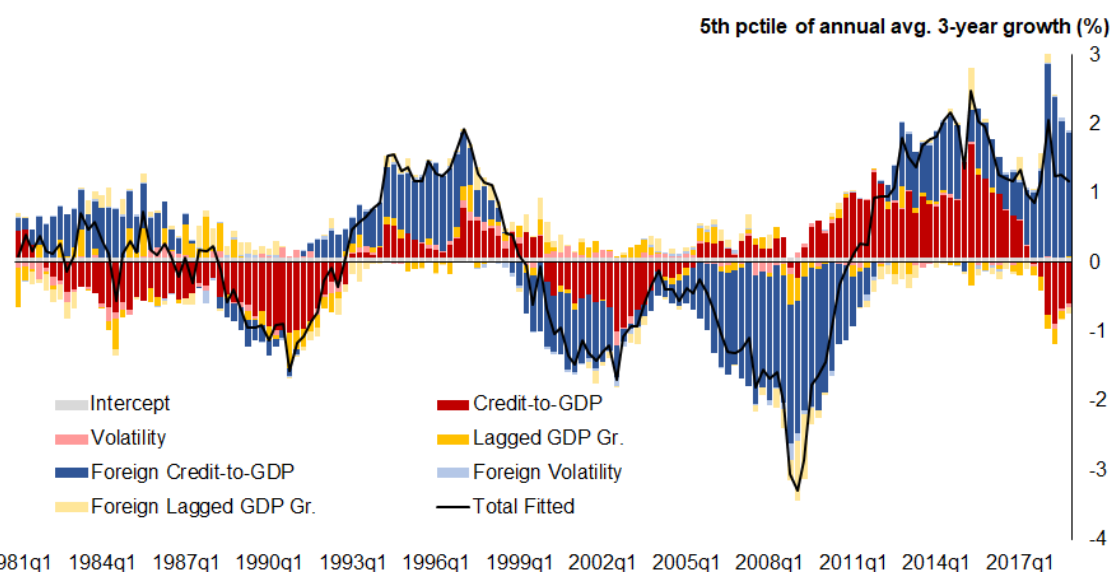
Given the myriad global spillover channels relevant to the UK discussed above, this macroprudential policy problem has an inherently international dimension. A downturn abroad can spill over to the UK through both UK banks’ foreign exposures and through broader macroeconomic channels, such as trade and financial markets.

Recent work has sought to account for these cross-border transmission channels in the Bank’s GDP-at-Risk framework (Lloyd et al., 2021). The globally-augmented GDP-at-Risk model of Lloyd et al. (2021) exploits data on bilateral trade and financial linkages to reflect heterogeneous cross-country transmission of macro-financial risks. The model includes three key ‘international’ variables – foreign-weighted credit-to-GDP growth, a measure of foreign-weighted financial conditions and foreign-weighted lagged GDP growth – that capture a combination of near and medium-term vulnerabilities and control for the global macroeconomic environment. They find that tighter foreign financial conditions are associated with more severe domestic GDP downside tail-risks in the near term (less than 1 year), while faster credit growth abroad significantly increases domestic tail-risks at medium-term horizons (from 1 to 5 years). In addition, Lloyd et al. (2021) demonstrate that including foreign variables in the model – over and above domestic ones – leads to a significant improvement in GDP-at-Risk estimates. This has important implications for policy: by accurately estimating GDP-at-Risk, the FPC can more effectively set policy to minimise the loss function specified above. The globally-augmented model can also highlight the causal implications of foreign developments for domestic GDP-at-Risk. Decomposing UK GDP-at-Risk estimates into contributions from foreign and domestic “shocks”, Lloyd et al. (2021) find that foreign shocks drive around 70% of variation in UK GDP-at-Risk as the 3-year horizon. **Figure 7** demonstrates this, plotting the time series decomposition of UK GDP-at-Risk into domestic and foreign drivers.

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<sup>8</sup> Where ‘lower’ GDP-at-Risk pertains to reduced left-tail risks to GDP.

**Figure 7** – Decomposition of 3-year-ahead UK GDP-at-Risk into foreign and domestic shocks



Source: Lloyd, Manuel and Panchev (2021).

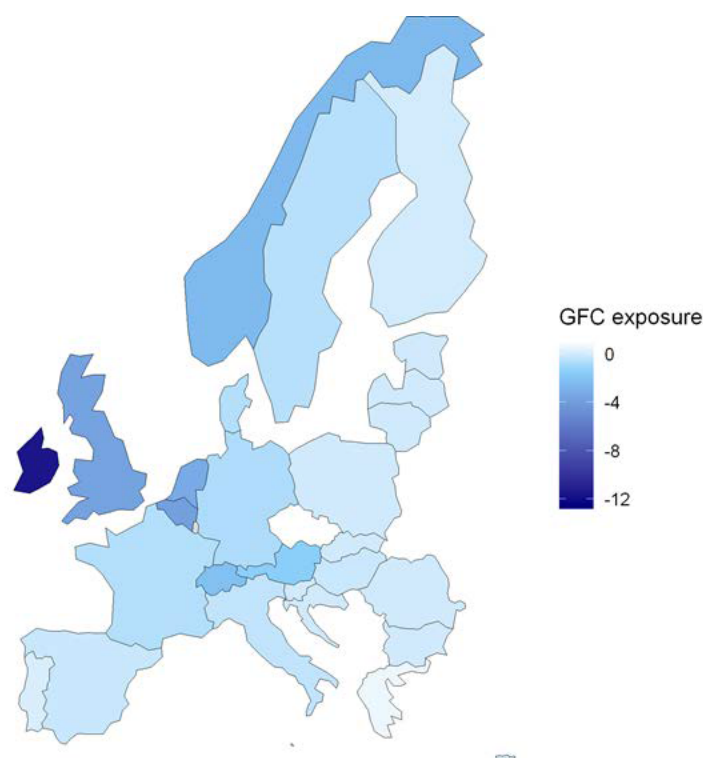
In summary, the UK’s position as an IFC has repercussions for sources of fragility. This, in turn, means that regulators, both micro-and macro-prudential, need to account for spillovers in the macro-financial framework. This is done by including global shocks and their potential spillover effects in the ACS, with the results being used as input into the FPC’s decisions on the CCyB.

#### 4. International effects of policies and their interactions

An expansive literature has documented an increasing synchronisation of financial cycles across countries over the past decades. Among others, Rey (2015), Passari and Rey (2015) and Miranda-Agrippino and Rey (2020) have shown that global factors are behind a significant share of movements in a large cross-section of cross-border capital flows, asset prices and credit growth. These studies have also shown that as flexible exchange rates cannot insulate the domestic economy from the global financial cycle, the “trilemma” of monetary policy might be reduced to a “dilemma” between open capital accounts and monetary policy autonomy. Alternatively, macroprudential policy can serve as tool to mitigate the impact of global financial cycles on domestic banking systems and macroeconomy, while flexible exchange rates can absorb external shocks.

Given the status of the UK as global financial centre, it is not surprising that it is among the European economies most exposed to the global financial cycle (**Figure 8**). The exposure of the UK’s capital flows to the global financial cycle is only matched by the exposure of Ireland, Belgium and the Netherlands.

**Figure 8** – Exposure of European economies’ capital flows to the global financial cycle



*Sources:* Portes et al. (2020). The Figure relies on ESRB calculations based on data from the IMF International Financial Statistics and Habib and Venditti (2019). The data period is Q1 1990-Q3 2018. Capital flows are normalised by GDP. The map shows the country-specific response intensity of total gross capital flows (as percentage of GDP) to a one standard deviation shock in global risk using the global financial cycle indicator devised by Habib and Venditti (2019). The exposure intensity is derived from a country-specific regression of total gross capital inflows (as percentage of GDP) on the lagged global financial cycle indicator. The regression specification also includes one lag of the dependent variable to account for serial correlation and a constant.

One of the primary channels through which the global financial cycle affects cross-border capital flows, asset prices and credit growth are global financial institutions. Specifically, Cetorelli and Goldberg (2012a,b) provide evidence that internationally active banks manage their liquidity on a global scale, thereby contributing to international shock transmission and contagion and how the existence of an internal capital market for global banks increases the international propagation of domestic liquidity shocks due to a substitution effect between internal and external lending. It is important to stress, however, that while contributing to the international transmission of shocks, global liquidity management by international banks can also constitute a stabilising factor for banks’ operations in times of financial stress, as intragroup funding may act as a substitute for volatile interbank funding (see, e.g., Reinhart and Riddiough, 2015).

A second important systemic risk dimension associated with the cross-border activities of banks stems from the way in which global liquidity conditions affect banks’ leverage and risk-taking through currency depreciation and appreciation. Bruno and Shin (2015) show theoretically and empirically the existence of a “risk-taking channel” of currency appreciation: global banks lend to corporate borrowers in US dollars, thus introducing a link between

exchange rates and financial stability: an appreciation of the local currency leads to local borrowers having stronger balance sheets, which decreases borrowers' credit risk and increases banks' lending capacity and thus risk-taking by banks. A dollar appreciation, however, is associated with deleveraging by global banks and an overall tightening of global financial conditions.

Further, the risk-taking channel of monetary policy has shown to have important cross-border spill-over effects. Time variation in US policy rates influences global banks' risk perceptions, and lower rates encourage them to search for yield across the global spectrum of risky assets (Kalemli-Ozcan, 2019). There is also a spillover of US monetary policy to domestic banking systems (e.g., Ioannidou et al., 2015; Lee et al., 2020). Coman and Lloyd (2019) show that prudential policies can help to reduce the macrofinancial spillover effects of US monetary policy and the associated global financial cycle in emerging markets. Loan-to-value ratio limits and reserve requirements appear to be particularly effective prudential tools.

Finally, the global operations of banks also imply that domestic macroprudential policies may create inward and outward cross-border spillovers, resulting in a potential need for international policy coordination by macroprudential authorities. For the pre-crisis period (1999-2006), Aiyar et al. (2014) find that UK banks reduced cross-border lending in response to increases in domestic capital requirements, while Berrospide et al. (2017) show that changes in US prudential policies affects lending by large US global banks to foreign residents, while changes in foreign prudential policies affects lending growth in the US through foreign branches and subsidiaries, while also affecting cross-border lending by US banks. Hills et al. (2017) find that prudential actions taken abroad do not have significant aggregate spillover effects on bank lending in the UK, but disaggregated sectoral effects: for instance, when a foreign authority tightens loan-to-value standards, UK affiliates of banks owned from that country expand their lending to U.K. households. Using aggregate cross-country data, Avdjiev et al. (2017) also report evidence for outward spillovers in relation to borrower-based measures (loan-to-value ratio (LTV) changes) and, consistent with Aiyar et al. (2014), domestic banks increased cross-border lending after a tightening of LTV ratios at home.<sup>9</sup>

The literature discussed in this section suggests that because of the status of the UK as global financial centre, it is both exposed to foreign shocks (inward spillovers) and can generate outward spillovers. In response to inward spillovers, the UK can use macroprudential tools, while recipient countries can use also such tools in response to outward spillovers. In the next section, we will explore more specifically the outward spillover effects of UK monetary policy, in interaction with macroprudential policies in foreign countries.

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<sup>9</sup> Several of the papers mentioned in this paragraph were part of an International Banking Research Network project, summarised by Buch and Goldberg (2017).

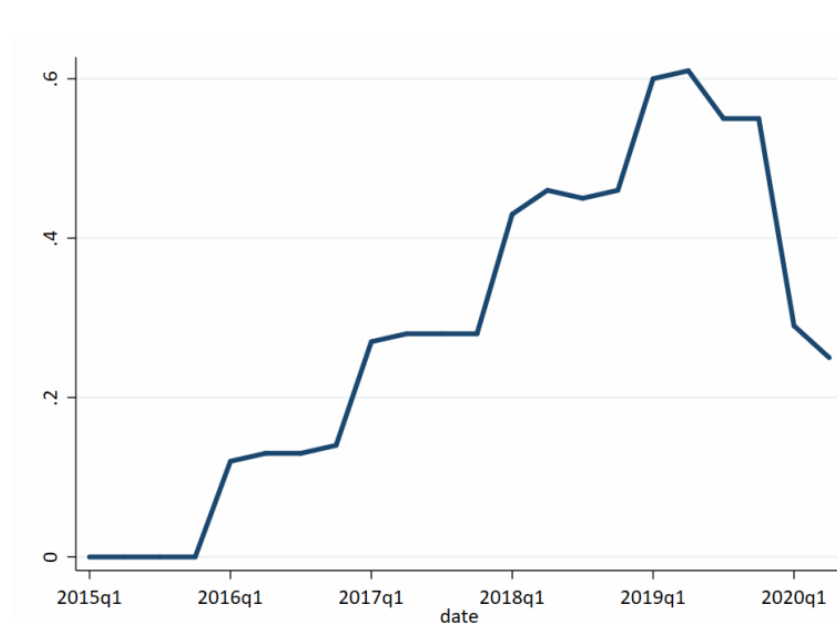
**Box 3: Counter-cyclical capital buffers during the Covid-19 crisis**

As discussed in Box 2, the Bank of England, the ECB and many other prudential authorities lowered capital and liquidity requirements for the banks under their supervisions. Most strikingly, CCyB rates were lowered across the board.<sup>10</sup> While these decisions were taken independently and primarily with domestic objectives, cross-border banking links (and reciprocity arrangements) provided important spillover effects. As reported by Reinhardt and van Hombecck (2020), banks around the world held around \$73bn of capital due to CCyBs effective in 2019Q4, almost half (\$32bn) due to banks' foreign exposures.

The reduction of CCyBs around the globe also lowered effective CCyB rates for UK banks with foreign exposure as shown in **Figure 9**. The Bank of England FPC's decision to lower the UK CCyB rate to zero has also contributed to the reduction in required capital holdings for foreign banks. Reinhardt and van Hombecck estimate a total capital release of \$64bn by 2020 Q2, with \$24bn of this reduction due to foreign exposures, which may support up to \$530bn in new lending to businesses globally.

This experience has shown that not only has the CCyB framework introduced after the Global Financial crisis served as an effective tool to respond to the Covid-19 shock, but the almost simultaneous release of capital buffers by many countries created positive international spillover effects.

**Figure 9** – UK exposure-weighted foreign effective CCyB rate (%)



Sources: Reinhardt and van Hombecck (2020) based on [BIS Consolidated Banking statistics](#), ESRB (based on national authorities) and [HKMA](#). Foreign CCyB's weighted by UK-owned banks consolidated exposures to the non-bank non-financial sector in foreign countries.

<sup>10</sup> It is important to note that in the euro area, CCyB rates are under national rather than ECB authority.

## 5. Empirical analysis on UK monetary policy interactions with macroprudential policy in receiving countries

In this section, we focus on the transmission of UK monetary policies through UK-based banks' cross-border lending behaviour and, in turn, how macroprudential policies taken in receiving countries may offset or amplify any possible effects. The section follows the setup used in International Banking Research Network studies on prudential policy interactions, summarised in Bussière et al. (2020a).

### Data

We combine panel data on UK-based banks' cross-border lending (as used e.g., in Forbes et al., 2017) with UK monetary policy shocks (Cesa-Bianchi et al., 2020) and macroprudential policy actions based on data from the IMF's Integrated Macroprudential Policy (iMaPP) Database, described in Alam et al. (2019).

To identify the UK monetary policy shocks we use, Cesa-Bianchi et al. (2020) estimate a structural vector auto-regression using high-frequency 'surprises' as an instrument in line with the existing literature (Gertler and Karadi, 2015). The monetary policy surprises are measured using intraday moves in Sterling futures in a thirty-minute window around Bank of England monetary policy events (e.g., policy announcements). The short time horizon over which these surprises are computed helps to isolate news about monetary policy from other types of news that could affect interest rates. In addition, the futures rate reflects expectations of the average short-term interest rate 3 to 6-months after the announcement. Importantly, because variation in the 2<sup>nd</sup> quarter-ahead futures rates captures variation about the expected future path of policy rates, it can capture changes in monetary policy expectations while the short-term policy rate is at its effective lower bound. In the context of our sample, this is important, because the UK policy rate was at its effective lower bound from 2009Q1 to the end of our sample. To construct quarterly time series for the shocks, we sum them in a given quarter.<sup>11</sup>

The iMaPP database collects data for changes in a range of macroprudential policies taken in 134 countries from 1990 to 2018. The data assigns the value of +1 to a given prudential policy if it was tightened in a specific period, the value of -1 if it was loosened, and 0 if no change occurred. For LTV ratio limits, there is also information on the intensity of the change, as the data records the average size of LTVs across countries. We first focus on the aggregate quarterly sum across all measures. In our baseline specification for prudential policy, we exclude reserve requirements as, in some countries, these are used for monetary policy, not prudential, purposes.<sup>12</sup> We then disaggregate into the most frequent actions taken in advanced and emerging market economies, i.e. capital requirements, conservation buffers, measures to

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<sup>11</sup> Importantly, the statistical properties (i.e. mean, standard deviation, persistence) of our quarterly-frequency surprises are not significantly different to the meeting-frequency surprises

<sup>12</sup> In particular, they have been used extensively in emerging economies as alternative to monetary policy in response to capital inflows (Claessens et al., 2013; IMF, 2012; Montoro and Moreno, 2011; IMF, 2011).

mitigate risks in SIFIs, limits to LTVs, limits to the debt-service-to-income ratio (DSTI), loan restrictions, the CCyB and reserve requirements.<sup>13</sup>

Bank balance sheet data including external lending data come from the Bank of England's statistical reporting forms. 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 banks and receiving countries. Specifically, we keep only links for which cross-border lending is either at least £100mn in size or 1% of a bank's total lending portfolio (if at least £10mn in size).<sup>14</sup> To alleviate the effect of outliers, we winsorise the dependent variable at the 10% level so that the growth rates lie within a -100%/+100% range. Control variables are winsorised at the 1% level.

Table 1 contains the summary statistics for the data entering the regression analysis. The sample period is 1998 Q2 to 2018 Q1.

## Methodology

Our first specification aims to assess UK monetary policy spillovers through UK-based banks' external lending:

$$\Delta Y_{b,j,t} = \alpha_0 + \sum_{k=0}^K \alpha_{1,k} MP_{t-k}^{UK} + \alpha_2 X_{b,t-1} + \alpha_3 Z_{j,t-1} + \alpha_4 G_{t-1} + f_b + f_j + \epsilon_{b,j,t} \quad (1)$$

where  $\Delta Y_{b,j,t}$  is the growth of cross-border lending by bank  $b$  to country  $j$  at quarter  $t$ ;  $MP_{t-k}^{UK}$  denotes the UK monetary policy shock;  $X_{b,t-1}$  is a vector of time-varying *bank* control variables;  $Z_{j,t-1}$  includes other time-varying *receiving country* control variables, which might co-move with domestic prudential policies—including controls for domestic demand, in our baseline specification we use lagged annual nominal GDP growth and credit growth;  $f_b$  are bank fixed effects; and  $f_j$  are receiving country fixed effects. Because the main coefficient of interest in the above equation  $\alpha_{1,k}$  loads on UK monetary policy, which is the same for all banks  $b$  and receiving countries  $j$ , we cannot include time fixed effects in the regression. Nevertheless, to capture global time-varying factors that may contaminate our estimates of monetary policy spillovers, we include global macroeconomic controls  $G_t$  such as the VIX and US monetary policy surprises. Standard errors  $\epsilon_{b,j,t}$  are clustered at the bank-time level.

Second, when assessing the interactions of UK monetary policy with receiving-country prudential policy  $Pru_{j,t}^{dest}$ , we alter our specification to include bank-time fixed effects  $f_{b,t}$ . These time fixed effects absorb the direct effect of UK monetary policy spillovers and the

<sup>13</sup> See also Figure 3 in Alam et al. (2019).

<sup>14</sup> Furthermore, we only consider observations of bank lending pairs if the stock of lending exceeds a share of 0.2% in the current or the preceding quarter's total stock of external lending (rather than large percent changes relative to small stocks).



global controls  $G_t$ , but control for *all possible* globally time-varying factors that could otherwise contaminate estimate of the interaction coefficient of interest. The baseline specification for assessing the interaction is therefore:

$$\Delta Y_{b,j,t} = \alpha_0 + \alpha_1 Pru_{j,t-4}^{dest.} + \sum_{k=0}^3 \alpha_{2,k} (MP_{t-k}^{UK} \cdot Pru_{j,t-4}^{dest.}) + \alpha_3 Z_{j,t-1} + f_{b,t} + f_j + \epsilon_{b,j,t} \quad (2)$$

In addition to the definitions above,  $Pru_{j,t-4}^{dest.}$  is a measure of the stance of destination-country prudential policy. We include both the level of the prudential policy stance, as well as its interaction with UK monetary policy. We include the former to account for the direct effects of prudential policy on inflows to the receiving country. For instance, Reinhardt and Sowerbutts (2015) show that countries experience capital inflows for up to four quarters following a tightening in capital requirements.

Our baseline measure cumulates all prudential policy actions, excluding reserve requirements, in a country over a two-year period. Importantly, we only account for prudential policy actions enacted prior to the UK monetary policy action of interest—reflected by the  $t - 4$  lag on the prudential policy measure. This mitigates the possibility that our estimates capture a (potentially endogenous) response of receiving-country prudential policy in response to a UK monetary policy surprise. In our baseline specification, we investigate the four-period effect of UK monetary policy. So, our prudential policy measure,  $Pru_{j,t-4}^{dest.}$  captures cumulated prudential policy actions in a country  $j$  over two years from  $t - 11$  to  $t - 4$ . The regression also includes bank-time fixed effects to absorb all unobserved variation impacting a bank's lending over time to all countries.

In relation to our main hypotheses, we expect that a surprise UK monetary policy tightening will (on average) reduce UK-based banks' external lending, reflected by  $\hat{\alpha}_{1,k} < 0$  in equation (1). In response to a surprise UK monetary policy, we also expect that a country with a tighter prudential policy stance prior to the surprise—higher  $Pru_{j,t-4}^{dest.}$ —should (on average) face a smaller negative spillover than a country with looser prudential policy, reflected by  $\hat{\alpha}_{2,k} > 0$  in equation (2). The coefficient  $\alpha_{2,k}$  can be interpreted as the influence of an additional prudential policy tightening on the cross-border spillover of UK monetary policy relative to its mean.

## Results

The first column of **Table 2** summarises our main results for the spillover effects of UK monetary policy through UK-based banks' cross-border lending. Column 1 indicates that a surprise UK monetary policy tightening significantly reduces UK-based banks' external lending growth. In particular a one (0.25) percentage point UK monetary policy surprise

reduces UK banks' external lending, on average, by 18.4pp (4.6pp) over one year.<sup>15</sup> This finding is in line with the previous literature, including Kalemli-Ozcan (2019).

Columns 2-4 show the mitigating effect that macroprudential policies in the receiving country can have on the spillover effects of UK monetary policy actions. Here, we present our headline estimate of the interaction between recipient-country prudential policies with UK monetary policy for UK banks' cross-border lending.<sup>16</sup> The prudential policy measure here sums all actions (excluding reserve requirements) over a two-year period in advance of the UK monetary policy event. An additional prudential policy tightening action in the recipient country, in advance of a surprise UK monetary policy tightening, can offset spillovers to lending growth by about 10pp over a one-year period in our preferred specification including bank-time fixed effects. Although these numbers appear large, in comparison to the monetary policy spillover, it is important to note that our monetary policy surprise measure does not capture changes in overall levels in interest rates and, unlike the spillover coefficient, our interaction coefficient is identified conditional on time fixed effects.

In Table 3, we explore whether the UK monetary policy spillovers, and interactions with recipient-country prudential policy, differ depending on the ownership type of the bank. To do this, we estimate regressions (1) and (2) for three types of bank: (i) UK-owned, (ii) foreign subsidiaries, and (iii) foreign branches. Building on Bussière et al. (2021), we hypothesise that the spillover and interaction effects are likely to be stronger for foreign-owned banks (i.e. subsidiaries and branches) than UK-owned banks on the grounds that long-term bank-lender relationships are most likely to be located at a bank's headquarters. In contrast, affiliates in major IFCs may concentrate on short-term lending or lending with synergies to financial transactions – in turn, associated with larger spillovers and interactions.

The results presented in Table 3 support this hypothesis. Focusing on UK-owned banks, columns (1) and (2) show that both the spillovers of UK monetary policy and the interactions with recipient-country prudential policies are insignificantly different from zero at all horizons. In contrast, the results for foreign subsidiaries and foreign branches – in columns (3)-(4) and (5)-(6), respectively – are strongly significant. They indicate both that: tighter UK monetary policy is associated with a subsequent reduction in foreign-owned banks' external lending; and that tighter recipient-country prudential policies can partially offset these spillovers. Together this supports our hypotheses for the differences between UK- and foreign-owned lenders.

The results so far lend support to the view that countries with a more developed prudential policy toolkit are better placed to shield themselves against the global financial cycle. But

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<sup>15</sup> Over our sample period, the minimum UK monetary policy surprise in a given quarter is minus 27bp, and the maximum surprise is plus 26bp.

<sup>16</sup> Column 2 presents an intermediate specification between columns 1 and 3, including monetary policy spillovers and interactions with receiving country prudential policy at the same time. This is achieved by excluding time fixed effects, which would otherwise absorb the monetary policy terms. In this regression, which is not preferred because of the exclusion of time fixed effects, the interaction term is significant up to a 3-quarter horizon.

which prudential tools are most effective? Next, we explore the differential interaction effects of specific prudential policy tools, using the decomposing in the Alam et al. (2019) dataset.

Following Borio (2010) and Claessens et al. (2013), we divide macroprudential policies into more long-standing ‘structural’ measures and those taken over the cycle. Reserve requirements are investigated separately as discussed. Again, we cumulate actions over a two-year period in advance of the UK monetary policy impulse.

The results in columns 1-4 of Table 4 show only weak evidence for structural prudential measures significantly offsetting some of the spillover effects from a surprise UK monetary policy tightening through UK-based banks’ external lending. Most strongly, the coefficient estimates on the interactions between monetary policy and capital requirements are statistically significant at the 10% level out to the three-quarter horizon. For SIFI measures there is a significant short-term offset at the contemporaneous level which fades after 2 quarters. The limited effects of structural measures are maybe not surprising as increases in capital requirements affect usually the supply of credit rather than the demand, and the measure we have is of direct lending from UK banks (which are not directly affected by structural measures in recipient countries). There is also some evidence (e.g., Reinhardt and Sowerbutts, 2015) suggesting that an increase in capital requirements leads to an increase in borrowing from foreign sources for about a year, and this may be affecting our results, although we do attempt to control for this by using a one-year lag on prudential policy.

Columns 5-9 of Table 4 shows clear evidence that previously implemented cyclical prudential policies affecting particular loans and in particular housing loans can act to significantly offset the effect of UK monetary policy shocks. For LTV and DTI limits as well as loan restrictions the interaction with monetary policy is significant at the one-year horizon. The measured effect is strongest when considering the measure for LTV limits which takes into account the intensity of the regulation in column 6.<sup>17</sup> The results suggest that a country with a 10pp lower LTV limit experiences an around 2.7pp smaller reduction in lending growth from UK banks following a monetary tightening in the UK by 0.25pp.

For the CCyB, we record positive though insignificant point estimates for the interaction effects. This might be because of several reasons including the fact that up to 2017 Q1 (the latest date prudential policies enter our sample at t-4) the CCyB has been implemented at positive rates only in 5 countries. Compared to the other cyclical measures the CCyB also targets a much broader category of lending and there is a large implementation lag (1 year usually) after the announcement.

Finally, in column 10, we examine reserve requirements. The point estimates are positive but not significant suggesting a limited role for past tightening in reserve requirements to offset foreign monetary policy shocks. As discussed, conceptually, results might be harder to interpret given reserve requirements are often also used for monetary purposes. In fact, they might

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<sup>17</sup> The measure in column 6 is the average LTV at the end of the quarter as of t-4.

change as a response or in parallel to UK monetary policy depending on the degree of economic linkages, making it hard to draw firm conclusions on reserve requirements with the setup at hand.

## 6. Conclusion

This paper has discussed the institutional structure of monetary and prudential policy decision making in the UK, as well as policy decisions in these areas over the past decade. Given the UK's status as an IFC, global shocks and their spillover effects are explicitly taken into account in the monitoring and policy process. We have discussed the rapidly expanding literature on the importance of the global financial cycle and the role of macroprudential policy tools in mitigating spillover effects from monetary and regulatory policy decisions in core countries, such as the US, euro area and the UK.

Using data on UK-based banks' external lending, we have presented findings that UK monetary policy surprises have a significant spillover effect on other countries, as a tightening surprise causes a significant fall in external lending. Taking macroprudential policies, especially borrower-targeted policies, can offset a considerable part of that spillover. In this sense, we find support for the thesis that (macro)prudential policies can help insulate countries from the global capital flows cycles. The wide variety of policy instruments which have been developed by policymakers suggests that there is merit in exploring not just, whether macroprudential policy can insulate a country from the credit cycle but which ones are more effective. We find that LTV limits, which affect credit demand, appear to be particularly effective in offsetting the spillovers from UK monetary policy.

## References

- Adrian, Tobias, Nina Boyarchenko and Domenico Giannone, 2019. Vulnerable Growth. *American Economic Review*, 109(4), pp 1263-1289.
- Aikman, David, Jonathan Bridges, Sinem Hociolgu Hoke, Cian O'Neill and Akash Raja (2019). Credit, capital and crises: a GDP-at-Risk approach. Bank of England Staff Working Paper, No. 824.
- Aiyar, Shekhar, Charles W. Calomaris and Tomasz Wieladek, 2014. Does Macro-Prudential Regulation Leak? Evidence from a UK Policy Experiment. *Journal of Money, Credit and Banking*, 46(S1), pp 181-214.
- Alam, Zohair, Adrian Alter, Jesse Eiseman, Gaston Gelos, Heedon Kang, Machiko Narita, Erlend Nier, and Naixi Wang, 2019. Digging Deeper – Evidence on the Effects of Macroprudential Policies from a New Database. IMF Working Paper, No. 19/66.

Ampudia, Miguel, Thorsten Beck, Andreas Beyer, Jean-Edouard Colliard, Agnese Leonello, Angela Maddaloni and David Marques-Ibanez, 2019. The architecture of supervision. ECB Working Paper Series, No. 2287, May.

Avdjiev, Stefan, Catherine Koch, Patrick McGuire and Goetz von Peter, 2017. International Prudential Policy Spillovers: A Global Perspective. *International Journal of Central Banking*, 13(2), 5-33.

Bailey, Andrew, 2021. The case for an open financial system. Speech at the Financial and Professional Services Address, Mansion House, 10 February.

Bailey, Andrew, Jonathan Bridges, Richard Harrison, Josh Jones and Aakash Mankodi, 2020. The central bank balance sheet as a policy tool: past, present and future. Bank of England Staff Working Paper, No. 899, December.

Bank of England, 1999. The transmission mechanism of monetary policy. *Bank of England Quarterly Bulletin*, May.

Bank of England, 2015. The Bank of England's approach to stress testing. October.

Bank of England, 2019. Key elements of the 2019 stress test. March.

Berrospide, Jose M., Ricardo Correa, Linda S. Goldberg and Friederike Niepmann, 2017. International Banking and Cross-Border Effects of Regulation: Lessons from the United States. *International Journal of Central Banking*, 13(S1), pp 435-476.

Bluwstein, Kristina, Marcus Buckman, Andreas Joseph, Miao Kang, Sujit Kapadia and Özgür Şimşek, 2020. Credit growth, the yield curve and financial crisis prediction: evidence from a machine learning approach. Bank of England Staff Working Paper, No. 848.

Borio, Claudio, 2010. Implementing a macroprudential framework: Blending boldness and realism. BIS Research papers.

Brazier, Alex, 2019. Financial resilience and economic earthquakes. Speech at the University of Warwick, 13 June.

Bruno, Valentina and Hyun Song Shin, 2015. Cross-Border Banking and Global Liquidity. *Review of Economic Studies*, 82(2), pp 535-564.

Buch, Claudia M. and Linda S. Goldberg, 2017. Cross-Border Prudential Policy Spillovers: How Much? How Important? Evidence from the International Banking Research Network. *International Banking Research Network*, 13(S1), pp 505-558.

Bussière, Matthieu., Cao, J., de Haan, J., Hills, R., Lloyd, S., Meunier, B., Pedrono, J., Reinhardt, D., Sinha, S., Sowerbutts, R., and Styrin K., 2020a. The interaction between macroprudential policy and monetary policy: Overview. *Review of International Economics*, 29(1), pp 1-19.

Bussière, Matthieu, Robert Hills, Simon Lloyd, Baptiste Meunier, Justine Pedrono, Dennis Reinhardt and Rhiannon Sowerbutts, 2020b. *Le Pont de Londres*: Interactions between monetary and prudential policies in cross-border lending. *Review of International Economics*, 29(1), pp 61-86.

Carney, Mark, 2020. The grand unifying theory (and practice) of macroprudential policy. Speech at University College London, 5 March.

Cesa-Bianchi, Ambrogio and Andrej Sokol, 2017. Financial shocks, credit spreads and the international credit channel. Bank of England Staff Working Paper, No. 693.

Cesa-Bianchi, Ambrogio, Fernando Eguren-Martin and Gregory Thwaites, 2019. Foreign Booms, Domestic Busts: The International Dimension of Banking Crises. *Journal of Financial Intermediation*, 37, pp. 58-74.

Cesa-Bianchi, Ambrogio, Gregory Thwaites and Alejandro Vicondoa, 2020. Monetary policy transmission in the United Kingdom: A High Frequency Identification Approach. *European Economic Review*, 123, pp 103-375.

Cesa-Bianchi, Ambrogio, Rosie Dickinson, Sevim Kösem, Simon Lloyd and Ed Manuel, 2021. No economy is an island: how foreign shocks affect UK macro-financial stability. *Bank of England Quarterly Bulletin*, Q3.

Cetorelli, Nicola and Linda Goldberg, 2012. Liquidity management of U.S. global banks: Internal capital markets in the great recession. *Journal of International Economics*, 88(2), pp 299-311.

Cetorelli, Nicola and Linda Goldberg, 2012. Banking Globalization and Monetary Transmission. *Journal of Finance*, 67(5), pp 1811-1843.

Claessens, Stijn, Swati R. Ghosh, and Roxana Mihet, 2013. Macro-prudential policies to mitigate financial system vulnerabilities. *Journal of International Money and Finance*, 39, pp 153–185.

Coman, Andra and Simon Lloyd, 2019. In the Face of Spillovers: Prudential Policies in Emerging Economies. ECB Working Paper Series, No. 2339, December.

Dieppe, Alistair, Georgios Georgiadis, Martino Ricci, Ine Van Robays and Björn van Roye, 2017. ECB-Global: introducing ECB's global macroeconomic model for spillover analysis. ECB Working Paper Series, No. 2045, April.

Fisher, Jack and Lukasz Rachel, 2016. Assessing vulnerabilities to financial shocks in some key global economies. Bank of England Staff Working Paper, No. 636.

Forbes, Kristin, Dennis Reinhardt and Tomasz Wieladek, 2017. The spillovers, interactions, and (un)intended consequences of monetary and regulatory policies. *Journal of Monetary Economics*, 85(C), pp 1-22.

Gertler, Mark and Peter Karadi, 2015. Monetary policy surprises, credit costs, and economic activity. *American Economic Journal: Macroeconomics*, 7(1), pp 44-76.

Gilhooly, Robert, Jen Han, Simon Lloyd, Niamh Reynolds and David Young, 2018. From the Middle Kingdom to the United Kingdom: spillovers from China. *Bank of England Quarterly Bulletin*, May.

Habib, Maurizio M and Fabrizio Venditti, 2019. The global capital flows cycle: structural drivers and transmission channels. ECB Working Paper Series, No. 2280, May.

Hills, Robert, Dennis Reinhardt, Rhiannon Sowerbutts and Tomasz Wieladek, 2017. International Banking and Cross-Border Effects of Regulation: Lessons from the United Kingdom. *International Journal of Central Banking*, 13(2), pp 404-433.

Hills, Robert, Kelvin Ho, Dennis Reinhardt, Rhiannon Sowerbutts, Eric Wong and Gabriel Wu, 2019. The international transmission of monetary policy through financial centres: Evidence from the United Kingdom and Hong Kong. *Journal of International Money and Finance*, 90(C), pp. 76-98.

Ioannidou, Vasso O., Steven Ongena and Jose-Luis Peydro, 2015. Monetary Policy, Risk-Taking and Pricing: Evidence from a Quasi-Natural Experiment. *Review of Finance*, 19(1), pp 95-144.

Kalemli-Özcan, Sebnem, 2019. U.S. Monetary Policy and International Risk Spillovers. NBER Working Papers No. 26297.

Lee, Seung J., Lucy Q. Liu, and Viktors Stebunovs, 2019. Risk-Taking Spillovers of US Monetary Policy in the Global Market for US Dollar Corporate Loans. *International Finance Discussion Papers*, No. 1251.

Lloyd, Simon, Ed Manuel and Konstantin Panchev, 2021. Foreign Vulnerabilities, Domestic Risks: The Global Drivers of GDP-at-Risk. Bank of England Staff Working Paper, No. 940.

Miranda-Agrippino, Silvia and H el ene Rey, 2020. U.S. Monetary Policy and the Global Financial Cycle. *Review of Economic Studies*, 87(6), pp 2754-2776.

Passari, Evgenia and H el ene Rey, 2015. Financial Flows and the International Monetary System. *The Economic Journal*, 125(584), pp 675-698.

Portes, Richard, Thorsten Beck, Willem Buiters, Kathryn Dominguez, Daniel Gros, Christian Gross, Sebnem Kalemli-Ozcan, Tuomas Peltonen and Antonio S anchez Serrano, 2020. The Global Dimensions of Macroprudential Policy. Reports of the Advisory Scientific Committee 10.

Reinhardt, Dennis and Steven J. Riddiough, 2015. The Two Faces of Cross-Border Banking Flows. *IMF Economic Review*, 63(4), pp 751-791.

Reinhardt, Dennis and Rhiannon Sowerbutts, 2015. Regulatory arbitrage in action: evidence from banking flows and macroprudential policy. Bank of England Staff Working Paper No. 546.

Reinhardt, Dennis and Carlos van Hombecck, 2020. With a little help from my friends: counter-cyclical capital buffers during the Covid-19 crisis. Bank Underground, 25 August. <https://bankunderground.co.uk/2020/08/25/with-a-little-help-from-my-friends-counter-cyclical-capital-buffers-during-the-covid-19-crisis/>.

Rey, H el ene, 2015. Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence. NBER Working Paper, No. 21162.



## Tables

**Table 1:** Summary statistics

Variable	Mean	SD	Min	Max	Obs.
<b>Dependent variables</b>					
Cross-border lending growth	0.08	0.42	-0.49	1.00	167628
<b>Monetary Policy and Global Factors</b>					
UK monetary policy shocks	-0.01	0.09	-0.27	0.26	167628
US monetary policy shocks	-0.01	0.37	-0.88	0.74	167628
VIX	20.56	7.74	10.30	58.32	167628
<b>Prudential Policy</b>					
Aggregate Index (Pru <sub>j,t-4</sub> )	0.85	1.91	-6.00	13.00	167628
<b>Bank balance sheet characteristics</b>					
Log total assets	16.10	1.95	6.08	20.96	167628
Capital ratio	0.08	0.11	-0.09	0.53	167628
Liquid assets ratio	0.45	0.26	0.01	1.10	167628
Core deposits ratio	0.16	0.20	0.00	0.85	167628
Commitments ratio	0.47	0.28	0.00	1.29	167628
<b>Domestic Macro Controls</b>					
GDP Growth (Annual)	0.027	0.030	-0.056	0.107	167628
Credit Growth (yoy)	0.022	0.067	-0.182	0.250	167628

**Table 2:** Monetary policy spillovers through UK banks' external lending, and interactions with receiving-country prudential policy

	(1)	(2)	(3)	(4)
	No interaction	Interaction	Interaction with Time FE	Interaction with Bank-Time FE
$\Sigma_{k=0}^0 MP_{t-k}^{UK}$	-0.000179	-0.00232		
p-value	0.991	0.883		
$\Sigma_{k=0}^1 MP_{t-k}^{UK}$	-0.0919***	-0.106***		
p-value	0.0006	0.0001		
$\Sigma_{k=0}^2 MP_{t-k}^{UK}$	-0.185***	-0.202***		
p-value	0.0000	0.0000		
$\Sigma_{k=0}^3 MP_{t-k}^{UK}$	-0.184***	-0.196***		
p-value	0.0000	0.0000		
$\Sigma_{k=0}^0 (MP_{t-k}^{UK} \cdot Pru_{j,t-4}^{dest})$		0.0195	0.0273*	0.0264*
p-value		0.125	0.0528	0.0694
$\Sigma_{k=0}^1 (MP_{t-k}^{UK} \cdot Pru_{j,t-4}^{dest})$		0.0607***	0.0830***	0.0803***
p-value		0.0042	0.00032	0.0008
$\Sigma_{k=0}^2 (MP_{t-k}^{UK} \cdot Pru_{j,t-4}^{dest})$		0.0691**	0.117***	0.109***
p-value		0.0160	0.0002	0.0009
$\Sigma_{k=0}^3 (MP_{t-k}^{UK} \cdot Pru_{j,t-4}^{dest})$		0.0527	0.108***	0.105***
p-value		0.116	0.0035	0.0063
$Pru_{j,t-4}^{dest}$		-0.0058***	-0.0005	-0.0008
		(0.0007)	(0.0008)	(0.0008)
$VIX_{t-1}$	-0.0007***	-0.0011***		
	(0.0002)	(0.0002)		
$\log(\text{Total Assets})_{t-1}$	-0.0262***	-0.0232***	-0.0119***	
	(0.0026)	(0.0026)	(0.0027)	
$\text{Capital Ratio}_{t-1}$	-0.1049***	-0.1016***	-0.0817***	
	(0.0280)	(0.0278)	(0.0270)	
$\text{Liquid Asset Ratio}_{t-1}$	-0.0012	0.0007	-0.0029	
	(0.0111)	(0.0110)	(0.0108)	
$\text{Core Deposits Ratio}_{t-1}$	-0.0093	0.0014	0.0130	
	(0.0177)	(0.0177)	(0.0173)	
$\text{Commitment Share}_{t-1}$	-0.0035	0.0017	0.0131	
	(0.0092)	(0.0092)	(0.0090)	
$\text{Annual GDP Growth}_{j,t-4}^{dest}$	0.4369***	0.4224***	0.3932***	0.3787***
	(0.0461)	(0.0459)	(0.0521)	(0.0553)
$\text{Credit to GDP Growth}_{j,t-1}^{dest}$	0.1684***	0.1696***	0.1129***	0.0962***
	(0.0159)	(0.0159)	(0.0167)	(0.0174)
US Monetary Policy shocks	Yes	Yes	N/A	N/A
Fixed Effects	Bank, Receiver	Bank, Receiver	Bank, Receiver, Time	Bank-Time, Receiver
Observations	167,628	167,628	167,628	166,431
R-squared	0.0124	0.0130	0.0178	0.1393
Adjusted R-squared	0.00928	0.00987	0.0142	0.0485

*Notes.* Dependent variable is quarterly growth in cross-border lending. The prudential policy measure is the sum of prudential policy actions (excluding reserve requirements) over a 2-year period. Standard errors, in brackets, are clustered by bank and time.

**Table 3: Interactions by type of lending**

	(1)	(2)	(3)	(4)	(5)	(6)
	UK-Owned		Foreign Subsidiaries		Foreign Branches	
	No interaction	Interaction	No interaction	Interaction	No interaction	Interaction
$\Sigma_{k=0}^0 MP_{t-k}^{UK}$	-0.0120		0.0207		-0.00299	
p-value	0.740		0.547		0.879	
$\Sigma_{k=0}^1 MP_{t-k}^{UK}$	-0.0952		-0.0963		-0.0893***	
p-value	0.130		0.108		0.00827	
$\Sigma_{k=0}^2 MP_{t-k}^{UK}$	-0.133		-0.290***		-0.164***	
p-value	0.125		0.000268		0.000398	
$\Sigma_{k=0}^3 MP_{t-k}^{UK}$	-0.127		-0.300***		-0.160***	
p-value	0.196		0.00114		0.00250	
$\Sigma_{k=0}^0 (MP_{t-k}^{UK} \cdot Pru_{j,t-4}^{dest})$		0.00871		0.0291		0.0308*
p-value		0.784		0.396		0.0974
$\Sigma_{k=0}^1 (MP_{t-k}^{UK} \cdot Pru_{j,t-4}^{dest})$		0.0802		0.112**		0.0699**
p-value		0.122		0.0467		0.0226
$\Sigma_{k=0}^2 (MP_{t-k}^{UK} \cdot Pru_{j,t-4}^{dest})$		0.0905		0.151**		0.0991**
p-value		0.217		0.0445		0.0174
$\Sigma_{k=0}^3 (MP_{t-k}^{UK} \cdot Pru_{j,t-4}^{dest})$		0.0933		0.147*		0.0934*
p-value		0.290		0.0850		0.0593
Fixed Effects	Bank, Receiver	Bank-Time, Receiver	Bank, Receiver	Bank-Time, Receiver	Bank, Receiver	Bank-Time, Receiver
Observations	26,812	26,672	39,852	39,494	100,921	100,222
R-squared	0.0167	0.1358	0.0151	0.1379	0.0129	0.1413
Adjusted R-squared	0.0116	0.0657	0.0100	0.0460	0.00928	0.0438

Notes: Dependent variable is quarterly growth in cross-border lending. The prudential policy measure is the sum of the respective prudential policy actions over a 2-year period. Standard errors, in brackets, are clustered by bank and time.

**Table 4:** Types of prudential policies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Structural Measures				Cyclical Measures					Reserve Requirements
Prudential policies	Capital Requirements	Conservation Buffer	SIFI	Liquidity Req.	LTV	LTV Limits (up is loosening)	DSTI	Loan Restrictions	CCyB	RR
$\Sigma_{k=0}^0 (MP_{t-k}^{UK} \cdot Pru_{j,t-4}^{dest})$	0.0494	0.133	0.341*	-0.0250	0.0285	-0.0036**	0.0875*	0.0681	0.353	0.0171
p-value	0.135	0.418	0.0852	0.616	0.433	0.0275	0.0555	0.339	0.301	0.136
$\Sigma_{k=0}^1 (MP_{t-k}^{UK} \cdot Pru_{j,t-4}^{dest})$	0.101*	0.0640	0.381	0.0688	0.135**	-0.0075***	0.183**	0.266**	0.736	0.0263
p-value	0.0754	0.820	0.278	0.397	0.0252	0.00418	0.0199	0.0204	0.270	0.191
$\Sigma_{k=0}^2 (MP_{t-k}^{UK} \cdot Pru_{j,t-4}^{dest})$	0.142*	-0.174	0.243	0.0912	0.153*	-0.0114***	0.251**	0.408***	0.960	0.0408
p-value	0.0672	0.630	0.601	0.430	0.0676	0.00123	0.0223	0.00723	0.353	0.152
$\Sigma_{k=0}^3 (MP_{t-k}^{UK} \cdot Pru_{j,t-4}^{dest})$	0.128	-0.202	0.592	0.0271	0.168*	-0.0109***	0.260*	0.382**	0.812	0.0433
p-value	0.157	0.615	0.269	0.849	0.0923	0.00959	0.0570	0.0307	0.510	0.211
$Pru_{j,t-4}^{dest}$	-0.0021	-0.0077*	-0.0157***	0.0004	-0.0006	-0.0001	0.0027	-0.0021	-0.0040	0.0005
	(0.0020)	(0.0044)	(0.0060)	(0.0034)	(0.0021)	(0.0002)	(0.0036)	(0.0029)	(0.0098)	(0.0012)
GDP and Credit Growth (dest)	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Fixed Effects	Bank-Time, Receiver	Bank-Time, Receiver	Bank-Time, Receiver	Bank-Time, Receiver	Bank-Time, Receiver	Bank-Time, Receiver	Bank-Time, Receiver	Bank-Time, Receiver	Bank-Time, Receiver	Bank-Time, Receiver
Observations	166,431	166,431	166,431	166,431	166,431	159,283	166,431	166,431	166,431	166,431
R-squared	0.1392	0.1392	0.1393	0.1392	0.1393	0.1436	0.1392	0.1393	0.1392	0.1392
Adjusted R-squared	0.0484	0.0484	0.0485	0.0484	0.0484	0.0497	0.0484	0.0485	0.0484	0.0484

Notes. Dependent variable is quarterly growth in cross-border lending. The prudential policy measure is the sum of the respective prudential policy actions over a 2-year period. Standard errors, in brackets, are clustered by bank and time.