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**Working Paper**

## Brexit, what Brexit? Euro area portfolio exposures to the United Kingdom since the Brexit referendum

ECB Working Paper, No. 2734

**Provided in Cooperation with:**

European Central Bank (ECB)

*Suggested Citation:* Carvalho, Daniel; Schmitz, Martin (2022) : Brexit, what Brexit? Euro area portfolio exposures to the United Kingdom since the Brexit referendum, ECB Working Paper, No. 2734, ISBN 978-92-899-5321-4, European Central Bank (ECB), Frankfurt a. M., <https://doi.org/10.2866/48316>

This Version is available at:

<https://hdl.handle.net/10419/269141>

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EUROPEAN CENTRAL BANK

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## Working Paper Series

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Brexit, what Brexit? Euro area  
portfolio exposures to the United  
Kingdom since the Brexit referendum

No 2734 / September 2022

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## Abstract

We study euro area investors' portfolio adjustment since the Brexit referendum in terms of securities issued in the UK or denominated in pound sterling, in the context of heightened policy uncertainty surrounding the exit process of the UK from the EU. Our sector-level analysis "looks-through" holdings of investment fund shares to gauge euro area sectors' full exposures to debt securities and listed shares. Our key finding is the absence of a negative "Brexit-effect" for euro area investors, which would have rendered UK-issued and pound-denominated securities generally less attractive. Instead, we observe that euro area investors increased their absolute and relative exposures to UK-issued and pound-denominated debt securities since the Brexit referendum. The analysis also reveals an increase in the euro area's exposure to listed shares issued by UK non-financial corporations, while the exposures to shares issued by UK banks declined. These findings should be seen against the backdrop of low yields on euro area debt securities and a strong recovery in UK share prices since the Brexit referendum, which appear to have largely outweighed the uncertainties associated with Brexit.

**Keywords:** Bilateral portfolio holdings, investment funds, cross-border investment, sovereign debt

**JEL Classification:** F30, F41, G15

## Non-technical summary

This paper analyses euro area investors' portfolio adjustment since the Brexit referendum in terms of securities issued in the United Kingdom (UK) or denominated in pound sterling (GBP), in the context of heightened policy uncertainty surrounding the exit process of the UK from the EU. Our sector-level analysis “looks-through” holdings of investment fund shares to gauge euro area investors' full exposures to debt securities and listed shares, while also accounting for heterogeneity across euro area investor sectors. Such granularity is pivotal, for instance, due to the differentiated behaviour that sectors show in response to returns.

Our key finding is the absence of a negative “Brexit-effect” for euro area investors, which would have rendered UK-issued and GBP-denominated securities generally less attractive. In fact, quite to the contrary – and in contrast to developments in trade between the two economic areas – euro area investors have increased their exposures since 2016. In terms of direct financial transactions, the picture is dominated by euro area investment funds, which recorded large net purchases of UK-issued and GBP-denominated debt securities and listed shares since the Brexit referendum. This highlights the usefulness of determining the indirect holdings via investment funds of the other euro area investor sectors, in order to have a comprehensive view on their exposures to the UK or to the GBP.

Descriptively, we observe that euro area investors increased their exposures to UK debt securities and listed shares since the Brexit referendum (often through indirect holdings via investment funds), which is line with the overall cumulated net current account deficit the UK recorded in the period, mostly financed by portfolio investment. These findings are, to a large extent, corroborated by our regression framework, which analyses how euro area exposures to UK-issued securities and GBP-denominated securities evolved in comparison to the rest of the securities portfolio. As regards debt securities issued by UK residents, we find that all euro area sectors increased their relative exposures vis-à-vis the UK, both for securities denominated in pound sterling and euro. For households in particular, this is driven by indirect holdings via investment funds. The increase in holdings of UK-issued and GBP-denominated debt securities by euro area investors may have been driven by the very low yields on euro area-issued and euro-denominated debt since the Brexit referendum, as well as the increasing spread between UK-issued and GBP-denominated debt, in the context of the Eurosystem's asset purchase programme.

Our regression analysis also reveals an increase in the euro area's relative exposure to UK-issued and GBP-denominated listed shares – in particular for those issued by UK non-financial corporations – which was likely supported by the recovery in UK share prices following the initial drop after the referendum.

On the other hand, there has been for most euro area sectors a significant reduction in exposures to UK bank shares since the Brexit referendum.

# 1 Introduction

Roughly three and a half years since, in June 2016, British voters voted for the UK to leave the European Union, Brexit finally took place. And yet, a number of areas of the future relationship between London and Brussels remain to be properly addressed, including the legal aspects that regulate the operations of the financial industry – see, for instance, [Armour \(2017\)](#) on the different legal options associated with a soft and a hard Brexit, and the likely consequences to the UK’s financial services industry, as well as to the remaining 27 members of the EU. In the meantime, the press reports about relocation efforts of some financial corporations from the UK to mainland Europe, and that a number of cities, such as Paris, Frankfurt and Amsterdam, have been fighting for the spoils ([Stafford, Khan, and Keohane, Stafford et al.](#)).

The main goal of this paper is to study how euro area investors adjusted their portfolio holdings since the Brexit referendum until end 2020. Specifically, it seeks to determine whether euro area investors rebalanced their portfolios away from securities issued in the UK or denominated in pound sterling, in the context of heightened policy uncertainty surrounding the process of the UK leaving the EU, which translated into volatility in financial markets. Using a novel approach developed by [Carvalho \(2022\)](#) and [Carvalho and Schmitz \(2021\)](#), the analysis “looks-through” holdings of investment fund shares to gauge euro area sectors’ full exposures to securities issued by UK entities, as well as securities issued in pound sterling, splitting euro area holdings between direct and indirect (via investment funds) exposures to debt securities and listed shares. Our analysis also accounts for heterogeneity across euro area investor sectors. Such granularity is pivotal due to the differentiated behaviour that sectors have in response to returns – see, for instance, [Adrian and Shin \(2010\)](#), [Adrian and Shin \(2013\)](#), [Timmer \(2018\)](#) and [Bergant and Schmitz \(2020\)](#) – as well as the different needs to comply with certain regulatory requirements.<sup>1</sup> Moreover, there is a high heterogeneity across sectors regarding their direct and indirect exposures to securities. For instance, a significant share of pension funds’, insurance companies’ and households’ overall exposures is attained via investment fund shares, while banks’ exposures are mostly via direct holdings.

Our study contributes to the specific strand of the literature dedicated to the assessment of the impact of Brexit on the UK and European economies, which encompasses several different approaches and perspectives.<sup>2</sup> A number of contributions have resorted to dynamic general equilibrium models to gauge the welfare costs of exiting the EU. Writing not long after the referendum, [Van Reenen \(2016\)](#) focuses mainly on the likely adverse effects of Brexit on trade, due to higher trading costs with European

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<sup>1</sup>For other studies, which explore sectoral patterns, see, for instance, [Bergant et al. \(2020\)](#), [Giofré \(2013\)](#), [Roque and Cortez \(2014\)](#), [Galstyan et al. \(2016\)](#), [Boermans and Vermeulen \(2019\)](#) and [Galstyan and Velic \(2018\)](#).

<sup>2</sup>See [Sampson \(2017\)](#) for a survey of this literature.

partner countries, which amount to about half of the UK's trade, but also on foreign direct investment (FDI), immigration and regulation, and estimates welfare losses in a range of 1.3 to 2.6%.<sup>3</sup> Bruno et al. (2017) focused specifically on the consequences of Brexit for FDI and estimate that Brexit would lead to a drop of 22% in the UK's inward FDI (see also Dhingra et al. (2016)). Finally, focusing on the financial market reactions to Brexit, Belke et al. (2018) investigate the interaction between UK policy uncertainty and UK financial market volatility in a time-varying framework as well as spillover-effects to European financial markets.

Our study also contributes to a broader literature that has analysed bilateral portfolio investment exposures and portfolio shifts. Earlier studies documented the existence of home bias – for instance, Sørensen et al. (2007), Bertaut and Kole (2004) and Ahearne et al. (2004). Subsequent studies – such as Portes et al. (2001), Portes and Rey (2005), Lane and Milesi-Ferretti (2008) and Okawa and Van Wincoop (2012) – showed that, similarly to trade in goods, gravity effects are determinants of international finance. These factors also helped to explain the adjustment patterns in bilateral portfolio investment positions during the global financial crisis (Galstyan and Lane, 2013). Of particular importance to our paper is that this literature has established that political and economic integration among economies is an important determinant of bilateral exposures, contributing to higher levels of financial integration – see, among others, Lane and Milesi-Ferretti (2008), Galstyan et al. (2016) and, in the euro area's case, Lane (2006) and Lane and Milesi-Ferretti (2005). Along these lines, Brexit provides for an interesting case-study of the reverse situation, i.e. of potential disintegration dynamics.

Our key finding is the absence of a negative “Brexit-effect” for euro area investors, which would have rendered UK-issued and GBP-denominated securities generally less attractive. In terms of direct financial transactions, the picture is dominated by euro area investment funds, which recorded large net purchases of UK-issued and GBP-denominated debt securities and listed shares since the Brexit referendum. This highlights the usefulness of determining the indirect holdings via investment funds of the other euro area investor sectors, in order to have a comprehensive view on the exposures to the UK.

Descriptively, we observe that euro area investors increased their exposures to UK debt securities and listed shares since the Brexit referendum (often through indirect holdings via investment funds), which is

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<sup>3</sup>Steinberg (2019) finds that the total consumption-equivalent welfare cost of Brexit for UK households is between 0.4 and 1.2%, of which less than a quarter of a percent of this cost is due to uncertainty. In their baseline scenario, which contemplates the UK and the EU raising both trade and FDI costs by 5 percentage points, McGrattan and Waddle (2020) find welfare losses of 1.4 and 2.3 percent for UK and EU citizens, respectively. Using a trade model with 31 industries and 35 countries, Dhingra et al. (2017) conclude that the efficiency losses associated with higher trade barriers (including tariff, nontariff and potential future reductions in trade costs among EU countries) surpass the UK's net fiscal contribution to the EU's budget. What is more, they find that leaving the EU will lead to a 1.3% permanent drop in consumption per capita in an optimistic scenario – in which the UK maintains access to the Single Market – and 2.7% in an adverse scenario – in which it follows general World Trade Organization rules. In turn, Born et al. (2019) resort to synthetic control methods to show that the decision to leave the EU has cost the UK an output loss of 1.7% to 2.5% by year-end 2018.

line with the overall cumulated net current account deficit the UK recorded in the period, mostly financed by portfolio investment. These findings are, to a large extent, corroborated by our regression framework, which analyses how euro area exposures to UK-issued securities and GBP-denominated securities evolved in comparison to the rest of the securities portfolio. As regards debt securities issued by UK residents, we find that all euro area sectors increased their relative exposures vis-à-vis the UK, both for securities denominated in pound sterling and euro. For households in particular, this is driven by indirect holdings via investment funds. The increase in holdings of UK-issued and GBP-denominated debt securities by euro area investors may have been driven by the very low yields on euro area-issued and euro-denominated debt since the Brexit referendum, as well as the increasing spread between UK-issued and GBP-denominated debt, in the context of the Eurosystem's asset purchase programme. Our regression analysis also reveals an increase in the euro area's relative exposure to UK-issued and GBP-denominated listed shares – in particular for those issued by UK non-financial corporations – which was likely supported by the recovery in UK share prices following the initial drop after the referendum. On the other hand, there has been, for most euro area sectors, a significant reduction in exposures to UK bank shares since the Brexit referendum.

The results of this paper are consistent with the perspective that, in relation to Brexit, euro area investors displayed a momentum-investment and return-chasing behaviour. At the same time, it is also in line with the uncovered equity parity hypothesis, as there was an increased investment in assets that, in euro terms, had underperformed. From this perspective, the patterns of euro area investors may reflect the intention of further investing in a market with relatively strong returns, together with keeping a constant currency exposure to the pound sterling. In turn, our results are at odds with the literature that has established that country-specific uncertainty is associated with a general investor retrenchment. What is more, the results also pose an interesting puzzle, in that the trade disintegration dynamics generated by Brexit went hand in hand with stronger financial integration.

The remainder of the paper is organised as follows: Section 2 provides a brief overview of Brexit and its impact on financial markets; Section 3 shows descriptively how the exposures of euro area investors to securities issued by residents of the UK and/or denominated in pound sterling evolved since the Brexit referendum; Section 4 lays out the empirical approach used, while Section 5 discusses the results; finally, Section 6 concludes.



## 2 The long and winding road: a brief summary of Brexit (thus far)

The unexpected outcome of the UK referendum on EU membership, held on 23 June 2016, sparked a complex process, resulting in a prolonged period of uncertainty. While the initial process of withdrawing from the EU was completed by February 2020, many aspects regarding the future of the relationship between the UK and the EU are still to be properly defined. In the political scene, the first consequence of the referendum's result was the end of David Cameron's government, who resigned the day after it took place, after having campaigned to remain in the EU.

Under the new Prime Minister Theresa May, the UK invoked, on 29 March 2017, the now-famous Article 50 of the Treaty of the European Union, formally notifying the EU of its intention to leave. The same article set forth a two-year period for both parties to reach an agreement on the withdrawal process, thus setting 29 March 2019 as the day in which the UK would leave the EU. With that goal in mind, the initial negotiation rounds between Brussels and London would kick off a few months later, in June, roughly a year after the referendum. Before that, however, Prime Minister May called for a snap election, hoping to secure a larger majority. The elections, held in 8 June 2017, resulted in the opposite outcome: although still the largest party in the House of Commons, the Conservative Party lost its small overall majority and formed a minority government under its leadership.

After the initial shock, in the aftermath of the referendum, tensions would flare up again in late-2018 and early-2019, as the deadline for Brexit approached and parliamentary approval of a deal was not in sight, sparking fears of a "hard Brexit", whereby trade with the EU Member States would follow general WTO rules. While, in late November 2018, the remaining 27 EU member states endorsed May's Withdrawal Agreement, it was vehemently rejected in the House of Commons by 432 votes to 202, the largest majority ever against a UK government. The agreement would be submitted once more for vote on 12 March and again rejected, albeit this time by a smaller margin. Unable to get the Withdrawal Agreement approved and just a few days shy of the deadline, May requested an extension to Article 50 to the European Council; European Leaders extended the deadline to 31 October 2019 on 10 April.

On 24 May, Theresa May announced her resignation, carrying on as caretaker until 24 of July, when Boris Johnson, the new leader of the Conservative Party, was invited by the Queen to form a new government and become Prime Minister. Johnson, however, initially endured the same difficulties as May: unsuccessful in passing the Brexit deal in Parliament by October, he was also forced to request yet another extension to Article 50, which was granted until 31 January 2020, and call for a new snap

election. The latter took place on 12 December 2019 and, in contrast to the 2017 election, resulted in a landslide 80-seat majority for the Conservatives, which allowed Johnson, only a few days later on 20 December 2019, to finally pass the Withdrawal Agreement in the House of Commons, with a comfortable 358-234 vote. Accordingly, on the first day of February 2020, the UK formally left the EU and the transition period began, during which EU rights and obligations still applied. Little more than a month later, the formal negotiations for a future agreement between the EU and the UK began. A deal on this agreement would be struck on Christmas Eve of 2020, just a few days before the end of the transition period.

However, a number of issues still remain to be agreed upon and it is, at this stage, unclear how they will unfold. In particular, in the context of finance, the so-called passporting rights, which allow a financial firm, once it has established itself in the European Economic Area (EEA), to carry out its activities in any other member state – either by also moving its operations there or cross-border – without the need for further authorisation from any of the remaining countries.

Figure 1 displays the UK monthly Economic Policy Uncertainty (EPU) index, which highlights the volatility induced by the Brexit referendum. The most striking element is the outstanding spike in June and July 2016, against the backdrop of the referendum. While the index receded afterwards, it still recorded high levels throughout the remainder of 2016, as well as in most of 2019 and 2020. In fact, even excluding the outlier observations of June and July 2016, the index average almost doubled from the pre-Brexit to the post-Brexit period.

Figure 2 displays the sterling nominal effective exchange rate, as well as the bilateral exchange rate vis-à-vis the euro. While the pound sterling was appreciating in the years before, partially due to the weaker euro, on the back of the expectation and the announcement of the ECB's Asset Purchase Programme, the British currency strongly depreciated immediately following the outcome of the referendum: on the close of the day after the referendum, it had lost more than 5% to the euro and 6% in nominal effective terms and, by the first days of July, those figures had roughly doubled. What is more, the currency has since not recovered. In turn, Figure 3 displays the implicit volatility of the EUR/GBP and the EUR/USD exchange rate crosses. It not only highlights the extreme levels of volatility attained immediately after the Brexit referendum (and which did not affect the EUR/USD exchange rate), but also bouts of higher volatility mostly during 2019 and in end-2020. In particular, a second spike in volatility is also visible in March 2020, associated to the Covid shock. However, in that case, the implied volatility of the EUR/USD also substantially increased, in line with a shock which was not specific to the UK.

Taken together, these developments substantiate the relevance of this paper's research question: as-

sessing to which extent euro area investors might have readjusted their exposures to UK-issued or GBP-denominated securities in the aftermath of the Brexit referendum. The latter is further reinforced by the fact that the UK and the euro area economies are highly integrated. The interconnections among the two economic blocks are particularly relevant in the case of financial integration, due to the role the UK – and in particular the City of London – plays in global and European finance, oftentimes acting as a platform between euro area and foreign investors.

### **3 Descriptive evidence on shifts in euro area investors' exposures to UK and GBP securities since the Brexit referendum**

In this section, we first review the direct financial transactions (i.e. net purchases/sales) of euro area investors in securities issued by UK residents or denominated in pound sterling (GBP) since the Brexit referendum until the end of our sample period (2020Q4). In a second subsection, we extend the analysis by looking at the developments in euro area exposures – both direct and indirect (i.e. via investment funds) – to those securities.

#### **3.1 Direct transactions**

We start the analysis by considering euro area investors' cumulated direct net transactions (i.e. net purchases and sales) since 2016Q2 (i.e. the quarter in which the Brexit referendum took place) in debt securities (Figure 4) and listed shares (Figure 5).

Several interesting patterns emerge with regard to debt securities: first, the overall picture is dominated by the investment fund (IF) sector that has recorded net purchases of around 200bn EUR – both in terms of UK-issued and GBP-denominated debt securities – since the Brexit referendum, followed by the other financial institutions (OFI) sector with considerably smaller net purchases of 20bn EUR. The large role played by euro area IFs highlights the usefulness to determine the indirect exposures via investment funds of the other euro area investor sectors, in order to have a comprehensive view of how euro area investors' exposures to the UK or to GBP-denominated securities have evolved since the Brexit referendum. Accordingly, we consider both the direct and indirect exposures in the next sub-section and the regression-based analysis.

Second, there is substantial heterogeneity across the different euro area sectors as IFs, OFIs and pension funds (PFs) were net buyers of UK debt securities, while banks, non-financial corporations

(NFCs) and households (HHs) sold UK-issued securities since 2016Q2, albeit on a much smaller scale. Thus, there is overall no evidence of a negative "Brexit-effect" for euro area investors, which would have rendered UK-issued and GBP-denominated securities less attractive.

Third, a number of sectors display a disconnect in terms of financial transactions between UK-issued and GBP-denominated debt securities. In particular, this is worth highlighting for banks and, to a lesser extent, insurance corporations (ICs), which were net buyers of GBP securities, but net sellers of UK-issued securities, while HHs reduced their exposure to UK-issued securities but kept the exposure to GBP-denominated securities almost constant. In turn, for IFs and PFs currency and geography were closely aligned.

As regards listed shares (Figure 5), there is no evidence of a Brexit effect either, while the picture is more homogeneous as all sectors were net buyers of UK-issued listed shares since 2016Q2, with GBP-denominated listed shares following a very similar pattern (with the exceptions of OFIs and NFCs). Again, the largest net purchases were due to IFs (around 50bn EUR), followed by banks with around 12bn EUR. It is also worth noting that there seems to have been a Covid-19 recovery effect at the end of 2020, with strong net purchases of UK-issued and GBP-denominated listed shares by IFs, ICs, PFs, NFCs and HHs.

Having established that euro area residents were net investors in UK-issued securities since the Brexit referendum, we put these developments into the context of the UK's overall balance of payments developments during this time period, displayed in Figure 6. We observe that the UK recorded a cumulated current account deficit of around 400bn EUR between 2016Q2 and 2020Q4, which was financed by net financial inflows, mostly in the form of portfolio investment. Specifically, foreign investors' net purchases of UK portfolio debt amounted to around 500bn EUR since the referendum, of which 40% came from euro area investors. Thus, the investment behaviour of euro area residents with regard to UK debt over this period appears to have been consistent with that of other foreign investors. For listed shares however, net inflows of around 60bn EUR can be largely attributed to euro area investors, revealing that other foreign investors had less of a preference for UK equity – in particular in the first quarters after the referendum when policy uncertainty was highest (Figure 1).

### **3.2 Direct and indirect exposures**

Next, in light of the important role of euro area investment funds, we employ a look-through method, that allows not only to assess the direct exposures of euro area investors – i.e. the exposures that the different sectors hold directly in their portfolios – but also their indirect exposures – i.e. the exposures

they have via their holdings of investment fund shares. In particular, pension funds, insurance companies and households are the euro area sectors with the highest allocation in investment fund shares (Carvalho and Schmitz, 2021).<sup>4</sup> Total exposures of euro area sectors are therefore the sum of direct and indirect exposures. Details of how indirect exposures of euro area investors are determined and computed are provided in the Appendix.

Figure 7a shows the direct and indirect exposures of euro area investors (by sector) to UK debt securities just before the Brexit referendum (i.e. at the end of 2016Q1) and at the end of our sample period (2020Q4). Comparing these two data points, it stands out that only the euro area banking sector has reduced its exposure to UK debt securities. In line with what was observed for transactions (Figure 4), this is driven by banks' direct holdings. All other sectors increased their exposures to UK debt since the Brexit referendum. For ICs (the sector with by far the largest exposure to the UK), HHs and NFCs this is largely driven by the indirect holdings via investment funds, while for PFs and OFIs also the direct holdings contributed.

In terms of listed shares (Figure 7b), all euro area sectors have increased their exposures to UK issued shares (with the exception of a small reduction for OFIs) and for most sectors this reflects an increase both in terms of direct holdings – in line with what was observed for transactions (Figure 5) – and indirect exposures.

In Figures 8a and 8b we further drill down by also considering the currency of denomination of UK-issued securities. A striking feature of the euro area's direct debt holdings is the large proportion of euro-denominated UK-issued securities (in particular for banks, OFIs and ICs). Since the Brexit referendum, this component has further increased for OFIs, while it declined for euro area households and banks. For the latter, this component drove the overall decrease in banks' exposure to UK debt securities. Remarkably, the direct holdings of GBP-denominated UK debt have been low throughout (and even close to zero for NFCs and HHs), albeit increasing somewhat for banks and PFs since 2016Q1. On the other hand, indirect holdings of GBP-denominated UK debt securities are of much higher importance for ICs, PFs, HHs and NFCs and have increased considerably since the referendum.

For listed shares the connection between UK issuance and GBP-denomination is much stronger than for debt (Figure 8b), both for the direct and indirect holdings, leading to higher GBP exposures since the referendum, while the role of the other currencies in UK listed shares has generally declined.

Finally, Figures 9a and 9b present the euro area's global exposure to the GBP, broken down by

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<sup>4</sup>As pointed out in Carvalho and Schmitz (2021), those sectors with higher proportions of investment fund shares in their total portfolio have, mechanically, higher shares of indirect exposures.

country groups of issuance. Overall, and not surprisingly following the evidence presented above, the geographic exposures to the UK are larger than to the GBP, especially for debt securities. Having said this, GBP exposures have increased for all sectors since the referendum which, for most sectors, is driven by indirect holdings of UK-issued GBP-denominated debt (in line with the evidence presented in Figure 8a). Exposures to GBP-denominated debt issued outside the UK (i.e. in the euro area and other countries) have remained relatively stable since 2016Q1 and are somewhat relevant in the indirect holdings of ICs, PFs and HHs. For listed shares the strong connection between UK issuance and GBP-denomination is once more visible, as euro area holdings of GBP-denominated listed shares issued outside the UK are relatively small. The largest (indirect) exposures to GBP listed shares are again recorded for ICs, PFs and HH and mainly relate to shares issued in non-euro area countries.

## 4 Regression analysis - empirical approach

While the descriptive evidence presented above showed the euro area investment patterns vis-à-vis the UK and the GBP since the Brexit referendum in absolute terms, our regression-based analysis provides an encompassing framework, which assesses how euro area exposures to the UK and the GBP fared over this period in comparison to the other securities held by euro area investors.

Accordingly, we use the following empirical approach, inspired by Galstyan and Lane (2013), but in a more dis-aggregated fashion over time, and estimated separately for the different euro area holding sectors, namely, Banks, OFIs, ICs, PFs, NFCs and HHs:

$$\Delta \ln(h_{hc,hs,t}^{ic,a,is,c}) = \ln(h_{hc,hs,t-1}^{ic,a,is,c}) + \alpha_{hc}^1 + \alpha_{ic,is,c}^2 + \alpha_t^3 + \beta^1 \gamma_{hc,ic} + \beta^2 \eta_{hi} + \varepsilon_{hi,t} \quad (1)$$

where  $\Delta \ln(h_{hc,hs,t}^{ic,a,is,c})$  is the quarterly change in the log of the direct, indirect or total exposures (i.e. the percentage difference) of holder country  $hc$  and holder sector  $hs$  to asset class  $a$ , of issuer country  $ic$ , issued by sector  $is$  and denominated in currency  $c$ .

We consider quarterly data for the period from 2016Q2 to 2020Q4, i.e. from the quarter of the Brexit referendum until the end of the transition period. To gauge the relative demand for UK and GBP securities by euro area investors, we control for host country, source (euro area) country, issuer sectors and currency of denomination: holder country ( $\alpha_{hc}^1$ ) and issuer country/sector/currency ( $\alpha_{ic,is,c}^2$ ) dummies are included (except for UK-issued and GBP-denominated securities, as outlined below), in order to control for any time-invariant factors along these dimensions. In addition, we employ time fixed effects

( $\alpha_t^3$ ) to remove any quarter-specific global factors.<sup>5</sup> In addition, three types of variables are included in the regressions:

- a key set of dummy variables  $\eta_{hi}$  to assess
  1. exposures vis-à-vis the UK ( $UK_c^{is}$ ), where  $c$  is the currency – GBP, EUR or, in the case of debt securities, also any other currency (OTH) – and  $is$ , the issuer sector – B, NFC, OFI or GG, the latter in the case of debt securities only. These variables provide insights on how euro area exposures to UK issued securities – broken down by currency and issuing sector – evolved in comparison to the rest of the portfolio;
  2. exposures to the pound sterling ( $GBP_{ic}^{is}$ ), where  $ic$  is the issuer country – the UK, the euro area (EA) or any other country (OTH) –, and  $is$  denotes the issuer sector as above. These variables provide insights on how euro area exposures to GBP denominated securities – broken down by issuing country and sector – evolved in comparison to the rest of the portfolio.
- $\ln(h_{hc,hs,t-1}^{ic,a,is,c})$  is the log of the outstanding direct, indirect or total exposure in the previous quarter, to control for the pre-existing level of a sector’s investment.
- a set of gravity variables  $\gamma_{hi}$ , including the logarithms of bilateral distance and bilateral imports, as well as dummies for shared language (definitions and sources of these data are described in the appendix).<sup>6</sup>

## 5 Regression analysis - results

We start by discussing the main results regarding debt securities, and then move on to listed shares, before performing several robustness exercises.<sup>7</sup>

### 5.1 Debt securities

As regards debt securities issued by UK residents, we find that all euro area sectors increased their exposures vis-à-vis the UK, both for securities denominated in pound sterling and euro (Table 1). For

<sup>5</sup>In order to focus only on non-trivial holdings, as well as to avoid potential bias, exposures smaller than €1 million were excluded.

<sup>6</sup>Due to the lack of gravity variables, the portfolio exposures to some territories were reclassified and included within larger ones – the list of reclassifications is also provided in the appendix – and, for the same reason, exposures to debt issued by international organisations were excluded.

<sup>7</sup>While not the focus of this paper, our findings for the gravity control variables are in line with the literature. In general, there is a “reversion to the mean” effect across almost all exposures and investor sectors, implying that larger positions in the previous quarter tend to be reduced during the next quarter; moreover, there is strong evidence that distance matters, both for direct and indirect holdings as quarterly net purchases (sales) are smaller (larger) for securities issued in more distant locations.

HHs in particular, this is largely driven by indirect holdings via investment funds, while for the other sectors also the direct exposures increased. The rise in exposures vis-à-vis the UK is strongest for those issued by the government, while for the other sectors an increase is also recorded, especially for euro-denominated securities.

Table 2 focuses on debt securities denominated in GBP and shows that all euro area sectors increased their exposure vis-à-vis the GBP, in particular if the securities are issued in the UK, which is in some cases driven by indirect holdings (across the board for HHs).

These findings show that the broad patterns revealed by the descriptive analysis in Section 3.2 also hold in relative terms, i.e. when analysing how euro area exposures to UK-issued securities and GBP-denominated securities evolved in comparison to the rest of the securities portfolio. In the case of banks, the evidence underscores that the deleveraging process focused proportionally less on securities issued in the UK or denominated in GBP, thus leading to an overall higher exposure to the latter securities.<sup>8</sup> The increase in holdings of UK-issued and GBP-denominated securities by euro area investors may have been largely driven by the low (or even negative) yields on euro area-issued and euro-denominated debt since the Brexit referendum, as well as the increasing spread between the yields of UK and euro area securities (Figures 10 and 11). Importantly, while spreads between UK and euro area government securities had previously attained similar magnitudes, especially in the 5-year tenor, the combination of both large spreads and low/negative euro area yields is a novel feature of the more recent period.

These shifts in holdings should also be seen against the backdrop of the Eurosystem's Asset Purchase Programme (APP). This programme – which had been in place since March 2015 – led to a broad-based portfolio rebalancing by euro area investors towards foreign debt securities, including 'closest substitutes' to the euro area public sector debt securities eligible to be purchased by the Eurosystem (Bergant et al. (2020)). UK government debt securities also fall under the category of highly rated 'closest substitutes', while offering a substantial yield differential vis-à-vis euro area debt. In line with our findings, Carvalho and Schmitz (2021) show that part of the euro area rebalancing induced by the APP was driven by indirect holdings via investment funds.

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<sup>8</sup>The descriptive analysis had revealed some decline in banks' absolute holdings of euro-denominated UK-issued debt securities, while the regression analysis showed a positive sign on these securities. This divergence can be explained by the euro area banking sector's persistent deleveraging process since the global financial crisis – and in particular shedding extra-euro area assets (Emter et al. (2019)).



## 5.2 Listed shares

Focusing on listed shares issued by UK residents, we observe a heterogeneous picture across issuance sectors (Table 3). All euro area sectors increased their relative exposures to UK listed shares issued by NFCs – both in terms of indirect and total holdings, if denominated in GBP (which is the case for the majority of UK-issued shares, see Figure 8b). In terms of shares issued by UK banks, there is a significant reduction in exposures by euro area investors (with the exception of banks and ICs) since the Brexit referendum (for GBP-denominated and largely for euro-denominated as well). Euro area OFIs, NFCs and HHs also reduced their exposures to listed shares issued by UK OFIs.

GBP issuance of listed shares outside the UK is only observed on a significant scale for NFCs.<sup>9</sup> For NFC listed shares, the picture is mixed across euro area sectors, with banks, ICs, PFs and HHs increasing their exposures to GBP-denominated listed shares issued outside the UK (Table 4), which is driven by indirect holdings for ICs and PFs.

Overall, in line with the evidence presented in Figure 7b, the regression analysis reveals an increase in the euro area’s relative exposure to UK-issued and GBP-denominated listed shares – in particular for those issued by UK NFCs – since the Brexit referendum. This rebalancing was likely supported by the increase in UK share prices following the initial drop after the referendum (Figure 12). In contrast, the underperformance of the UK’s banking sector (see Figure 13) may well justify the decrease in exposure to banks.

## 5.3 Discussion

How do our results square with the literature on cross-border portfolios and foreign currency movements? Studies of the determinants of portfolio flows have arrived at the conclusion that country-specific uncertainty is associated with a retrenchment from the relevant market – see [Fratzscher \(2012\)](#); [Caporale et al. \(2015\)](#); [Sarno et al. \(2016\)](#); [Schmidt and Zwick \(2015\)](#) – see also [Choi and Furceri \(2019\)](#), in the case of bilateral banking flows, and [Julio and Yook \(2016\)](#) for foreign direct investment. Notwithstanding, these studies generally use push and pull frameworks, controlling for both, respectively, global and country-specific determinants of bilateral flows. In particular, [Sarno et al. \(2016\)](#) find that global push factors play a much larger role in explaining portfolio flows than domestic pull factors. These findings reverberate with the global liquidity literature, which argues that global financial conditions are highly synchronised and that measures of US financial conditions explain a substantial amount of the movements in capital

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<sup>9</sup>Issuance by GBP-denominated listed shares outside the UK is mainly done by entities resident in offshore centres with close links to the UK, such as Jersey, Gibraltar, etc.

flows (Rey, 2015; Miranda-Agrippino and Rey, 2015).

In contrast, existing literature in international economics predicts that investors target an optimal currency exposure, in order to keep a given level of foreign currency risk (Hau and Rey, 2004; Camanho et al., 2020). For that reason, investors rebalance their portfolios by decreasing (increasing) their exposure to markets/currencies which have outperformed (underperformed). This is in line with the broader concept of Uncovered Equity Parity (UEP), which predicts that when foreign equity holdings outperform domestic holdings, domestic investors are exposed to higher relative exchange rate exposure and decide to repatriate some of the foreign equity to decrease exchange rate risk (Cappiello and De Santis, 2007; Kim, 2011; Curcuru et al., 2014). Furthermore, empirical and theoretical work from the finance literature shows that investors often adjust their targets pro-cyclically and buy more of assets that are increasing in value (e.g. Bohn and Tesar (1996) for international investment in the US, or Becker and Ivashina (2015) for insurance companies). These investment patterns are better known as “momentum investment” or “return chasing”. More recently, Ammer et al. (2018) present empirical evidence that investors shift their portfolio into riskier US corporate bonds in response to low interest rates in their domestic markets. Similarly, Bergant and Schmitz (2020) find evidence for “momentum investment” among euro area investors that show larger net purchases of foreign securities which experience relatively higher valuation gains.

The results of this paper can be seen to lend support to both of the latter views. On the one hand, they are in line with UEP, as the initial negative returns (in euro terms) of British equities and bonds, brought about by the stark depreciation of the Pound sterling, was met with increased investment of euro area investors in those assets. On the other hand, these investment patterns are also in line with momentum investment and return-chasing motives, as euro area investors increased their exposures towards a market, which delivered a relatively stronger performance, since the initial Brexit shock. Hence, the observed investment patterns of euro area investors – increasing their exposure to UK and GBP-denominated securities – may reflect both the objective to maintain a given level of currency risk, as well as to increase the exposure to a market which recorded relatively strong returns.<sup>10</sup>

## 5.4 Extensions and robustness

We run several extensions and robustness checks (all results are available upon request).

First, we distinguish between euro area investors resident in financial centres and the rest of the euro

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<sup>10</sup>It should, notwithstanding, be noted that currently available datasets do not allow to assess the extent to which these exposures are hedged. Thus, it is not possible to determine if euro area investors hedged their foreign exchange risk to the Pound sterling. However, survey evidence indicates that hedging is more common in foreign currency fixed income positions than in equity positions.

area.<sup>11</sup> The results are overall consistent between these two groups of euro area countries, both for debt and listed shares. The disinvestment from listed shares issued by UK banks is slightly less pronounced for the euro area financial centres (in particular by PFs and HHs).

Second, we exclude intra-euro holdings (for the residency-based regressions) and euro holdings (for the currency-based regressions) from the analysis, in order to take a purely international perspective of euro area investments. Again, all main results hold. Interestingly, the rebalancing into GBP-denominated debt becomes slightly stronger in the specification when euro-denominated debt is not included, suggesting that the GBP has been among the most attractive international currencies for euro area investors during our sample period.

Third, we test if our results are different when focusing on the immediate Brexit “shock period”, i.e. when we consider the difference in holdings between two time periods, namely between the first quarter of 2016 (“pre-Brexit”) and the third quarter of 2016 (“immediate post-Brexit”). This approach, inspired by Galstyan and Lane (2013), was also followed by Carvalho and Schmitz (2021) to analyse the impact of the COVID-19 shock on euro area portfolio holdings. In general, there is no evidence of a negative “immediate Brexit-effect” either. For debt, there is also, in this time period, some rebalancing by most euro area sectors into UK sovereign and bank securities, mainly driven by indirect holdings via investment funds. As regards listed shares, there is some indication of disinvestment from securities issued by banks and increased exposure to those issued by NFCs, however in both cases not as strong as over the whole sample period.

Fourth, we distinguish the euro area investment into UK-issued and GBP-denominated securities according to the quarters with “high uncertainty” and “calm” time periods. In doing so, we investigate if in the high uncertainty quarters – i.e. those with spikes in the UK Economic Policy Uncertainty Index (Figure 1) – euro area investors show different investment patterns with regard to UK-issued and GBP-denominated securities than in the calmer periods.<sup>12</sup> Our analysis reveals – perhaps somewhat surprisingly – that for both debt and equity securities there are no significant differences between these two types of time periods. This may indicate that euro area investors’ portfolio decisions with regard to UK issued and GBP-denominated were not significantly influenced by the turns and noise during the Brexit negotiations, but rather driven by the return-considerations outlined above.

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<sup>11</sup>We follow the definition proposed by Lane and Milesi-Ferretti (2018), which is based on the financial openness of countries. Accordingly, the euro area financial centres are Belgium, Cyprus, Ireland, Luxembourg, Malta, and the Netherlands.

<sup>12</sup>We consider quarters with uncertainly levels of two standard deviations above the long-term average as “high uncertainty” periods. These are from 2016Q1 to 2017Q2; 2018Q4 and 2019Q1 and 2019Q3 to 2020Q4, with the exception of 2020Q3.

## 6 Conclusion

This paper's main finding is that euro area investors have not shifted their holdings away from either securities issued in the UK or denominated in pound sterling on account of the market tensions and uncertainty following the outcome of the Brexit referendum. In fact, quite to the contrary – and in contrast to developments in trade between the two economic areas – euro area investors have increased their exposures since 2016.

These developments should be seen against the backdrop of prevailing market conditions in the euro area. Arguably, with the current low and/or negative interest rates of euro area bonds, UK bonds may provide a (much) higher-yielding alternative – in particular, in the case of UK government bonds, a highly-rated asset that may substitute core euro area government bonds; accordingly, this effect may dominate other negative effects associated to Brexit. What is more, the relatively contained impact of the Brexit referendum on British stock indices, as well as the swift recovery thereafter, may well have supported the continued investment of euro area investors in UK listed shares, with the exception of UK bank shares. Furthermore, to the extent that the FTSE100 is composed of the UK's largest companies that have a significant international focus, it may have been particularly insulated from domestic political tensions.

## A Estimation of indirect portfolio exposures

The method to look through investment fund holdings of euro area investors broadly follows [Carvalho \(2022\)](#) and [Carvalho and Schmitz \(2021\)](#). For that purpose, the Eurosystem’s Securities Holdings Statistics (SHS) by sector are used, which contain highly granular security-level information on the holdings, valued at market prices, of debt securities, listed shares and investment fund shares of euro area investors, aggregated by institutional sectors.<sup>13</sup> It should be noted that this dataset represents a subset of euro area sectors’ complete portfolio, to the extent that it does not include unlisted shares – in this sense, listed shares are taken as a proxy for the whole of the equity instrument class.<sup>14</sup>

The following sectors are considered and their holdings are accordingly aggregated at the euro area country-sector level: deposit taking corporations except central banks, which corresponds to banks (B); money market and non-money market investment funds (IF); insurance corporations (IC); pension funds (PF); other financial institutions excluding financial vehicle corporations (OFI); non-financial corporations (NFC) and households (HH).

The first step towards “looking-through” is to compute the distribution of holdings by investment funds. Money-market and non-money market funds are pooled together into a single investment fund sector.<sup>15</sup>

This is done for the holdings of each instrument class and gives  $w_{hc,IF,t}^{ic,a,is,c}$ , i.e., the weight of asset class  $a$ , denominated in currency  $c$ , issued by issuer sector  $is$  of issuer country  $ic$ , in total investment fund ( $IF$ ) holdings resident in euro area country  $hc$ , in period  $t$ . It should be noted that investment funds also hold investment fund shares (funds of funds) and therefore, in this step, these weights are computed for debt securities, listed shares, and also investment fund shares.

The second step is to compute the IF share holdings of each sector, in each euro area country and in each period of time. These are given by  $h_{hc,hs,t}^{ic,IFS,IF,c}$ , where  $hs$  stands for holder sector, the asset is investment fund shares ( $IFS$ ), and the remaining super- and subscripts have the same interpretation as before. There is, however, one element which is unknown: the holdings of investment funds which are resident outside the euro area. In order to allocate these amounts, it is assumed that the distribution of these holdings corresponds to the average of that of Luxembourgian and Irish resident investment funds, which tend to be representative of global investment funds. Accordingly, that average is given by

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<sup>13</sup>Data for other EU countries that do not belong to the euro area are also available; however, these countries participate only on a voluntary basis, as opposed to euro area countries, for which the collection of this data is compulsory. In practical terms, the availability of data for the EU countries not belonging to the euro area is more restricted and, in general, of inferior quality.

<sup>14</sup>For more information on the SHS, see [ECB \(2015\)](#)

<sup>15</sup>In this pooled investment fund sector non-money market investment funds accounted for 92% of the overall holdings at end-2019.

$\bar{w}_{hc,IF,t}^{ic,IFS,IF,c}$ , where  $hc$  includes Luxembourg and Ireland.<sup>16</sup>

For this reason, one needs to separate the investment fund share holdings of a euro area country-sector vis-à-vis other euro area countries —  $h_{hc,hs,t}^{ic=EA,IFS,IF,c}$ , which we allocate on a issuer-country by country basis — and non-euro area countries —  $h_{hc,hs,t}^{ic\neq EA,IFS,IF,c} = \sum_{ic \notin EA} h_{hc,hs,t}^{ic,IFS,IF,c}$ , which we allocate as a single block of non-euro area issuer countries.

With all these elements, the estimated holdings of a given holder country  $hc$  of asset class  $a$ , denominated in currency  $c$ , issued by issuer sector  $is$ , vis-à-vis issuer country  $ic$ , in period  $t$ , are given by:

$$\hat{h}_{hc,hs,t,1}^{ic,a,is,c} = h_{hc,hs,t}^{ic=EA,IFS,IF,c} \times w_{hc,IF,t}^{ic,a,is,c} + h_{hc,hs,t}^{ic\neq EA,IFS,IF,c} \times \bar{w}_{hc,IF,t}^{ic,IFS,IF,c} \quad (2)$$

Due to the existence of funds of funds, this process is not able to distribute the whole investment fund shares holdings of a given country-sector pair in a single go. Therefore, a residual is attained, which is the difference between the observed holdings of investment fund shares per holding country-sector pair and the estimated figures, i.e.  $\widehat{RES}_{hc,hs,t,1}^{ic,IFS,IF,c} = \sum_{ic} h_{hc,hs,t}^{ic,a,is,c} - \hat{h}_{hc,hs,t,1}^{ic,a,is,c}$ . For this reason, the procedure is repeated, this time allocating only the residual:

$$\hat{h}_{hc,hs,t,2}^{ic,a,is,c} = \widehat{RES}_{hc,hs,t,1}^{ic=EA,IFS,IF,c} \times w_{hc,IF,t}^{ic,a,is,c} + \widehat{RES}_{hc,hs,t,1}^{ic\neq EA,IFS,IF,c} \times \bar{w}_{hc,IF,t}^{ic,IFS,IF,c} \quad (3)$$

This process is repeated until the residual is minimal — in practice, five rounds are sufficient to arrive at a residual which is about 0.1% of the original investment fund share holdings of each country-sector pair. Finally, the total estimated figures for debt instruments and listed shares are given by

$$\hat{h}_{hc,hs,t}^{ic,a,is,c} = h_{hc,hs,t}^{ic,a,is,c} + \hat{h}_{hc,hs,t,1}^{ic,a,is,c} + \dots + \hat{h}_{hc,hs,t,5}^{ic,a,is,c} \quad (4)$$

We refer to  $h_{hc,hs,t}^{ic,a,is,c}$  as the direct component of the investment of a given holding country-sector pair in asset class  $a$  (i.e., excluding the exposures held via investment funds) and  $\hat{h}_{hc,hs,t,1}^{ic,a,is,c} + \dots + \hat{h}_{hc,hs,t,5}^{ic,a,is,c}$  as the indirect component (i.e., the exposures held via investment funds).

There are two caveats to our approach: the first is that the information in SHS data does not cover all investment fund assets, but only their portfolio investment holdings. For instance, SHS has no

<sup>16</sup>The potential bias introduced by this assumption is deemed not to be significant since the vast majority of investment fund shares held by euro area sectors is issued by investment funds resident in the euro area, for which the distribution is known. In fact, at end-2019, the average non-euro area share in total investment fund share holdings of euro area country-sectors was under 11%. For a subsample of the largest euro area countries – Austria, Belgium, Finland, France, Germany, the Netherlands, Greece, Italy, Portugal and Spain – the share was even smaller, of less than 6%.

information on non-financial assets (such as real estate) held by euro area investment funds. Nevertheless, the instrument classes that are covered by the SHS make up for the bulk of the assets held by investment funds. In fact, according to the ECB's investment fund statistics, at the end of 2019, the share of debt securities, equities and investment fund shares in the aggregate balance sheet of euro area investment funds was slightly above 85%, with loans and deposits, non-financial assets and other assets accounting for the remainder.

The second caveat relates to the assumption that investors across euro area countries have the same preferences across issuing countries of investment fund shares, in terms of those funds' portfolio allocations. In practice this means that for investment fund shares issued by investment funds resident in Luxembourg, we need to assume that German investors hold fund shares issued by investment funds with the same asset composition as those held by French residents. The same applies for the different sectors, i.e., banks may invest predominantly in certain Irish investment funds, which are distinct from the choices of Irish investment funds made by pension funds. The concerns raised by these assumptions are partially alleviated by the findings in [Monti and Felettigh \(2008\)](#), who report that estimates of indirect holdings are not significantly affected by the assumption that they follow the overall distribution of Irish and Luxembourgian investment funds, compared to a more detailed estimation, where the investment strategy of the individual investment funds in which Italian residents invest is known.

## B Data Appendix

### B.1 Sources of gravity variables

- **Bilateral distance and shared language** – Data are taken from the GeoDist database, compiled by the Centre d'Études Prospectives et d'Informations Internationales (CEPII) – see [Mayer and Zignago \(2011\)](#) for details
- **Bilateral imports** – Data are from Eurostat and are four-quarter moving sums.

### B.2 Issuer country reclassifications due to the lack of gravity variables

- **Switzerland** – includes Liechtenstein
- **United States** – includes Puerto Rico, Guam, American Samoa, the US Virgin Islands and Minor Outlying Islands

### B.3 Gravity variables of British offshores

- **Guernsey, Jersey, Isle of Man, Gibraltar and the Virgin Islands** – to the extent that these territories may have an added relevance to the purpose of this paper, we opted not to reclassify these country codes as the UK and keep them individually. Whenever not available in the CEPII database, distance and common language were assumed to be the same as that of the UK. In all cases, however, imports are not available and were set to zero.



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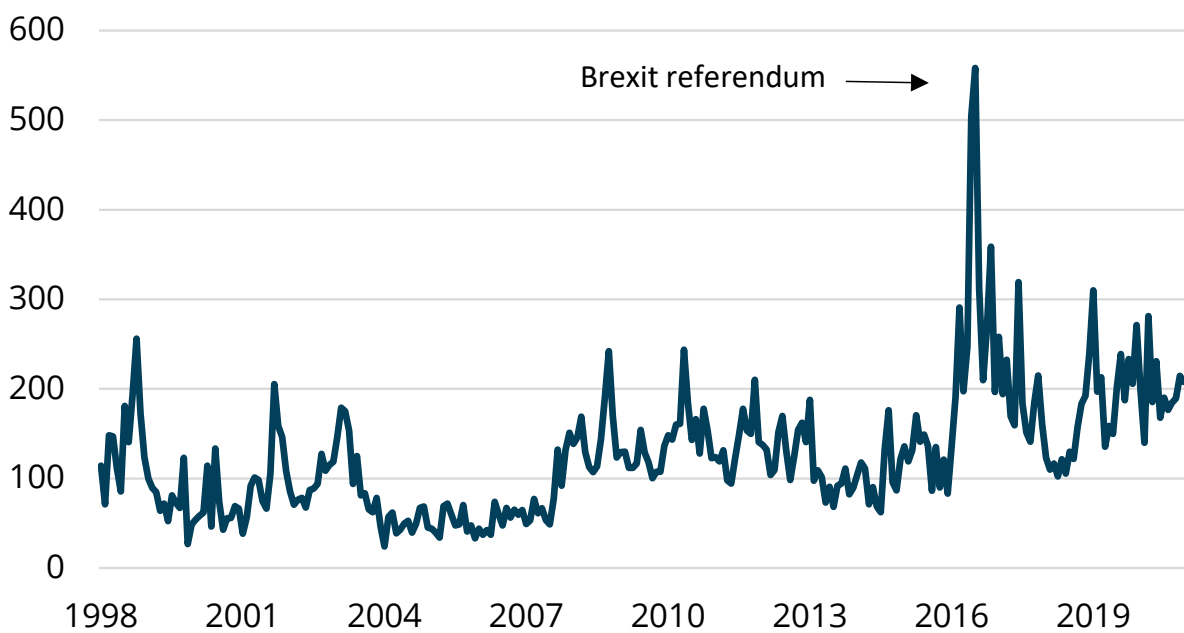
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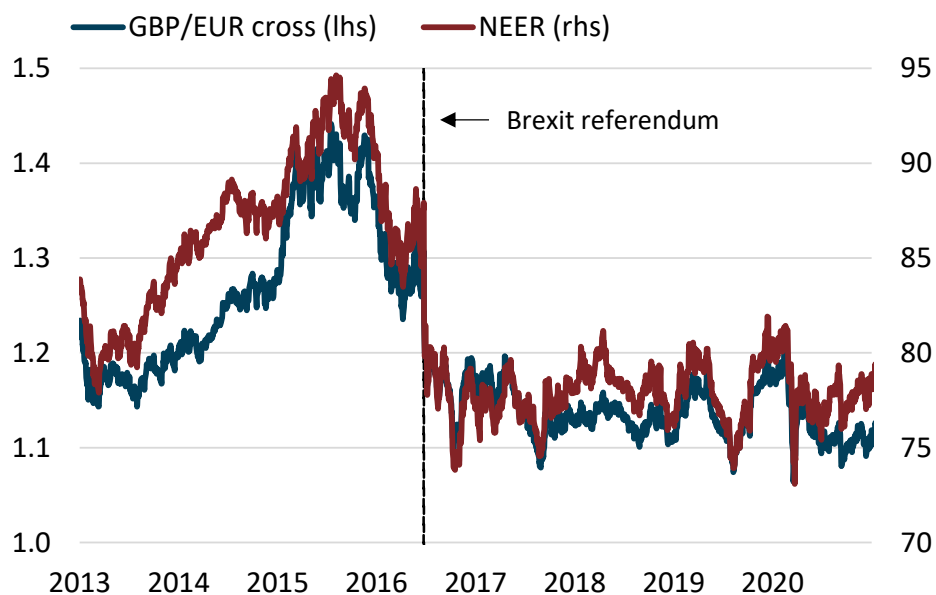
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Figure 1: UK Economic Policy Uncertainty Index



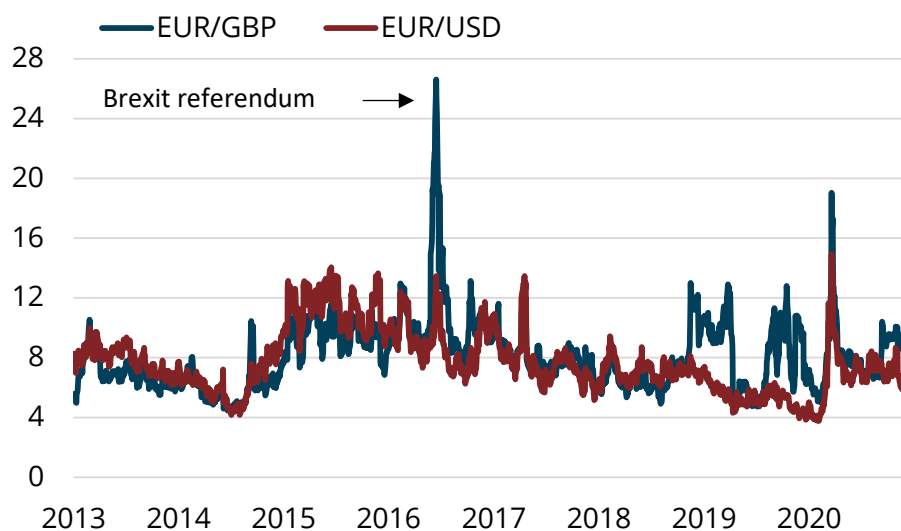
Source: Economic Policy Uncertainty. The index is constructed based on news articles containing the terms uncertain or uncertainty, economic or economy, as well as policy relevant terms (scaled by the smoothed total number of articles). Policy relevant terms include: 'policy', 'tax', 'spending', 'regulation', 'Bank of England', 'budget', and 'deficit'. newspaper articles. The newspapers included are: The FT, The Times and Sunday Times, The Telegraph, The Daily Mail, The Daily Express, The Guardian, The Mirror, The Northern Echo, The Evening Standard, and The Sun. Last observation: December 2020

Figure 2: Sterling exchange rate



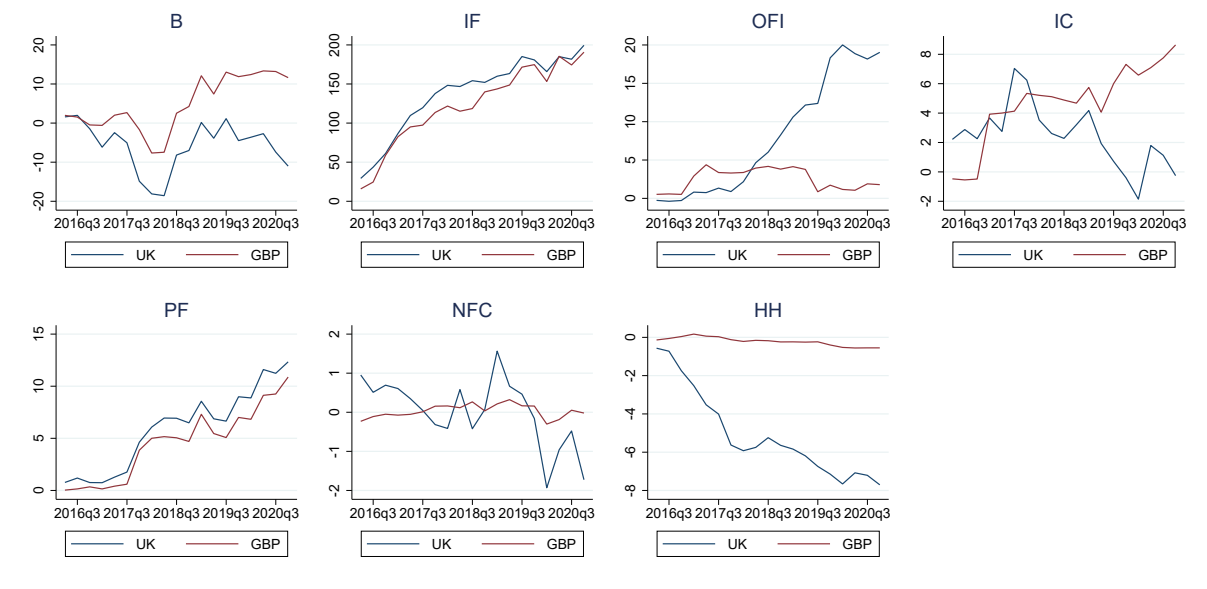
Source: Bloomberg and Bank of England. The nominal effective exchange rate is calculated using trade flows of both goods and services and is rebased to Jan 2005 = 100.

Figure 3: Sterling exchange rate implied volatility



Source: Bloomberg. Implied volatility of one-month at the money options.

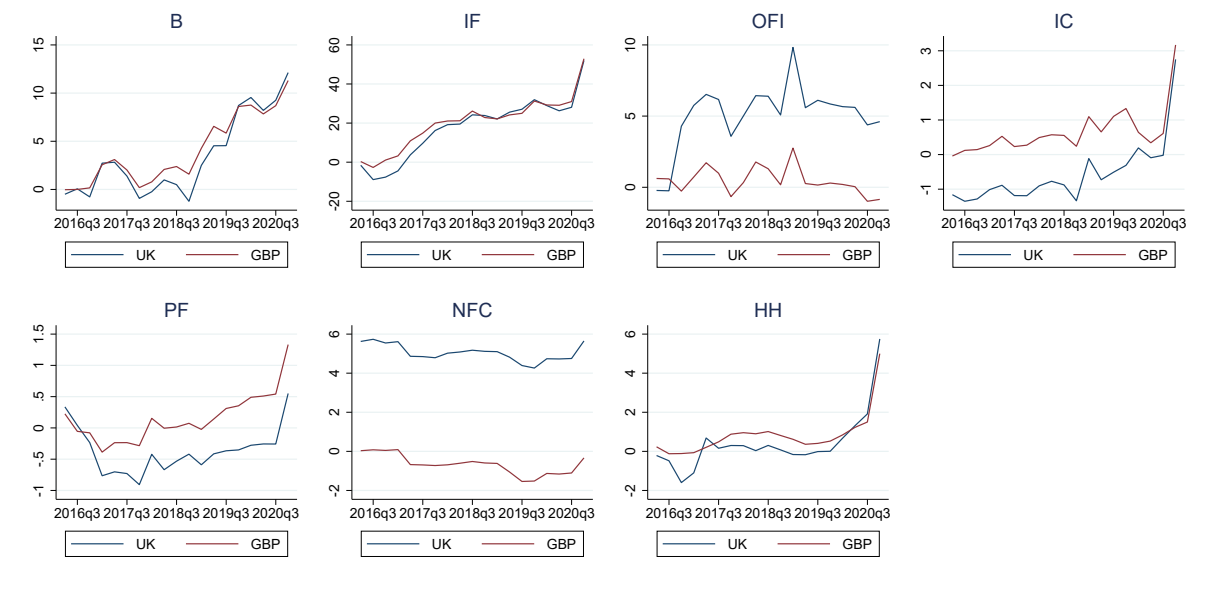
**Figure 4: Euro area net purchases of debt securities by sector** (*cumulated quarterly flows since 2016Q2 in EUR bn*)



Source: ECB. Note: “UK” refers to securities issued by residents of the United Kingdom; “GBP” refers to securities denominated in British pound. “B” are deposit-taking corporations; “IF” are investment and money market funds; “OFI” are other financial intermediaries; “IC” are insurance companies; “PF” are pension funds; “NFC” are non-financial corporations; “HH” are households.

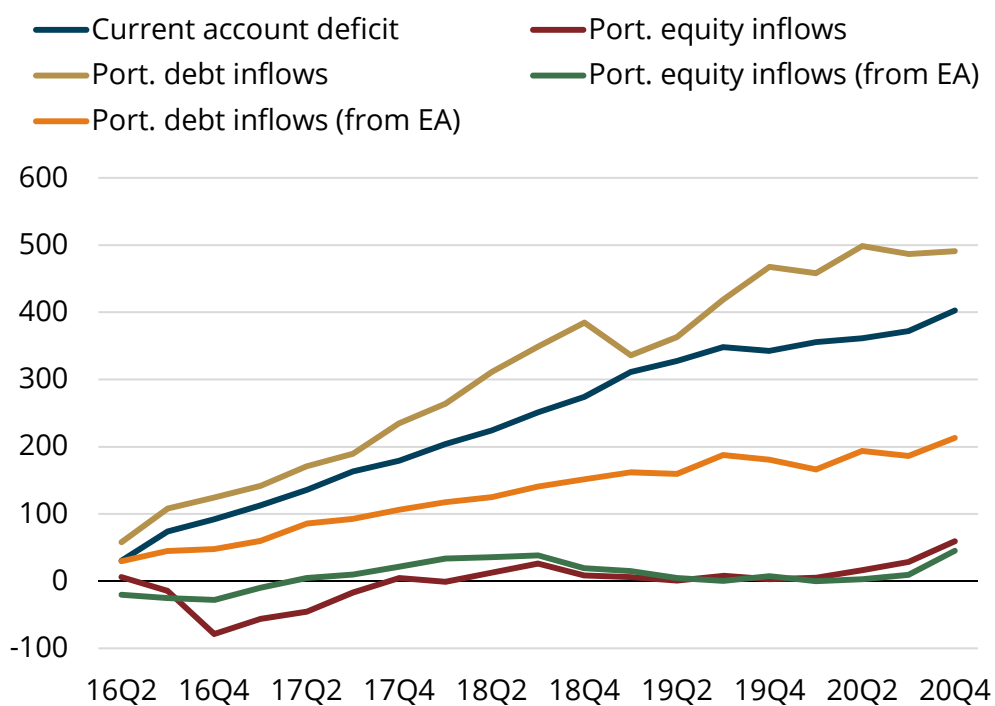


**Figure 5: Euro area net purchases of listed shares by sector (cumulated quarterly flows since 2016Q2 in EUR bn)**



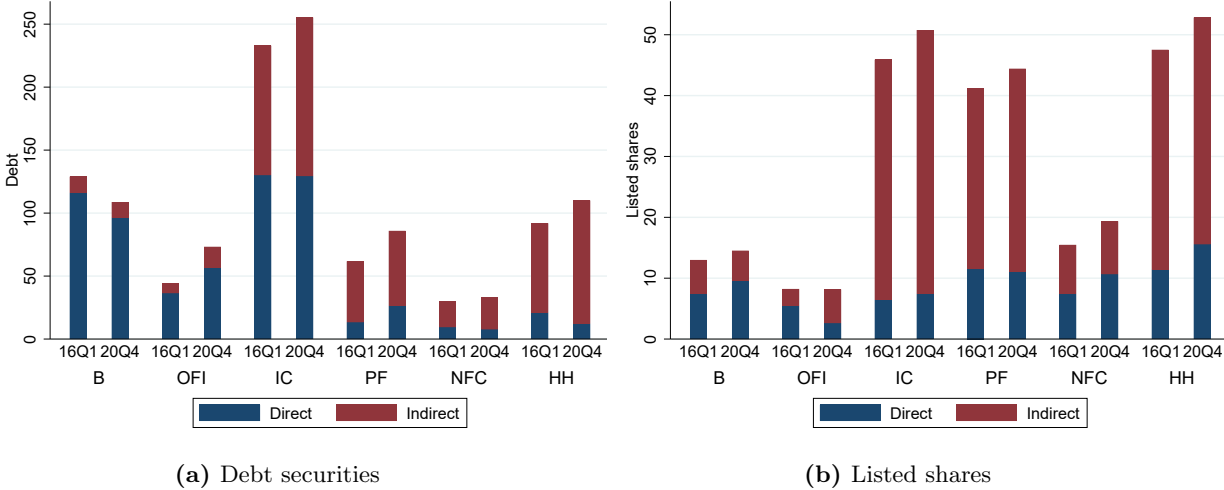
Source: ECB. Note: “UK” refers to securities issued by residents of the United Kingdom; “GBP” refers to securities denominated in British pound. “B” are deposit-taking corporation; “IF” are investment and money market funds; “OFI” are other financial intermediaries; “IC” are insurance companies; “PF” are pension funds; “NFC” are non-financial corporations; “HH” are households.

**Figure 6: United Kingdom: selected balance of payments developments** (*cumulated quarterly flows since 2016Q2 in EUR bn*)



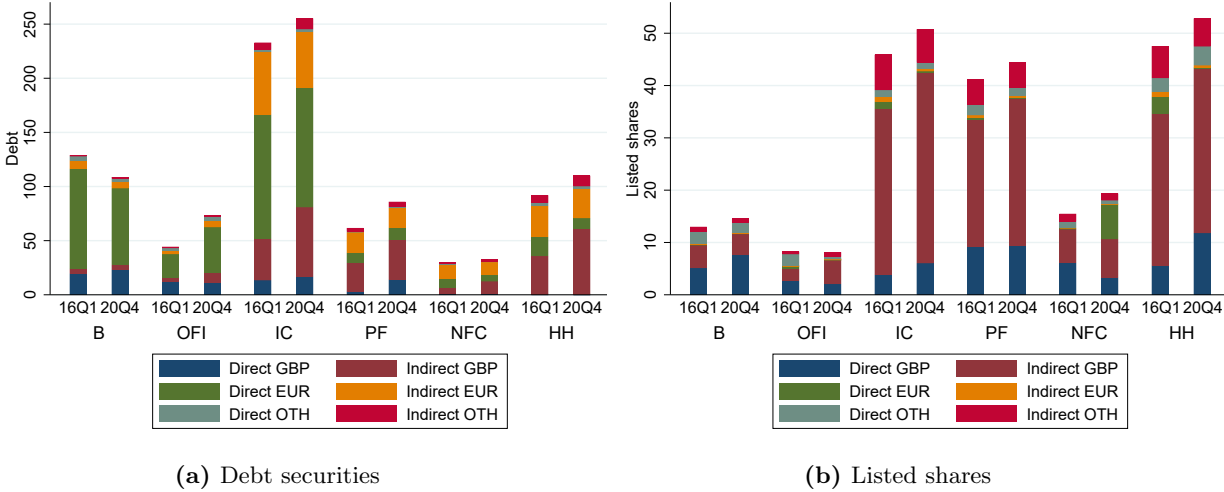
Source: Office for National Statistics and ECB.

**Figure 7: Direct and indirect exposures of euro area investors to UK securities in 2016Q1 and 2020Q4 (EUR bn)**



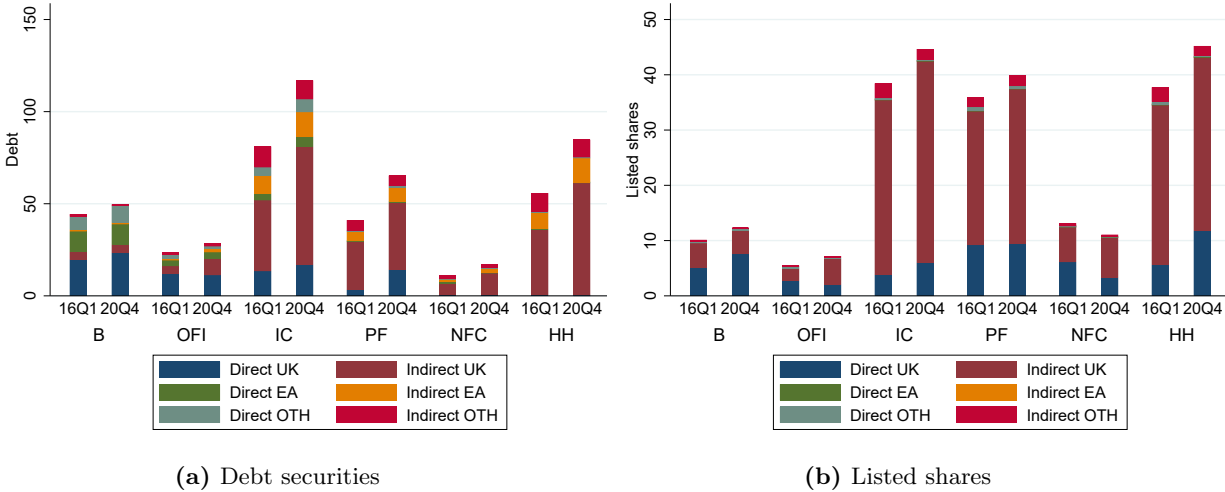
Source: ECB. Note: “Direct” refers to securities held by euro area investors in their own portfolio; “Indirect” refers to securities held by euro area investors via holdings of investment fund shares. “B” are deposit-taking corporation; “IF” are investment and money market funds; “OFI” are other financial intermediaries; “IC” are insurance companies; “PF” are pension funds; “NFC” are non-financial corporations; “HH” are households.

**Figure 8: Direct and indirect exposures of euro area investors to UK securities by currency in 2016Q1 and 2020Q4 (EUR bn)**



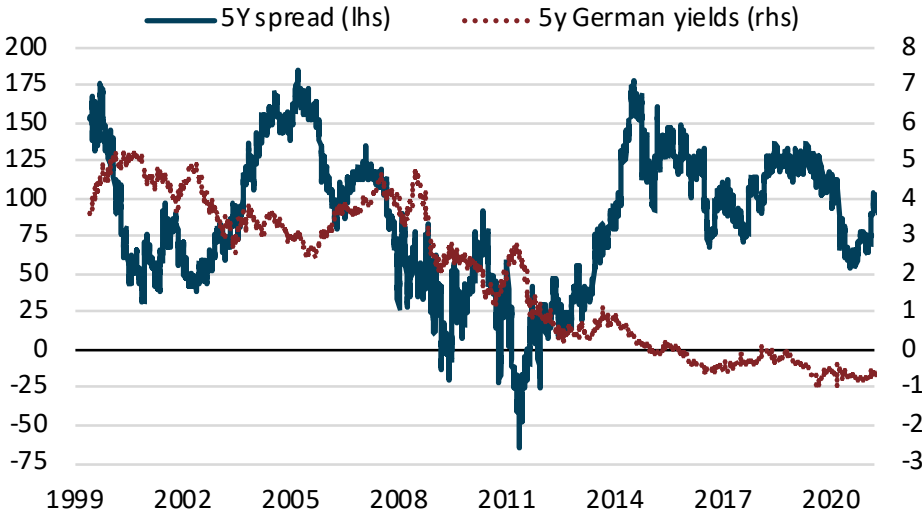
Source: ECB. Note: “Direct” refers to securities held by euro area investors in their own portfolio; “Indirect” refers to securities held by euro area investors via holdings of investment fund shares. “GBP”, “EUR” and “OTH” refer to securities denominated in British pound, euro and other currencies, respectively. “B” are deposit-taking corporation; “IF” are investment and money market funds; “OFI” are other financial intermediaries; “IC” are insurance companies; “PF” are pension funds; “NFC” are non-financial corporations; “HH” are households.

**Figure 9: Direct and indirect exposures of euro area investors to GBP-denominated securities by issuer geography in 2016Q1 and 2020Q4 (EUR bn)**



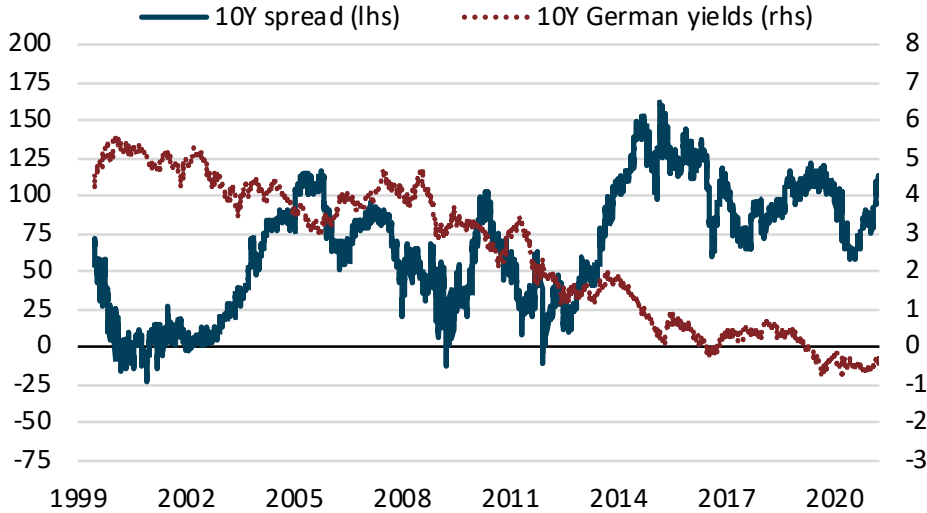
Source: ECB. Note: “Direct” refers to securities held by euro area investors in their own portfolio; “Indirect” refers to securities held by euro area investors via holdings of investment fund shares. “UK”, “EA” and “OTH” refer to securities issued by residents of the United Kingdom, the euro area and other countries, respectively. “B” are deposit-taking corporation; “IF” are investment and money market funds; “OFI” are other financial intermediaries; “IC” are insurance companies; “PF” are pension funds; “NFC” are non-financial corporations; “HH” are households.

**Figure 10: Spread of British and German government bonds and German yields - 5-year tenor (spreads in basis points, yields in %)**



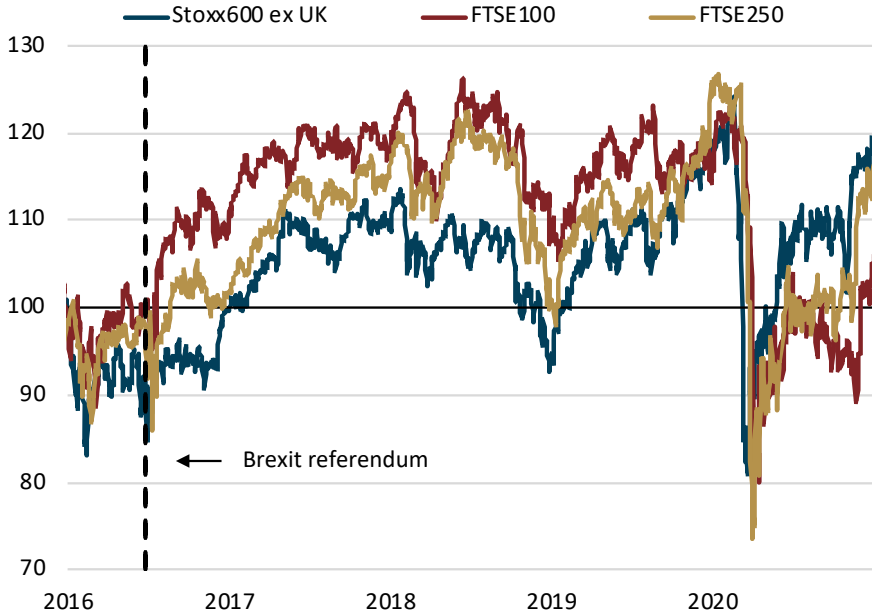
Source: Bloomberg and authors’ calculations

**Figure 11: Spread of British and German government bonds and German yields - 10-year tenor** (spreads in basis points, yields in %)



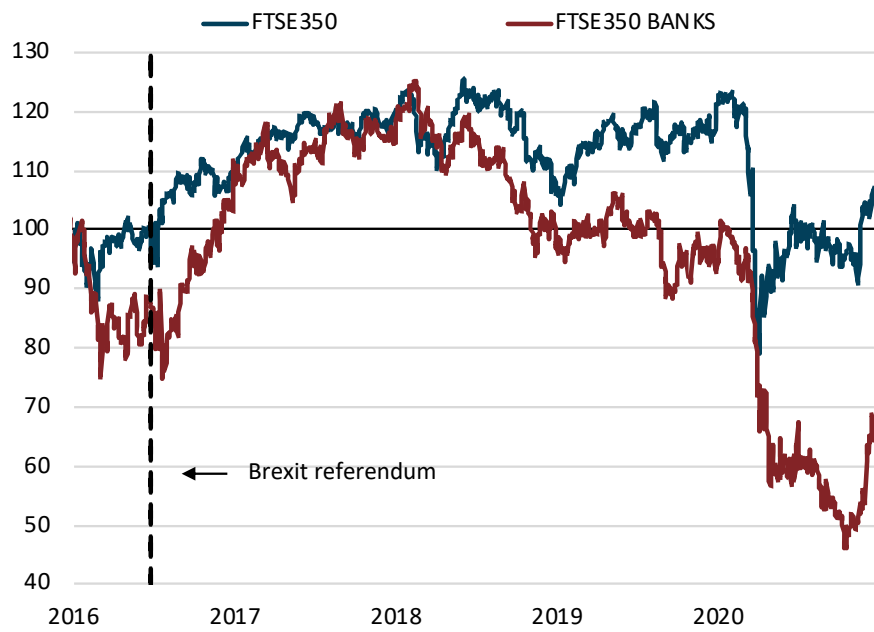
Source: Bloomberg and authors' calculations

**Figure 12: European and British stock indices** (index base=31-12-2015)



Source: Bloomberg and authors' calculations.

Figure 13: British FTSE stock index - headline and bank subsector (*index base=31-12-2015*)



Source: Bloomberg and authors' calculations.

Table 1: Debt securities, UK-exposures by currency of denomination – all euro area countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	B.dir	B.ind	B.tot	OFL.dir	OFL.ind	OFL.tot	IC.dir	IC.ind	IC.tot	PF.dir	PF.ind	PF.tot	NFC.dir	NFC.ind	NFC.tot	HH.dir	HH.ind	HH.tot
$\ln(h_{bc,bs}^{a,rs,c})$	-0.07*** (0.00)	-0.08*** (0.00)	-0.06*** (0.00)	-0.09*** (0.00)	-0.10*** (0.00)	-0.08*** (0.00)	-0.04*** (0.00)	-0.07*** (0.00)	-0.05*** (0.00)	-0.04*** (0.00)	-0.08*** (0.00)	-0.06*** (0.00)	-0.08*** (0.00)	-0.08*** (0.00)	-0.06*** (0.00)	-0.03*** (0.00)	-0.07*** (0.00)	-0.05*** (0.00)
Distance	-0.07*** (0.00)	-0.04*** (0.00)	-0.06*** (0.00)	-0.04*** (0.01)	-0.03*** (0.00)	-0.05*** (0.00)	-0.03*** (0.00)	-0.02*** (0.00)	-0.03*** (0.00)	-0.04*** (0.00)	-0.01*** (0.00)	-0.03*** (0.00)	-0.07*** (0.00)	-0.03*** (0.00)	-0.04*** (0.00)	-0.03*** (0.00)	-0.02*** (0.00)	-0.03*** (0.00)
Imports	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.01*** (0.00)	0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	-0.00*** (0.00)	0.00*** (0.00)	-0.01*** (0.00)	0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	0.00*** (0.00)	-0.00*** (0.00)
Com. language	0.01*** (0.01)	-0.00*** (0.01)	0.01*** (0.01)	0.03*** (0.01)	-0.01*** (0.00)	0.00*** (0.01)	-0.00*** (0.00)	0.00*** (0.00)	-0.00*** (0.00)	-0.01*** (0.01)	0.00*** (0.00)	-0.01*** (0.00)	0.03*** (0.01)	-0.01*** (0.00)	-0.01*** (0.00)	0.00*** (0.01)	-0.00*** (0.00)	-0.00*** (0.00)
$UK_{GBP}^B$	0.10*** (0.05)	0.22*** (0.05)	0.14*** (0.04)	0.05*** (0.07)	0.19*** (0.02)	0.06*** (0.04)	0.11*** (0.03)	0.32*** (0.03)	0.23*** (0.02)	0.32*** (0.04)	0.32*** (0.04)	0.22*** (0.03)	0.04*** (0.07)	0.24*** (0.04)	0.18*** (0.03)	-0.02*** (0.02)	0.30*** (0.03)	0.22*** (0.02)
$UK_{EUR}^B$	0.31*** (0.03)	0.26*** (0.05)	0.30*** (0.03)	0.15*** (0.05)	0.27*** (0.02)	0.15*** (0.04)	0.19*** (0.02)	0.33*** (0.03)	0.28*** (0.03)	0.09*** (0.03)	0.31*** (0.04)	0.23*** (0.03)	0.23*** (0.04)	0.28*** (0.04)	0.20*** (0.04)	0.04*** (0.02)	0.29*** (0.03)	0.21*** (0.02)
$UK_{OTH}^B$	0.01*** (0.03)	-0.05*** (0.07)	-0.02*** (0.04)	0.01*** (0.06)	0.02*** (0.04)	-0.04*** (0.04)	0.04*** (0.03)	-0.01*** (0.04)	0.01*** (0.03)	-0.00*** (0.05)	-0.04*** (0.05)	-0.03*** (0.04)	-0.03*** (0.05)	0.06*** (0.05)	-0.04*** (0.06)	-0.02*** (0.02)	-0.03*** (0.04)	-0.03*** (0.03)
$UK_{GBP}^{GG}$	0.12*** (0.06)	0.35*** (0.05)	0.22*** (0.03)	0.05*** (0.08)	0.36*** (0.02)	0.17*** (0.04)	0.13*** (0.03)	0.44*** (0.04)	0.30*** (0.03)	0.12*** (0.05)	0.45*** (0.05)	0.33*** (0.04)	0.01*** (0.05)	0.37*** (0.04)	0.25*** (0.04)	-0.01*** (0.02)	0.40*** (0.04)	0.29*** (0.03)
$UK_{GBP}^{NFC}$	0.16*** (0.04)	0.11*** (0.05)	0.13*** (0.04)	0.04*** (0.09)	0.04*** (0.02)	0.04*** (0.05)	0.05*** (0.03)	0.20*** (0.03)	0.15*** (0.02)	0.00*** (0.06)	0.19*** (0.04)	0.14*** (0.03)	-0.06*** (0.05)	0.11*** (0.04)	0.07*** (0.03)	-0.01*** (0.02)	0.17*** (0.03)	0.13*** (0.02)
$UK_{EUR}^{NFC}$	0.20*** (0.03)	0.24*** (0.05)	0.21*** (0.03)	0.14*** (0.07)	0.15*** (0.02)	0.13*** (0.05)	0.21*** (0.02)	0.27*** (0.03)	0.27*** (0.02)	0.12*** (0.03)	0.24*** (0.04)	0.22*** (0.03)	0.14*** (0.03)	0.21*** (0.04)	0.16*** (0.03)	0.01*** (0.02)	0.25*** (0.03)	0.18*** (0.02)
$UK_{OTH}^{NFC}$	0.05*** (0.04)	0.11*** (0.05)	0.07*** (0.04)	-0.11*** (0.05)	0.01*** (0.02)	-0.06*** (0.03)	0.01*** (0.03)	0.10*** (0.04)	0.06*** (0.03)	0.02*** (0.03)	0.15*** (0.04)	0.11*** (0.03)	-0.01*** (0.03)	-0.01*** (0.04)	0.09*** (0.04)	0.04*** (0.03)	0.08*** (0.05)	0.07*** (0.03)
$UK_{GBP}^{OFL}$	0.15*** (0.04)	0.17*** (0.05)	0.14*** (0.04)	0.08*** (0.07)	0.13*** (0.02)	0.06*** (0.04)	0.08*** (0.03)	0.27*** (0.03)	0.19*** (0.02)	0.06*** (0.03)	0.26*** (0.04)	0.19*** (0.03)	0.14*** (0.07)	0.19*** (0.04)	0.14*** (0.03)	-0.05*** (0.02)	0.24*** (0.03)	0.17*** (0.02)
$UK_{EUR}^{OFL}$	0.24*** (0.03)	0.24*** (0.05)	0.23*** (0.03)	0.13*** (0.06)	0.19*** (0.02)	0.15*** (0.04)	0.20*** (0.02)	0.28*** (0.03)	0.27*** (0.02)	0.11*** (0.03)	0.25*** (0.04)	0.22*** (0.03)	0.16*** (0.04)	0.24*** (0.04)	0.18*** (0.04)	0.04*** (0.02)	0.26*** (0.03)	0.19*** (0.03)
Observations	49,763	39,670	67,332	26,011	52,432	61,065	64,931	117,601	131,105	31,280	77,083	83,911	22,017	59,082	65,301	36,358	107,126	115,707
R-squared	0.06	0.09	0.05	0.06	0.11	0.07	0.05	0.10	0.08	0.06	0.10	0.09	0.07	0.10	0.08	0.06	0.10	0.09

$UK_{GBP}^B$ ,  $UK_{EUR}^B$  and  $UK_{OTH}^B$  are exposures to securities issued in the UK, by banks, and denominated in, respectively, sterling, euro and other currencies.  $UK_{GBP}^{NFC}$ ,  $UK_{EUR}^{NFC}$  and  $UK_{OTH}^{NFC}$  are similar dummies for securities issued by NFCs;  $UK_{GBP}^{OFL}$ ,  $UK_{EUR}^{OFL}$  and  $UK_{OTH}^{OFL}$  for securities issued by OFIs;  $UK_{GBP}^B$  for securities issued by the general government. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Robust standard errors in parentheses, clustered at holder and issuer country-sector-currency level.

Table 2: Debt securities, sterling exposures by issuer country – all euro area countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	B.dir	B.ind	B.tot	OFL.dir	OFL.ind	OFL.tot	IC.dir	IC.ind	IC.tot	PF.dir	PF.ind	PF.tot	NFC.dir	NFC.ind	NFC.tot	HH.dir	HH.ind	HH.tot
$\ln(h_{bc,bs}^{\alpha, \beta, \gamma, \delta, \epsilon})$	-0.07***	-0.08***	-0.06***	-0.09***	-0.09***	-0.07***	-0.04***	-0.07***	-0.05***	-0.04***	-0.08***	-0.06***	-0.08***	-0.08***	-0.06***	-0.03***	-0.07***	-0.05***
Distance	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Imports	-0.06***	-0.03***	-0.05***	-0.04***	-0.02***	-0.04***	-0.02***	-0.02***	-0.02***	-0.03***	-0.01***	-0.03***	-0.06***	-0.03***	-0.03***	-0.02***	-0.02***	-0.02***
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Com. language	-0.00***	-0.00	-0.00**	-0.01***	0.00**	-0.00**	0.00*	0.00***	0.00***	0.00	0.00	0.00	-0.01***	0.00*	0.00	0.00	0.00	0.00
	(0.02)**	(0.01)	(0.01)	(0.03)**	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.03)**	(0.01)**	(0.01)**	(0.01)	(0.00)	(0.00)
$GBP_{UK}^B$	0.06	0.26***	0.10**	0.26***	0.27***	0.17***	0.05**	0.30***	0.18***	0.02	0.32***	0.19***	0.11	0.26***	0.20***	-0.01	0.27***	0.19***
	(0.06)	(0.03)	(0.04)	(0.06)	(0.02)	(0.03)	(0.02)	(0.02)	(0.01)	(0.04)	(0.02)	(0.02)	(0.08)	(0.02)	(0.02)	(0.03)	(0.02)	(0.01)
$GBP_{EA}^B$	0.06	0.11***	0.04	0.03	0.08***	0.03	-0.03	0.12***	0.06***	-0.06	0.15***	0.07***	0.05	0.08***	0.08***	-0.06**	0.11***	0.07***
	(0.05)	(0.03)	(0.04)	(0.07)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.04)	(0.02)	(0.02)	(0.07)	(0.02)	(0.02)	(0.03)	(0.02)	(0.01)
$GBP_{OTH}^B$	0.08*	0.09***	0.07*	0.08*	0.06***	0.02	0.01	0.10***	0.05***	-0.03	0.11***	0.06***	-0.02	0.07***	0.07***	-0.06**	0.08***	0.06***
	(0.05)	(0.02)	(0.04)	(0.05)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.04)	(0.02)	(0.02)	(0.08)	(0.02)	(0.02)	(0.03)	(0.02)	(0.01)
$GBP_{UK}^{GG}$	0.07	0.40***	0.18***	0.26***	0.41***	0.27***	0.08***	0.42***	0.26***	0.13**	0.46***	0.30***	0.08	0.38***	0.28***	0.01	0.39***	0.27***
	(0.07)	(0.03)	(0.04)	(0.07)	(0.03)	(0.03)	(0.03)	(0.02)	(0.01)	(0.05)	(0.03)	(0.02)	(0.06)	(0.03)	(0.02)	(0.04)	(0.02)	(0.01)
$GBP_{EA}^{GG}$	0.04	0.01	0.00	0.11**	0.00	-0.06**	-0.04*	0.05*	0.01	-0.20***	0.08***	0.03	0.02	0.01	0.01	-0.01	0.03	0.02
	(0.05)	(0.04)	(0.04)	(0.05)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.05)	(0.03)	(0.02)	(0.05)	(0.03)	(0.02)	(0.03)	(0.03)	(0.02)
$GBP_{OTH}^{GG}$	-0.02	-0.05	-0.04	0.01	-0.08***	-0.09***	0.03	-0.01	0.02	-0.03	-0.11***	-0.08***	-0.01	-0.04*	-0.02	-0.01	-0.03	0.01
	(0.06)	(0.04)	(0.05)	(0.03)	(0.02)	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.10)	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)
$GBP_{UK}^{NFC}$	0.11**	0.15***	0.09*	0.25***	0.13***	0.15***	-0.01	0.18***	0.10***	-0.01	0.19***	0.11***	0.01	0.13***	0.10***	0.01	0.15***	0.10***
	(0.05)	(0.03)	(0.05)	(0.08)	(0.02)	(0.04)	(0.03)	(0.01)	(0.01)	(0.06)	(0.02)	(0.02)	(0.06)	(0.02)	(0.02)	(0.03)	(0.01)	(0.01)
$GBP_{EA}^{NFC}$	-0.04	-0.02	-0.03	0.10*	-0.08***	-0.04	-0.04	-0.01	-0.01	-0.07*	0.01	-0.03	0.01	-0.04*	-0.04**	-0.06*	-0.01	-0.02
	(0.05)	(0.03)	(0.04)	(0.06)	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)	(0.04)	(0.03)	(0.02)	(0.06)	(0.02)	(0.02)	(0.03)	(0.02)	(0.01)
$GBP_{OTH}^{NFC}$	-0.04	-0.01	-0.02	0.10**	-0.02	0.02	0.02	-0.02	-0.00	-0.02	-0.03	-0.02	-0.13	-0.03	-0.02	-0.03	-0.04*	-0.01
	(0.06)	(0.04)	(0.04)	(0.05)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.05)	(0.03)	(0.02)	(0.09)	(0.03)	(0.02)	(0.04)	(0.02)	(0.01)
$GBP_{UK}^{OFFI}$	0.10*	0.21***	0.09*	0.29***	0.21***	0.17***	0.02	0.25***	0.14***	0.05	0.26***	0.15***	0.22***	0.21***	0.17***	-0.03	0.22***	0.14***
	(0.06)	(0.03)	(0.05)	(0.06)	(0.02)	(0.03)	(0.03)	(0.02)	(0.01)	(0.04)	(0.02)	(0.02)	(0.08)	(0.02)	(0.02)	(0.03)	(0.02)	(0.01)
$GBP_{EA}^{OFFI}$	-0.03	0.02	-0.03	0.13*	0.00	0.00	-0.05*	0.06***	0.03*	-0.00	0.07***	0.02	0.03	0.03*	0.03	-0.13***	0.06***	0.04***
	(0.06)	(0.03)	(0.04)	(0.07)	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)	(0.08)	(0.02)	(0.02)	(0.07)	(0.02)	(0.02)	(0.04)	(0.02)	(0.01)
Observations	49,766	39,673	67,333	26,011	52,433	61,066	64,931	117,601	131,104	31,280	77,083	83,912	22,022	59,081	65,302	36,360	107,125	115,706
R-squared	0.06	0.09	0.05	0.06	0.11	0.07	0.05	0.09	0.07	0.06	0.10	0.08	0.07	0.10	0.07	0.06	0.10	0.09

$GBP_{EA}^B$ ,  $GBP_{UK}^B$  and  $GBP_{OTH}^B$  are dummies for sterling exposures, issued by banks, in, respectively the UK, the euro area and all other countries.  $GBP_{UK}^{GG}$ ,  $GBP_{EA}^{GG}$  and  $GBP_{OTH}^{GG}$  are similar dummies for securities issued by the general government;  $GBP_{UK}^{NFC}$ ,  $GBP_{EA}^{NFC}$  and  $GBP_{OTH}^{NFC}$  for securities issued by NFCs; and  $GBP_{UK}^{OFFI}$ ,  $GBP_{EA}^{OFFI}$  and  $GBP_{OTH}^{OFFI}$  for securities issued by OFIs. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Robust standard errors in parentheses, clustered at holder and issuer country-sector-currency level.



**Table 3: Listed shares, UK exposures by currency of denomination – all euro area countries**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	B.dir	B.ind	B.tot	OFL.dir	OFLind	OFL.tot	IC.dir	IC.ind	IC.tot	PF.dir	PF.ind	PF.tot	NFC.dir	NFC.ind	NFC.tot	HH.dir	HH.ind	HH.tot
$ln(h_{hc,hs}^{ic,a,rs,c})$	-0.15*** (0.01)	-0.10*** (0.01)	-0.10*** (0.01)	-0.08*** (0.01)	-0.09*** (0.01)	-0.07*** (0.01)	-0.05*** (0.00)	-0.05*** (0.00)	-0.05*** (0.00)	-0.06*** (0.00)	-0.09*** (0.01)	-0.06*** (0.01)	-0.04*** (0.00)	-0.07*** (0.01)	-0.05*** (0.00)	-0.02*** (0.00)	-0.05*** (0.00)	-0.03*** (0.00)
Distance	-0.09*** (0.02)	-0.06*** (0.01)	-0.08*** (0.01)	-0.10*** (0.01)	-0.04*** (0.01)	-0.07*** (0.01)	-0.05*** (0.01)	-0.02*** (0.00)	-0.03*** (0.00)	-0.04*** (0.01)	-0.02*** (0.01)	-0.03*** (0.01)	-0.05*** (0.01)	-0.04*** (0.01)	-0.05*** (0.01)	-0.03*** (0.01)	-0.02*** (0.00)	-0.03*** (0.00)
Imports	-0.03*** (0.01)	-0.00 (0.00)	-0.01*** (0.00)	-0.01*** (0.00)	-0.00* (0.00)	-0.01*** (0.00)	-0.00** (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.02*** (0.00)	-0.00*** (0.00)	-0.01*** (0.00)	-0.00*** (0.00)	-0.00** (0.00)	-0.00*** (0.00)
Com. language	0.06 (0.04)	-0.00 (0.01)	0.01 (0.02)	0.02 (0.03)	0.01 (0.00)	0.01 (0.01)	0.01 (0.01)	0.01** (0.00)	0.00 (0.00)	0.01 (0.01)	0.02** (0.01)	0.01* (0.01)	0.03** (0.01)	0.00 (0.01)	0.02* (0.01)	0.02*** (0.01)	0.01 (0.01)	0.01*** (0.00)
$UK_{GBP}^B$	-0.21** (0.10)	-0.14*** (0.04)	-0.04 (0.06)	-0.16** (0.06)	-0.14*** (0.03)	-0.10*** (0.03)	-0.12*** (0.04)	-0.03 (0.02)	-0.03 (0.02)	-0.14*** (0.03)	-0.08* (0.04)	-0.06** (0.03)	-0.16*** (0.03)	-0.10*** (0.03)	-0.10*** (0.02)	-0.09*** (0.02)	-0.04** (0.02)	-0.05*** (0.02)
$UK_{EUR}^B$	-0.24*** (0.09)	-0.34*** (0.07)	-0.07 (0.08)	0.04 (0.05)	-0.12*** (0.03)	-0.06** (0.03)	-0.10*** (0.04)	-0.14*** (0.04)	-0.14*** (0.04)	-0.10*** (0.03)	-0.40*** (0.11)	-0.29*** (0.08)	-0.32*** (0.04)	-0.19*** (0.04)	-0.15*** (0.03)	-0.05 (0.06)	-0.12*** (0.03)	-0.07 (0.05)
$UK_{NFC}^{NFC}$	0.15 (0.10)	0.21*** (0.04)	0.22*** (0.05)	0.20*** (0.04)	0.21*** (0.03)	0.18*** (0.03)	0.12*** (0.02)	0.19*** (0.02)	0.18*** (0.02)	0.09*** (0.02)	0.25*** (0.03)	0.17*** (0.02)	-0.00 (0.03)	0.19*** (0.03)	0.09*** (0.02)	0.07*** (0.01)	0.15*** (0.02)	0.10*** (0.02)
$UK_{EUR}^{NFC}$	-0.31*** (0.10)	-0.17*** (0.05)	-0.19*** (0.07)	-0.06 (0.17)	-0.17*** (0.03)	-0.15*** (0.05)	-0.15*** (0.04)	-0.05* (0.03)	-0.04 (0.03)	-0.15*** (0.03)	-0.13*** (0.05)	-0.09** (0.03)	-0.19* (0.10)	-0.11*** (0.03)	-0.09* (0.05)	-0.09** (0.05)	-0.06*** (0.02)	-0.07*** (0.02)
$UK_{GBP}^{OFL}$	-0.13 (0.11)	-0.10*** (0.04)	-0.05 (0.07)	-0.10* (0.06)	-0.10*** (0.03)	-0.10*** (0.04)	-0.07*** (0.02)	0.00 (0.02)	0.00 (0.02)	-0.12*** (0.02)	-0.03 (0.04)	-0.04 (0.03)	-0.11** (0.05)	-0.07** (0.03)	-0.08*** (0.03)	-0.08*** (0.02)	-0.02 (0.02)	-0.04** (0.02)
Observations	8,075	14,748	16,712	10,557	19,415	21,875	12,883	40,480	41,341	10,732	28,206	29,671	9,407	21,432	23,297	18,255	37,739	40,967
R-squared	0.12	0.16	0.09	0.09	0.16	0.08	0.11	0.23	0.21	0.18	0.20	0.19	0.11	0.23	0.16	0.18	0.26	0.23

$UK_{GBP}^B$  and  $UK_{EUR}^B$  are exposures to securities issued in the UK, by banks, and denominated in, respectively, sterling and euro.  $UK_{GBP}^{NFC}$  and  $UK_{EUR}^{NFC}$  are similar dummies for securities issued by NFCs;  $UK_{GBP}^{OFL}$  and  $UK_{EUR}^{OFL}$  for securities issued by OFIs. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Robust standard errors in parentheses, clustered at holder and issuer country-sector-currency level.

Table 4: Listed shares, sterling exposures by issuer country – all euro area countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	B_dir	B_ind	B_tot	OFL_dir	OFL_ind	OFL_tot	IC_dir	IC_ind	IC_tot	PF_dir	PF_ind	PF_tot	NFC_dir	NFC_ind	NFC_tot	HH_dir	HH_ind	HH_tot
$\ln(h_{hc,hs}^{c,\alpha,\lambda,s,c})$	-0.15*** (0.01)	-0.10*** (0.01)	-0.10*** (0.01)	-0.08*** (0.01)	-0.10*** (0.01)	-0.07*** (0.01)	-0.05*** (0.00)	-0.06*** (0.00)	-0.05*** (0.00)	-0.05*** (0.00)	-0.09*** (0.01)	-0.06*** (0.00)	-0.04*** (0.00)	-0.07*** (0.01)	-0.05*** (0.00)	-0.03*** (0.00)	-0.05*** (0.00)	-0.03*** (0.00)
Distance	-0.09*** (0.02)	-0.06*** (0.01)	-0.08*** (0.01)	-0.10*** (0.01)	-0.04*** (0.01)	-0.07*** (0.01)	-0.05*** (0.01)	-0.02*** (0.00)	-0.03*** (0.00)	-0.03*** (0.00)	-0.03*** (0.01)	-0.04*** (0.00)	-0.05*** (0.01)	-0.04*** (0.01)	-0.04*** (0.01)	-0.03*** (0.00)	-0.02*** (0.00)	-0.03*** (0.00)
Imports	-0.03*** (0.01)	-0.00 (0.00)	-0.01** (0.00)	-0.01*** (0.00)	-0.00* (0.00)	-0.01*** (0.00)	-0.00** (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.01*** (0.00)	-0.00** (0.00)	-0.01*** (0.00)	-0.00** (0.00)	-0.00 (0.00)	-0.00** (0.00)
Com. language	0.06* (0.04)	-0.01 (0.01)	0.01 (0.02)	0.02 (0.03)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01** (0.00)	0.00 (0.00)	0.01 (0.01)	0.01* (0.01)	0.01 (0.01)	0.03** (0.01)	0.00 (0.01)	0.02* (0.01)	0.02*** (0.01)	0.00 (0.01)	0.01*** (0.00)
$GBP_{UK}^B$	0.54*** (0.14)	0.22*** (0.05)	0.38*** (0.08)	0.02 (0.08)	0.14*** (0.02)	0.10** (0.05)	0.05 (0.05)	0.12*** (0.02)	0.11*** (0.02)	0.08 (0.05)	0.22*** (0.04)	0.16*** (0.04)	0.06 (0.11)	0.14*** (0.03)	0.16*** (0.04)	0.07** (0.03)	0.11*** (0.02)	0.08*** (0.02)
$GBP_{UK}^{NFC}$	0.91*** (0.14)	0.58*** (0.07)	0.65*** (0.09)	0.38*** (0.07)	0.50*** (0.04)	0.38*** (0.05)	0.30*** (0.05)	0.37*** (0.02)	0.34*** (0.03)	0.31*** (0.04)	0.56*** (0.05)	0.40*** (0.04)	0.22* (0.11)	0.43*** (0.04)	0.36*** (0.05)	0.23*** (0.03)	0.31*** (0.03)	0.24*** (0.02)
$GBP_{OTH}^{NFC}$	0.24** (0.12)	0.19*** (0.06)	0.22*** (0.07)	-0.06 (0.06)	0.10*** (0.03)	0.01 (0.04)	0.06 (0.05)	0.05*** (0.02)	0.06*** (0.02)	0.05 (0.04)	0.13*** (0.05)	0.09** (0.04)	-0.13 (0.11)	0.07** (0.03)	0.02 (0.03)	0.07** (0.03)	0.05** (0.02)	0.04* (0.02)
$GBP_{UK}^{OFL}$	0.62*** (0.14)	0.26*** (0.05)	0.37*** (0.09)	0.07 (0.08)	0.18*** (0.03)	0.10* (0.05)	0.10** (0.05)	0.16*** (0.02)	0.15*** (0.02)	0.10** (0.04)	0.27*** (0.04)	0.19*** (0.04)	0.10 (0.11)	0.18*** (0.03)	0.19*** (0.04)	0.08*** (0.03)	0.13*** (0.02)	0.10*** (0.02)
Observations	8,075	14,748	16,712	10,556	19,414	21,875	12,883	40,481	41,342	10,733	28,206	29,671	9,408	21,432	23,298	18,258	37,739	40,969
R-squared	0.12	0.16	0.09	0.09	0.17	0.08	0.11	0.24	0.21	0.18	0.20	0.19	0.11	0.24	0.16	0.18	0.26	0.22

$GBP_{UK}^{OFL}$ ,  $GBP_{UK}^{NFC}$  and  $GBP_{OTH}^{NFC}$  are dummies for sterling exposures, issued by banks, in, respectively the UK, the euro area and all other countries.  $GBP_{UK}^{OFL}$ ,  $GBP_{UK}^{NFC}$  and  $GBP_{OTH}^{NFC}$  are similar dummies for securities issued by the general government;  $GBP_{UK}^{NFC}$ ,  $GBP_{UK}^{OFL}$  and  $GBP_{OTH}^{NFC}$  for securities issued by NFCs; and  $GBP_{UK}^{OFL}$ ,  $GBP_{UK}^{NFC}$  and  $GBP_{OTH}^{NFC}$  for securities issued by OFIs. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Robust standard errors in parentheses, clustered at holder and issuer country-sector-currency level.

### Acknowledgements

We thank Philip Lane, Yannick Timmer and participants at an internal ECB seminar for helpful comments and suggestions. The views expressed are those of the authors and do not necessarily reflect those of Banco de Portugal or the European Central Bank.

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ISBN 978-92-899-5321-4

ISSN 1725-2806

doi:10.2866/48316

QB-AR-22-099-EN-N