THE EURIBOR SURGE AND BANK DEPOSIT COSTS: AN INVESTIGATION OF INTEREST RATE PASS-THROUGH AND DEPOSIT PORTFOLIO REBALANCING

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Abstract

Against the backdrop of sharp monetary policy tightening, this article studies the links between bank deposit costs and the EURIBOR. In doing so the authors employ an SVAR multivariate model that jointly includes deposit rates and volumes, fitted on monthly data covering the period 2003-2019. Increases in the EURIBOR are found to pass through to bank deposit rates in Spain, pushing up interest rates on term deposits in particular. In turn, increases in the EURIBOR triggered shifts from sight to term deposits. Through both mechanisms, bank deposit costs increased. The article documents that in 2022 the pass-through from the EURIBOR to deposit rates is falling short, relative to what would be expected according to the historical pattern captured by model results; as a result, the increase in bank deposit costs has been weaker than expected. To draw insights into the reasons behind this pattern, the authors analyse several euro area economies. Correlation analyses suggest that the impact of the EURIBOR on deposit rates and costs was weaker in banking sectors with greater excess liquidity and higher market concentration.

Keywords: deposit rates, deposit volumes, pass-through, VAR model, conditional forecasts.

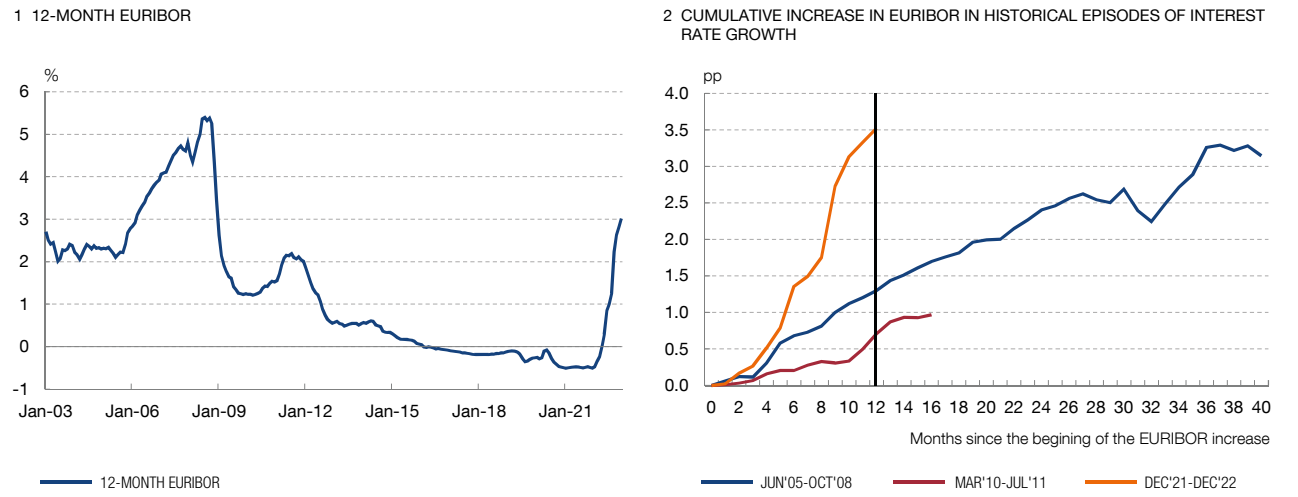
1 Introduction

The EURIBOR, the reference interbank interest rate in the euro area, rocketed in 2022 as monetary policy tightened sharply to address the persistent increase in prices in the monetary area. The EURIBOR has so far not reached the levels recorded before the Great Financial Crisis (see Chart 1.1). Yet the speed and the size of its current increase certainly overshadow previous episodes. Indeed, by December 2022 the twelve-month cumulative increase in the EURIBOR amounted to 350 basis points (bp), relative to just 70 bp and 130 bp in the same period after June 2005 and March 2010. Furthermore, even the total increase in the EURIBOR in the period 2005-2008 was smaller, amounting to just 310 bp.

In the past, increases in the EURIBOR pushed up bank funding costs. Descriptive analyses of patterns reveal that changes in the EURIBOR passed through to bank deposit rates in Spain. In particular, in this period increases in the EURIBOR passed through to the interest rates on term deposits. By doing so, they triggered a shift from sight to term deposits. Through both mechanisms, rises in the EURIBOR resulted in an increase in bank deposit costs.

Chart 1

THE HISTORICAL EVOLUTION OF THE 12-MONTH EURIBOR



SOURCE: Banco de España.

We formally assess these linkages by developing a Structural Vector Autoregressive (SVAR) model, estimated over the period 2003-2019, and building on Bernanke and Blinder (1992). A key ingredient of our analysis is the joint modelling of deposit rates and volumes. Specifically, in the baseline specification, we include the growth rate of the industrial production index (IPI), harmonised index of consumer prices (HICP) inflation, the 12-month EURIBOR, four deposit rates (household: sight; non-financial corporation: sight; household: term; and non-financial corporation: term) and, lastly, the growth rate of volumes of the same deposit categories. This specification allows us to assess the potential portfolio rebalancing across types of deposits triggered by increases in the EURIBOR, as it: i) distinguishes between sight and term deposits; ii) breaks down deposits of households and non-financial corporations (NFCs); and iii) jointly models deposit rates and volumes. The multivariate nature of the model allows us to take into account interactions between several variables, distinguishing this approach from simpler, univariate or bivariate models. To estimate the model, we set contemporaneous zero restrictions based on economic reasoning to trace out the impact of an increase in the 12-month EURIBOR.[1]

In our analysis we focus on retail deposits and select the 12-month EURIBOR (12M EURIBOR) as the reference rate to assess pass-through. The 12M EURIBOR is the most relevant measure for our purposes, as commercial banks usually define the interest rate on their deposits as a mark-down on the interbank rate of a similar

1 The aim of this article is not to identify the impact of monetary shocks on retail deposit rates and volumes, but rather to study the pass-through of a tightening of the monetary conditions regardless of its nature (expected or unexpected), focusing on medium and long-term effects.

maturity.[2] The 12M EURIBOR is a single variable widely used as a reference rate in euro area member countries, which facilitates the comparability of results across countries. Moreover, the other most common maturities, e.g. 1, 3 or 6 months, are very strongly correlated (close to 100%) with the 12M EURIBOR, which makes the choice of maturity less critical from a statistical point of view.

The results confirm that the 12M EURIBOR has historically had a significant impact on deposit rates, and particularly on term deposit rates, which is to be expected. Indeed, term deposits have close substitutes among other financial products. Therefore, banks have a higher need to raise term deposit rates, although due to frictions these typically fall short of other instrument rates. In Spain the negative aggregate impact on deposit volumes was relatively muted.[3] Overall, the impact of the EURIBOR on bank deposit costs operated through two mechanisms. First, the interest rates charged on outstanding term deposits increased. Second, this increase triggered a portfolio deposit rebalancing from sight to term deposits.

Using these results, we produce conditional forecasts of the expected monthly path of deposit rates, volumes and costs for the period January 2021-December 2022, and we benchmark the observed paths of these variables. The results show that the actual increase in deposit rates was significantly lower than that expected given the level of the 12M EURIBOR. The weak pass-through of the 12M EURIBOR to deposit rates is apparent for all types of deposits, including term accounts, which typically exhibit a stronger response. Aggregate deposit volumes did not decrease, in contrast to the model results. Overall, bank deposit costs failed to increase, which relates to the weak pass-through of the 12M EURIBOR to deposit rates.

To draw insights into the reasons behind the weakened pass-through in 2022, we analyse several euro area countries, namely Germany, France, Italy, and the Netherlands. Despite quantitative differences, we also find that: the 12M EURIBOR had a significant impact on deposit rates, which was stronger for term accounts; deposit volumes remained unaffected; and it pushed up bank deposit costs. In addition, comparing model predictions with current developments, we observe that the pass-through is falling short this time across all countries. Yet we find differences in the strength of the observed pass-through, which is particularly weak in Spain and Italy.

Lastly, we assess the potential reasons behind the differences in the strength of the pass-through of the 12M EURIBOR to deposit rates and costs. We examine as

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2 For previous research using the 12M EURIBOR to assess the response of deposit volumes and rates to changes in interest rates, see Pérez Montes and Ferrer (2018) in the context of bank profitability. The choice of a single EURIBOR rate allows us to better capture statistically meaningful relationships, isolate the behavior of banks towards their retail customers as regards the remuneration of funds and the translation of the underlying interest rate changes, and interpret results in terms of a widely used variable in economic policy analysis. Furthermore, the 12-month maturity is frequently used as a reference rate in Spain, particularly for mortgages.

3 Previous research has shown that some banks may face a significant reduction in loanable funds (Kishan and Opiela, 2000).

potential drivers the banking sector's excess liquidity, measured by the deposits from the ECB that banks had on their balance sheets, and market concentration, gauged by the market share of the five largest banks. We gauge excess liquidity by looking at the liability side (deposits obtained from the ECB), and not the asset side (deposits at the ECB), due to data issues. Indeed, the ECB statistics are compiled on a residency basis and, due to intra-group funding flows, using asset-side measures would overstate the excess liquidity of certain banking systems.[4] In this exercise we expand the sample by adding Belgium, Ireland, Greece, Austria, Portugal and Finland. We find that deposit rates grew far less, relative to what was expected based on previous historical experience, in countries showing greater excess liquidity. We also observe that the pass-through was weaker than expected in countries with higher market concentration. These results suggest that the reduction in the liquidity obtained from the Eurosystem could strengthen the pass-through of the 12M EURIBOR to deposit rates, therefore increasing bank deposit costs.

The results obtained need to be analysed with caution and are an initial step towards understanding which factors may be driving the slow response of deposit rates to the increase in the 12M EURIBOR. Indeed, we think that the methodology put forward, which consists in benchmarking current developments against model predictions, can be useful to assess the strength of the observed impact of the 12M EURIBOR. Yet looking ahead, a more careful analysis of the reasons behind the weakness of the current pass-through is certainly warranted. Exploiting bank-level data may help in this regard, in particular as the pass-through accelerates and differences across banks emerge.

2 Deposit rates, deposit volumes and the EURIBOR: stylised facts in Spain

2.1 Historical patterns

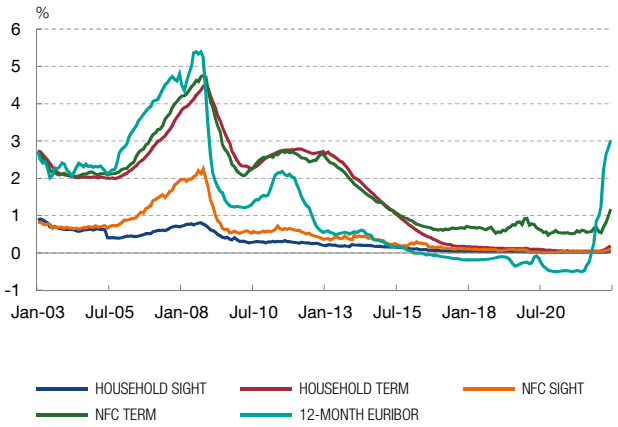
We provide stylised facts regarding the evolution of retail deposit rates and volumes over the last twenty years and discuss links to the EURIBOR. This analysis is based on data drawn from the regulatory information on interest rates and balance sheet composition that Spain's main banks must report to the ECB every month. Only information from banks reporting information on interest rates has been considered. Several patterns emerge.

4 As the ECB statistics are compiled on a residency basis, using asset-side measures would overstate the excess liquidity of certain banking systems. Problems arise as the bulk of the asset purchase programme (APP) portfolio was bought from counterparties whose head institution is domiciled outside the euro area, which kept their liquidity in accounts in certain euro area countries, such as Germany and Luxembourg. For further details, see Baldo et al. (2017).

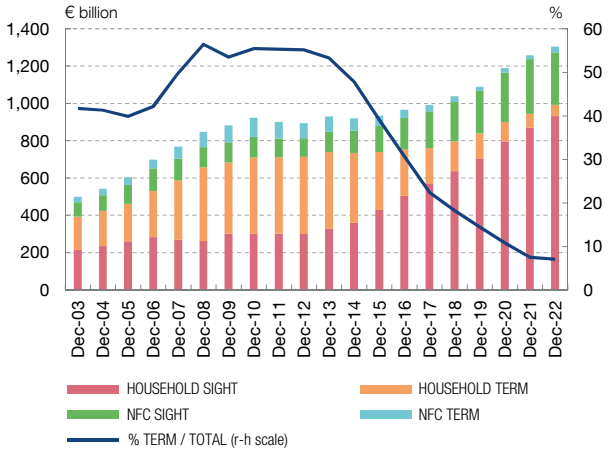
Chart 2

HISTORICAL EVOLUTION OF RETAIL DEPOSIT RATES, VOLUMES AND COSTS IN SPAIN

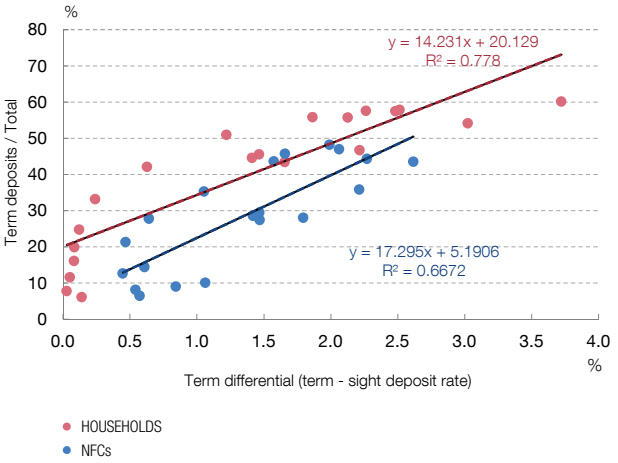
1 SIGHT AND TERM DEPOSIT RATES FOR NFCs AND HOUSEHOLDS



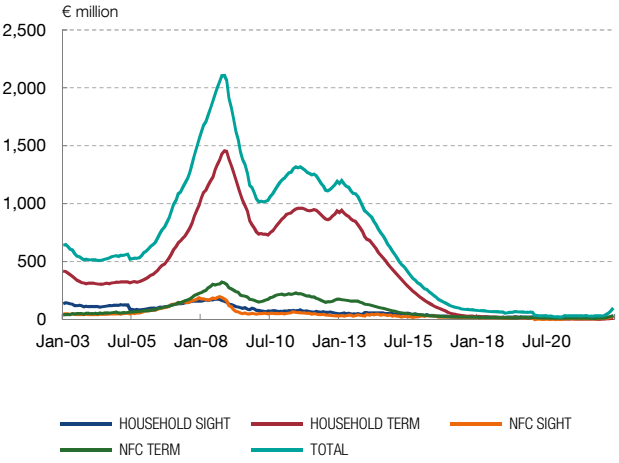
2 DEPOSIT VOLUMES FROM NFCs AND HOUSEHOLDS



3 SIGHT VS. TERM DECISION BASED ON PRICE DIFFERENTIALS



4 MONTHLY COST OF SIGHT AND TERM DEPOSITS FOR NFCs AND HOUSEHOLDS



SOURCE: Banco de España.

First, interest rates on retail deposits at Spanish banks, which have in general decreased over the last twenty years, doing so steadily since 2013, strongly correlate with the 12M EURIBOR. Sight and term interest rates on household and NFC deposits have decreased steadily since 2013 (see Chart 2.1). Interest rates on sight accounts have historically shown less sensitivity to the 12M EURIBOR than term deposit rates, although with some differences depending on the holder. In particular, the return on household sight deposits moved within a narrow range of values, with an average rate that did not reach 1% at any time throughout the sample. However, since 2016 the gap between rates on term and sight deposits has narrowed, a development likely related to the constraint imposed by the zero lower bound on sight deposit rates.

Second, deposits from Spanish households and NFCs have remained a major source of funding for deposit-taking institutions in Spain. Over the last twenty years, the total volume of these deposits has grown practically uninterruptedly to exceed €1,300 billion in December 2022 (see Chart 2.2). Household deposits, with an amount exceeding €991 billion in December 2022, account for 76.1% of the total.[5]

Third, term accounts of households and NFCs decreased after 2013, while sight accounts grew strongly. The proportion of retail term deposits shrunk to an all-time low of 7.1% in December 2022. Currently, nearly all deposits are held in sight accounts, with this modality representing 93.9% of the total in the case of households and 89.9% in the case of NFCs. Back in 2013, term deposits accounted for 53.3% of total deposits.

Fourth, shifts from term to sight deposits registered over the last two decades correlate with changes in the interest rates on term deposits. The spread of interest rates on term deposits over sight accounts exhibits a positive correlation with term deposits as a percentage of the total, as depicted in Chart 2.3. The relationship is economically significant, as each percentage point (pp) increase in this differential (spread) typically increases the percentage of term deposits in the total volume by 14.2 pp and 17.3 pp in the case of households and NFCs, respectively.

Overall, decreases in deposit rates, particularly steep in term accounts, have entailed a shift away from them, and a major reduction in the cost of deposits (see Chart 2.4). These shifts have historically exhibited close ties with 12M EURIBOR dynamics.

2.2 Current developments

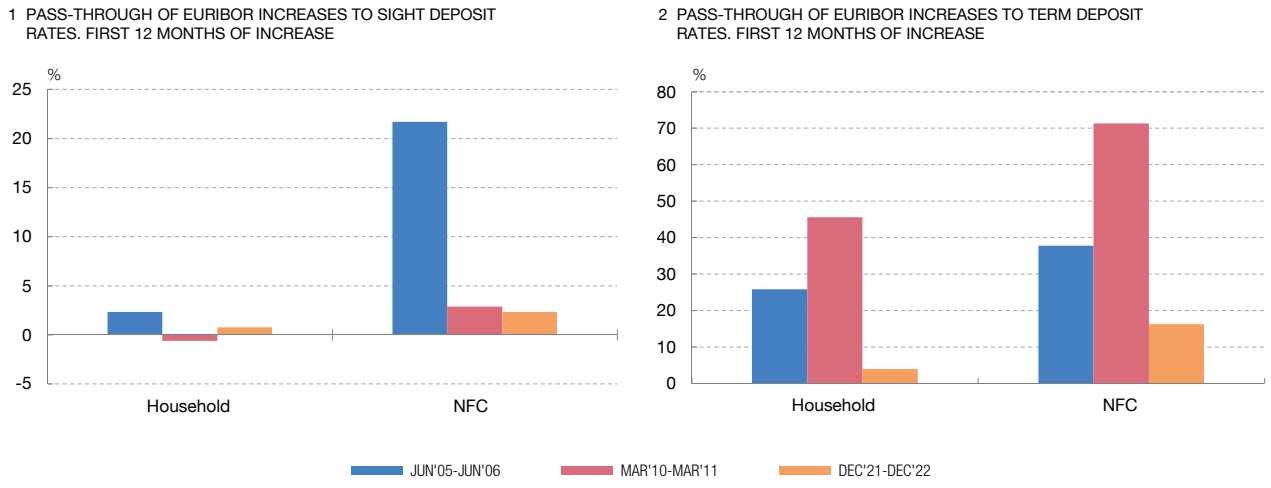
According to the historical evidence, the rapid surge in the 12M EURIBOR could have pushed up deposit interest rates. We examine if this is the case, benchmarking current developments against two other episodes of 12M EURIBOR increases, starting in June 2005 and March 2010. In doing so, we compare the pass-through of the 12M EURIBOR to retail deposit rates, defined as the ratio of the cumulative change (in pp) in the commercial interest rate to the change in the 12M EURIBOR during the period considered. In this exercise, we limit the period of analysis to the first twelve months of the EURIBOR rise, which is the maximum length of the current episode for which data are available.

The results show that the pass-through from the 12M EURIBOR to deposit rates is much weaker than in previous periods, particularly for certain types of deposits.

5 As a reference, as of September 2022 deposits accounted for 38.5% of total household financial assets.

Chart 3

PASS-THROUGH OF THE 12M EURIBOR TO DEPOSIT RATES



SOURCE: Banco de España.

This is apparent in the pass-through to sight deposits, which has historically been more moderate. The pass-through to sight deposits in the first episode (June 2005 to June 2006), reached 20% for NFC sight accounts. The pass-through to sight deposits is currently negligible (see Chart 3.1). Specifically, of the 352 bp increase in the 12M EURIBOR accumulated over the course of 2022, only 0.7% and 2.3% has been passed through to interest rates on sight accounts held by households and NFCs, respectively.

Differences in pass-through strength are even starker for term deposits (see Chart 3.2). Currently, the pass-through to term deposits from households only amounts to 4%, relative to 25% and 40% in the first and second episodes considered. Pass-through for NFC term deposits is also falling short; it amounts to 16.2%, well below the percentages observed for this same portfolio in the two previous episodes (around 40% and 70%, respectively).[6]

3 Empirical analysis

Our next step is to formally analyse the impact of changes in the 12M EURIBOR on deposit rates, volumes and costs in Spain, using an SVAR model. Building on the non-structural representation of the VAR model, we then assess how the recent increases in the 12M EURIBOR should have affected key deposit indicators.

6 The pass-through gained traction over time. By the end of the first episode of rising rates, which lasted for more than three years, the pass-through to term deposit rates exceeded 80%.

The latter exercise helps us to document that the impact of the current monetary policy cycle on these variables has been unusually weak, relative to historical evidence.

3.1 Model description

Our baseline model harnesses the SVAR of Bernanke and Blinder (1992) who documented using US data the negative impact of a surprise increase in the federal funds rate on the volume of bank deposits. We depart from them in distinguishing between sight and term deposits, which is a critical distinction to uncover portfolio rebalancing across types of deposits. Furthermore, we distinguish deposits by their respective holders (i.e. households and NFCs), which provides a more accurate assessment of portfolio rebalancing across types of deposits.

More recently, Gerlach, Mora and Uysal (2018) investigated the pass-through of an increase in the federal funds rate to bank deposit rates (the so-called "deposit betas"), finding imperfect pass-through (that is, less than one-to-one changes between the federal funds rate and various deposit rates).[7] Furthermore, by estimating both the expected increases in the deposit rates and the corresponding changes in volumes, they quantified the overall deposit funding costs expected during the normalisation of US monetary policy after a decade of near-zero interest rates. In our empirical analysis, we take advantage of having observed the beginning of the tightening cycle in the euro area, and hence we can see what our VAR model would have predicted for key deposit rates and volumes in Spain. This enables us to analyse how unusual the current period is in terms of bank deposit rates and volumes.

The VAR model is a system of equations, which explains a set of variables y_t by their own past values, a constant and random innovations hitting the system. This class of model allows us to jointly model the evolution of the variables in the system, capturing potential interactions between them. To summarise the dynamics embedded in the model, we produced impulse-response functions to answer the question "What happens to the variables in the system if the 12-month EURIBOR unexpectedly increases by a certain amount?". This involved turning the VAR model into an SVAR model, appropriately restricting the contemporaneous response of certain variables. Furthermore, we generated conditional forecasts using the VAR model, which describe the path of a certain set of variables as predicted by the

7 While investigating the structural sources of imperfect pass-through is beyond the scope of this article, we briefly refer to early studies, such as Berger and Hannan (1989), who explain it by banks' market power, and Kishan and Opiela (2000), who provide an analysis focusing on bank size. For a comprehensive overview of the literature, see Section 2.1 in Gerlach, Mora and Uysal (2018). We will provide insights into market concentration and pass-through in a European context in Section 4. Furthermore, while we are not investigating asymmetric pass-through, we refer to Driscoll and Judson (2013) on this issue. Our VAR model does not explicitly take into account the effective lower bound, which can be modelled as in Johannsen and Mertens (2021).

model, while keeping the path of others fixed at appropriately chosen values. For technical details, please see the annex.

In the baseline specification, the variables in y_t are as follows: growth rate of the IPI; HICP inflation; the 12M EURIBOR; four deposit rates (household: sight; NFC: sight; household: term; and NFC: term); and, lastly, the growth rate of outstanding amounts of the same deposit categories, for a total of eleven variables.[8,9] We estimated the VAR model using monthly data between January 2003 and December 2019, which is the longest sample available before the COVID-19 pandemic. For further details on possible sample periods, please see the annex.

Based on economic reasoning, in the coefficient matrices we restrict the direct impact of the deposit rates and volumes on the first three variables (industrial production growth, inflation and the 12M EURIBOR) to zero. This reflects our view that the former variables do not have a direct impact on the latter set of variables. To balance the number of observations and the number of estimated parameters, we specified the VAR model with $p = 2$ lags.

3.2 Impulse-response function analysis

After estimating the VAR model, we generated structural impulse-response functions, which trace out the reaction of the variables in the system following a surprise increase in the 12M EURIBOR. To do so, we used the following identifying assumptions: industrial production growth and inflation do not respond contemporaneously to an increase in the 12M EURIBOR, while the 12M EURIBOR and the deposit rates and volumes are allowed to respond within the month when the shock hits the system. These assumptions reflect our belief that industrial production growth and inflation are "slow-moving" variables, while interest rates and volumes are "fast-moving". These assumptions are in line with those used by Bernanke and Blinder (1992) and Gerlach, Mora and Uysal (2018), for example.

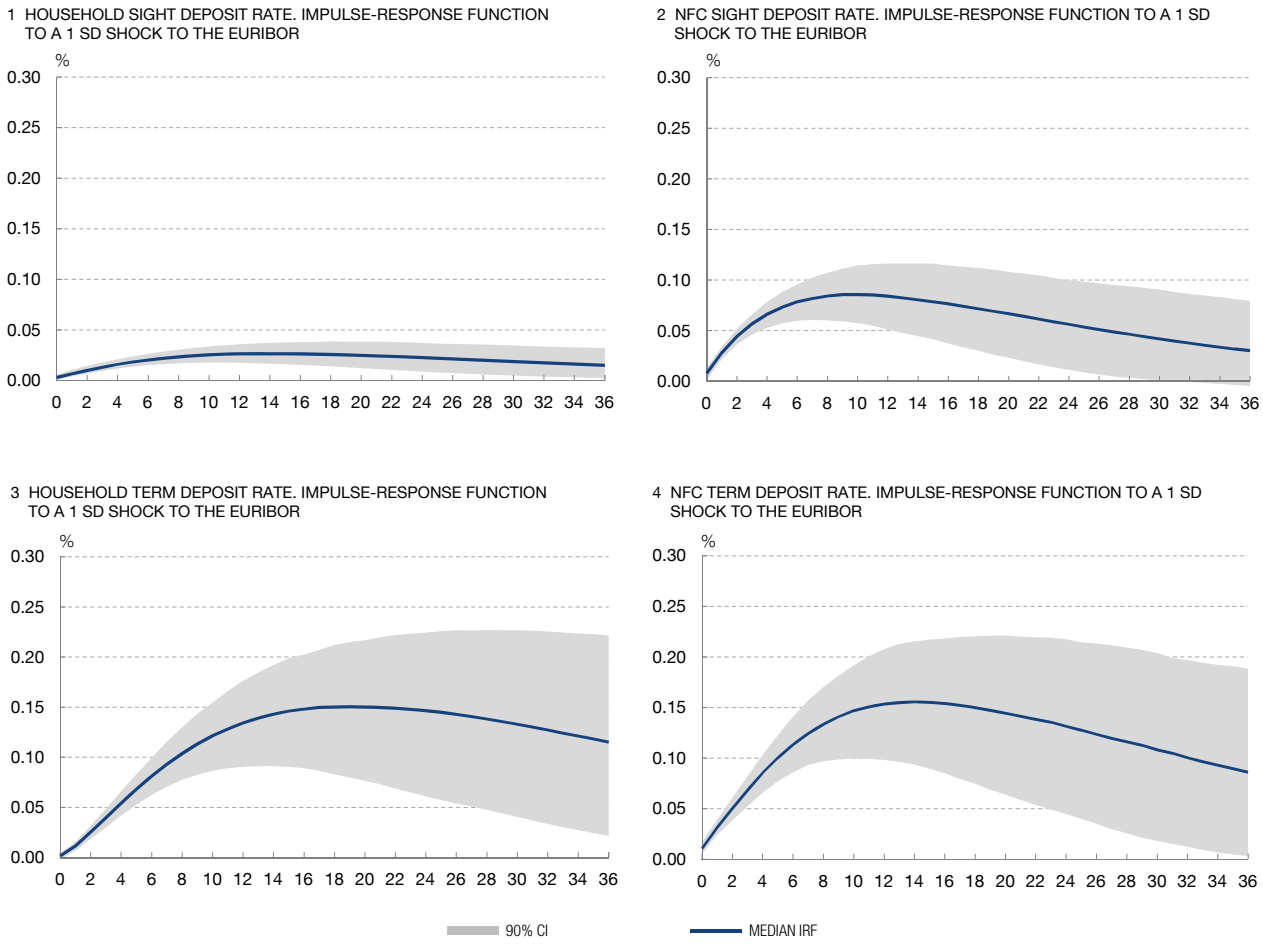
Chart 4 shows the responses of the deposit rates following a positive 12M EURIBOR shock of one standard deviation (approximately 9 bp). As Chart 4.1 demonstrates, the response of the household sight deposit rate is very minor: the median response is 2.7 bp at the peak, which is reached 12 months after the shock, followed by a sluggish return. In Chart 4.2, we see that the NFC sight deposit rate reacts stronger

8 Both the IPI and the HICP series were seasonally adjusted.

9 This parsimonious list of macro variables (IPI and HICP) and the 12M EURIBOR, albeit reduced, facilitates the interpretation of results and it also provides some control for the general macroeconomic conditions (activity and inflation). However, there could be other more sector-specific factors affecting the dynamics of deposit rates and outstanding amounts, like the level of liquidity, competition or risk appetite, as well as regulatory issues or the availability of other sources of operating profit, like net fees and commissions.

Chart 4

IMPULSE-RESPONSE FUNCTIONS OF RETAIL DEPOSIT RATES TO A 1 SD SHOCK TO THE EURIBOR



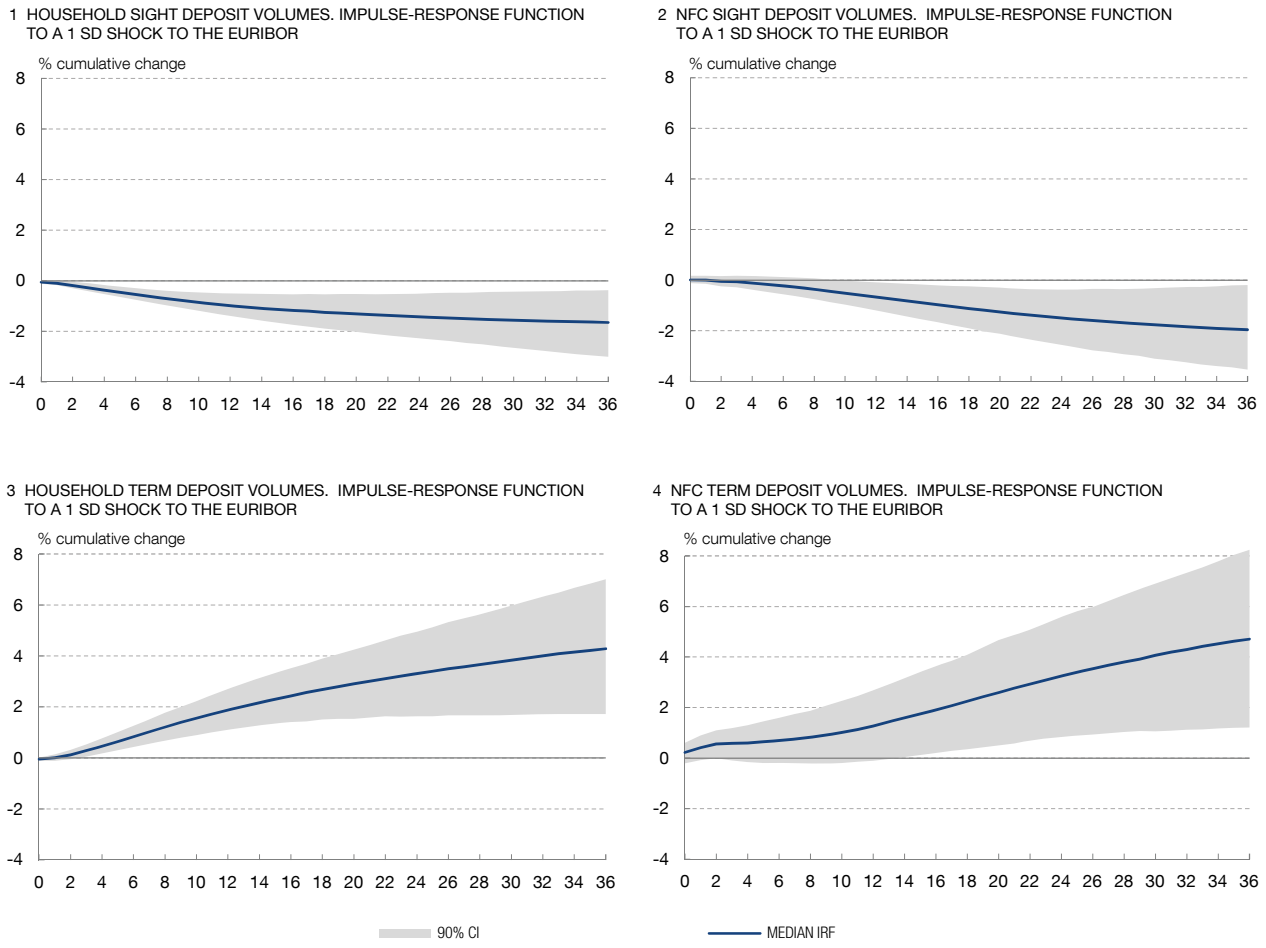
SOURCE: Banco de España.

and faster: the peak impact of 8.6 bp is reached in 9 months. Charts 4.3 and 4.4 show that both household and NFC term deposit rates show a sizeable response after a 12M EURIBOR shock, with median peaks of 14.4 bp (after 1.5 years) and 15 bp (after 14 months), respectively, and a markedly more persistent response. This latter feature is in line with the longer maturity of term deposit portfolios. To sum up, we see that sight deposit rates (particularly those of households) are less sensitive to changes in the 12M EURIBOR than term deposit rates.

Turning to deposit volumes, Chart 5 shows the cumulative responses of the various deposit volumes to the same 12M EURIBOR shock as before. First, as Charts 5.1 and 5.2 show, sight deposits held by both households and NFCs tend to decrease in response to an increase in the EURIBOR, although the decline in the latter is somewhat more muted in the months immediately following the shock. This latter feature can be explained by companies' liquidity needs, which limit how much they can reduce their sight deposits. In contrast, the volumes of both types of term

Chart 5

IMPULSE-RESPONSE FUNCTIONS OF RETAIL DEPOSIT VOLUMES TO A 1 SD SHOCK TO THE EURIBOR



SOURCE: Banco de España.

deposits dynamically increase, as Charts 5.3 and 5.4 demonstrate. Taken together, these responses suggest that households act in line with a portfolio rebalancing motive, taking advantage of the higher yield offered by term deposits.

Note that the net impact of a positive 12M EURIBOR shock to the volume of total deposits depends not only on these four impulse-response functions, but also on their relative starting composition. In particular, since the overwhelming majority of deposits are currently held in sight accounts, as discussed in Section 3.1 above, a positive 12M EURIBOR shock would entail a drain effect, that is, a decline in total deposits, even if term deposit volumes present a positive response that is higher in percentage terms than the negative reaction observed in the sight deposit volume. This drain effect is consistent with the findings of Bernanke and Blinder (1992) and Gerlach, Mora and Uysal (2018). This is despite the fact that total household savings typically increase, as households tend to direct resources from bank deposits to instruments issued by other financial institutions.

3.3 Conditional forecasts

Our VAR model allows us to generate an alternative or counterfactual path for deposit rates and volumes in the past, and quantitatively answer whether or not current developments differ from historical patterns. Importantly, note that no information related to the current policy cycle was used to estimate the model (as the estimation sample ended in December 2019), hence the model's predictions reflect historical relationships between the variables, spanning several monetary policy and macroeconomic cycles. In particular, we produced conditional forecasts of the four deposit rates and volumes jointly for the period between January 2021 and December 2022, based on the actual paths of the remaining variables (industrial production growth, HICP inflation and 12M EURIBOR).

We compute the corresponding forecasts of the average deposit rate (weighted by volumes), total deposit volumes (calculated as the sum of the four deposit types) and total deposit costs (computed as the sum of the products of each rate and volume). This exercise is particularly relevant due to the important role played by deposits in the funding structure of Spanish banks, as we highlighted at the beginning of this section.

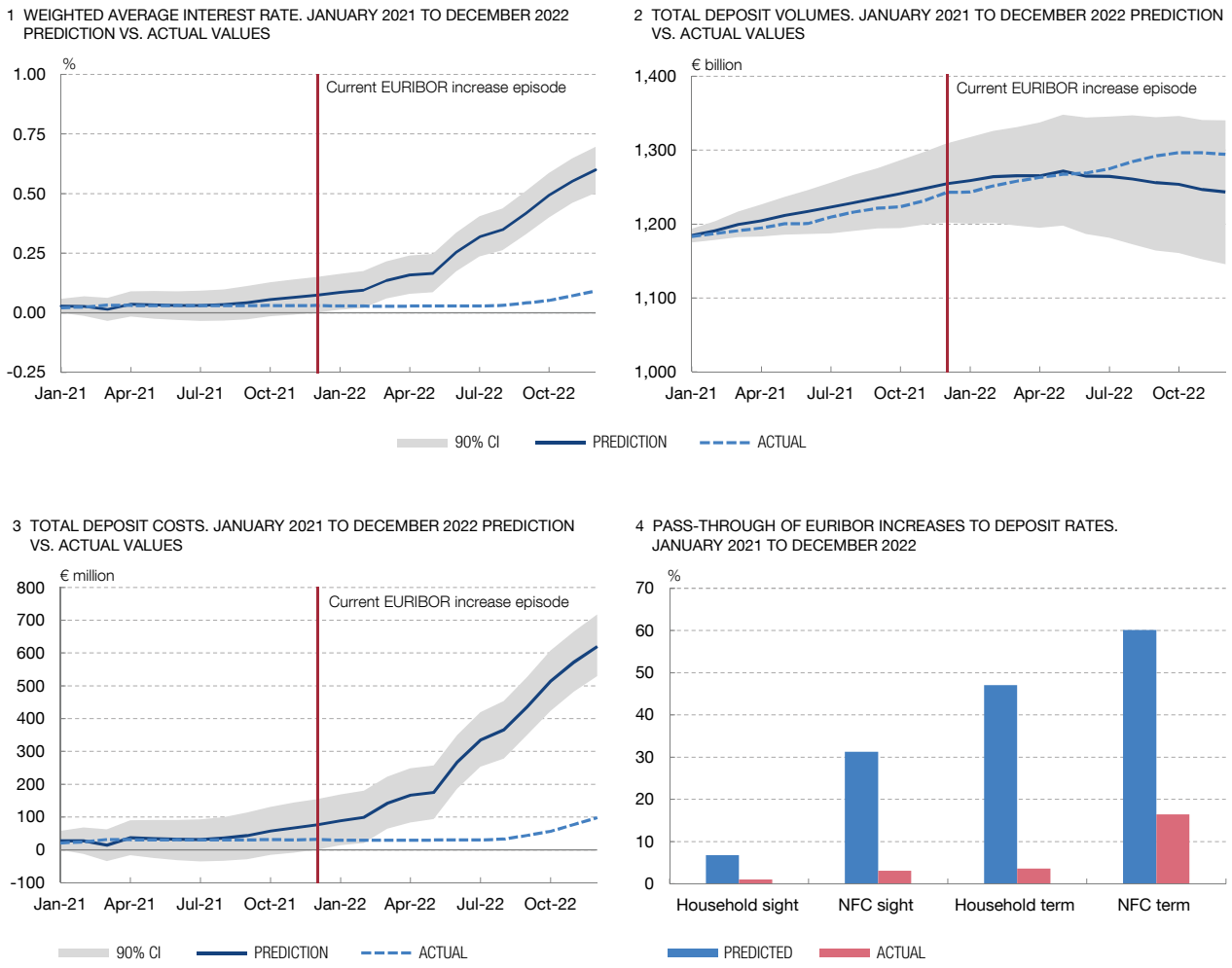
Chart 6.1 shows that the counterfactual average rate gradually diverged from the observed rate. Considering the total volume of deposits, we see in Chart 6.2 that the model's forecasts are in line with the actual data, thanks to its ability to capture the developments of sight deposit volumes. Finally, as Chart 6.3 shows, the divergence between the predicted deposit costs – suggested by historical patterns and summarised by the VAR model – and their observed counterparts closely mirrors that of the (average) deposit rate, amounting to close to €525 million a month by the end of the period analysed. According to this estimation, the total deposit cost divergence in 2022 amounts to €3.25 billion that otherwise would have reduced the aggregate net interest income (of around €24 billion for all deposit institutions' business in Spain), according to the underlying estimation.

Seen through the lens of the model, the actual pass-through in each deposit category is substantially lower than what historical patterns would suggest, as Chart 6.4 clearly demonstrates. In absolute terms, the discrepancy is the most striking in the case of term deposits, where we see a 43 pp gap.

In Chart 7 we document that the model would predict a much steeper path for all deposit rates, in line with historical patterns. Considering deposit volumes (see Chart 8), the picture is somewhat different. For household sight deposits (see Chart 8.1), the model's predictions closely track the observed series until about the end of 2021. Starting at around the beginning of 2022, the model suggests a slight decline (although with considerable uncertainty, as the predictive bands show), while

Chart 6

ACTUAL PATTERNS VS. MODEL PREDICTIONS IN THE CURRENT 12M EURIBOR SURGE EPISODE (a)



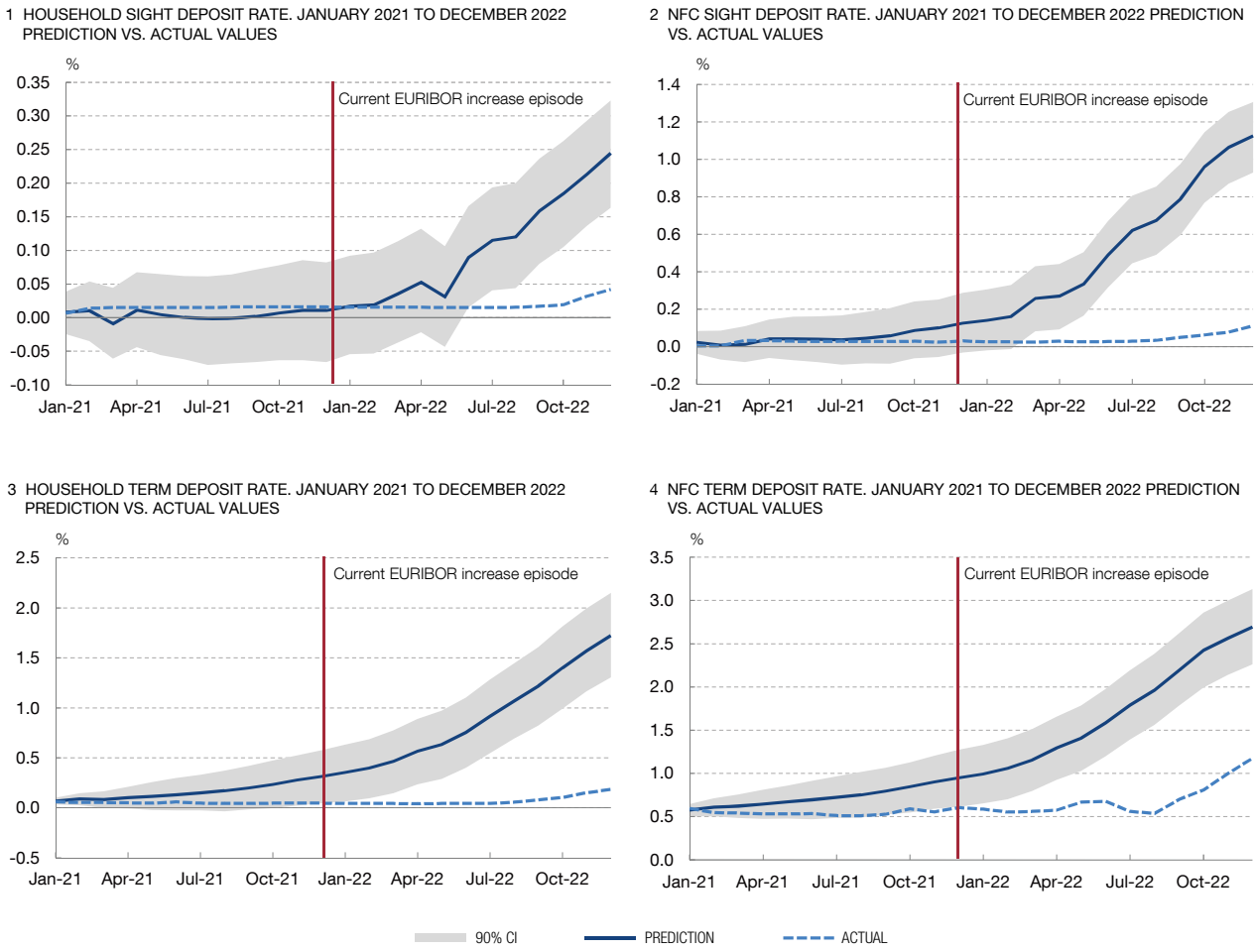
SOURCE: Banco de España.

a The weighted average interest rate is computed as the average of the predicted deposit rates (see Chart 7), weighted by the corresponding predicted relative volumes (see Chart 8). Total volume is calculated as the sum of the four deposit volumes, while total deposit costs are obtained as the sum of the products of each predicted deposit rate and the corresponding volume. Predictive bands are based on 1,000 forward simulations of the VAR model, taking the conditioning paths of industrial production growth, HICP inflation and the 12M EURIBOR as given. The dark red lines indicate the beginning of the current EURIBOR increase episode.

in reality deposits kept increasing. For NFC sight deposits, the model's predictions in Chart 8.2 are fairly in line with the actual values, although the latter tend to fall in the lower end of the predictive uncertainty bands. Turning to household term deposits (see Chart 8.3), the model would have suggested a U-shaped path, while the actual series steadily declined until the beginning of the second half of 2022. Finally, we can see in Chart 8.4 that while up to the second half of 2022 the VAR model's forecasts are largely in line with the actual changes in the deposits held by NFCs, the model would not predict the dynamic increase in deposit volumes observed in the second half of the year. This upswing is presumably due to the similarly rapid increase in the deposit rate seen in Chart 7.4.

Chart 7

INTEREST RATE FORECASTS IN THE CURRENT 12M EURIBOR SURGE EPISODE (a)



SOURCE: Banco de España.

a The dark red lines indicate the beginning of the current EURIBOR increase episode.

In sum, our results indeed suggest that deposit rates do not follow the current increase in the 12M EURIBOR as much as our model would predict, in line with a remarkably muted pass-through mechanism. In contrast, the behaviour of deposit volumes shows a pattern which is not extreme from a historical perspective.

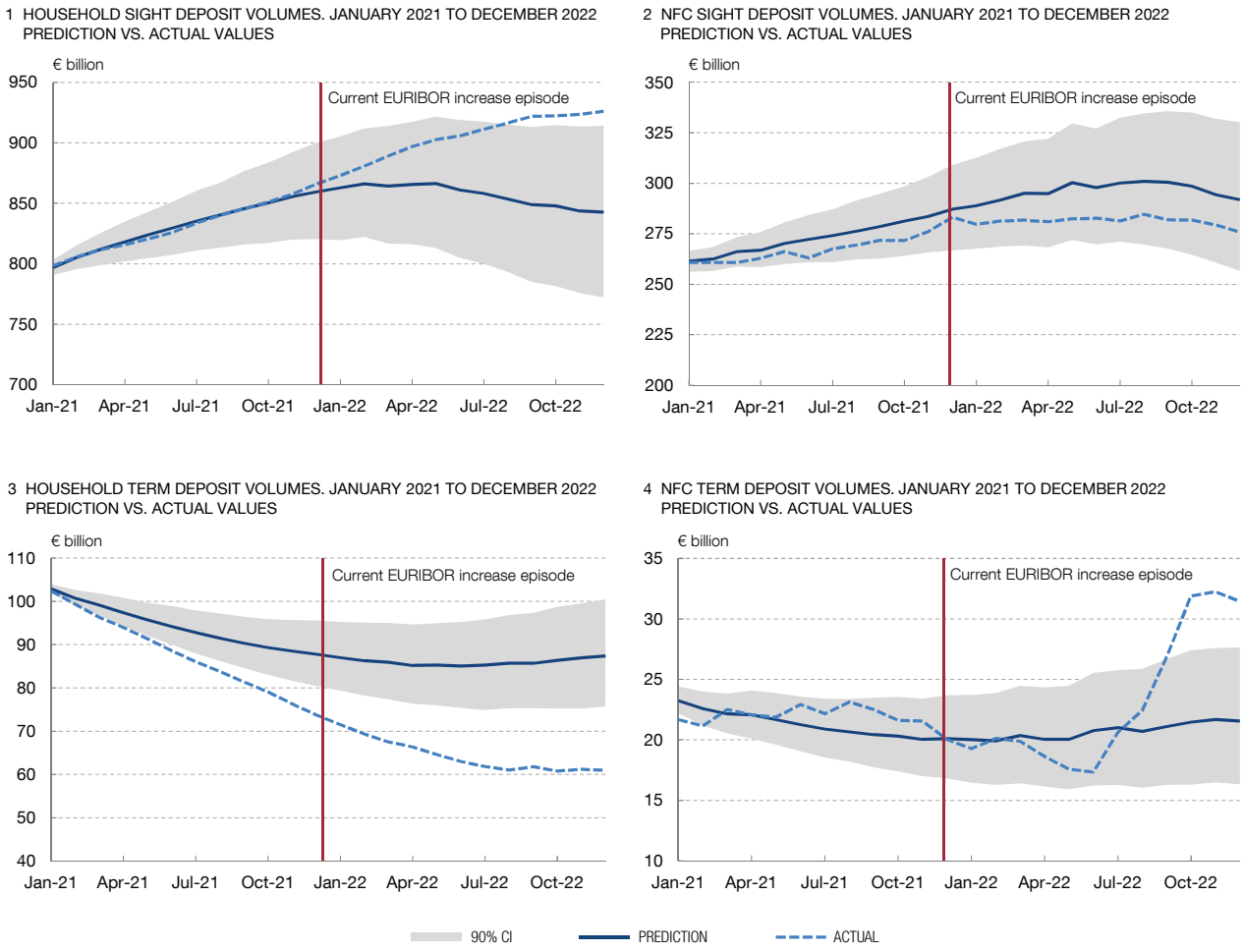
4 Comparative analysis of deposit rates and volumes with main euro area countries

4.1 Stylised facts

Having documented that the pass-through of the 12M EURIBOR in Spain is weaker than in the past, we turn to examine the potential reasons. In order to do so, we expand our analysis to a number of euro area countries. Specifically, we compare historical patterns

Chart 8

DEPOSIT VOLUME FORECASTS IN THE CURRENT 12M EURIBOR SURGE EPISODE (a)



SOURCE: Banco de España.

a The dark red lines indicate the beginning of the current EURIBOR increase episode.

of deposit rates, volumes and costs in the main euro area countries (Germany (DE), France (FR), Italy (IT) and the Netherlands (NL)), both from a historical perspective and in the current scenario. For this purpose, we use the data on interest rates and deposit volumes published by the European Central Bank in its Statistical Data Warehouse.[10]

The comparison suggests that Spain shares historical patterns with other euro area countries.

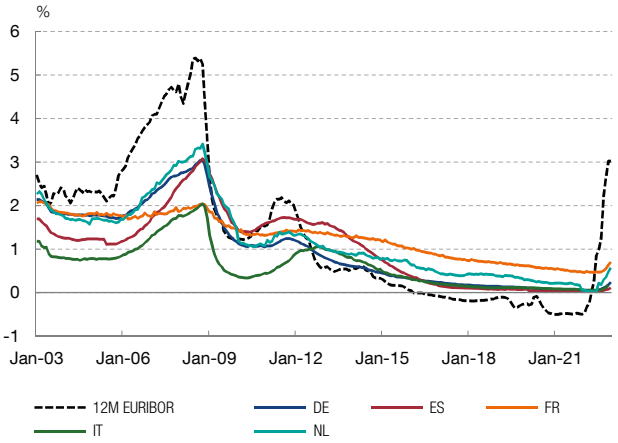
First, over the last twenty years the average interest rate on retail deposits declined in all the euro area countries examined, largely following the 12M EURIBOR (see

10 Information on interest rates is obtained from the ECB's MFI Interest Rate Statistics, and information on volumes is available from the ECB's Balance Sheet Items database.

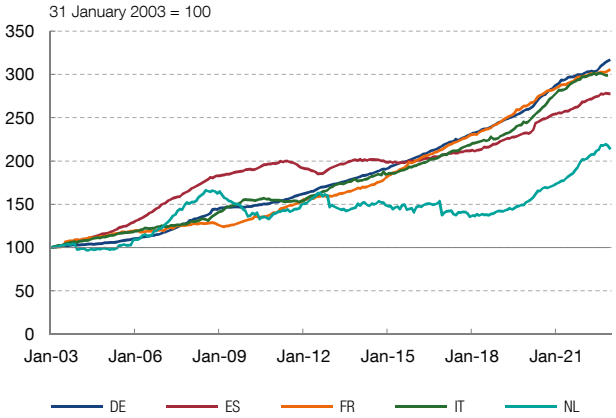
Chart 9

HISTORICAL EVOLUTION OF RETAIL DEPOSIT RATES, VOLUMES AND COSTS IN MAIN EURO AREA COUNTRIES

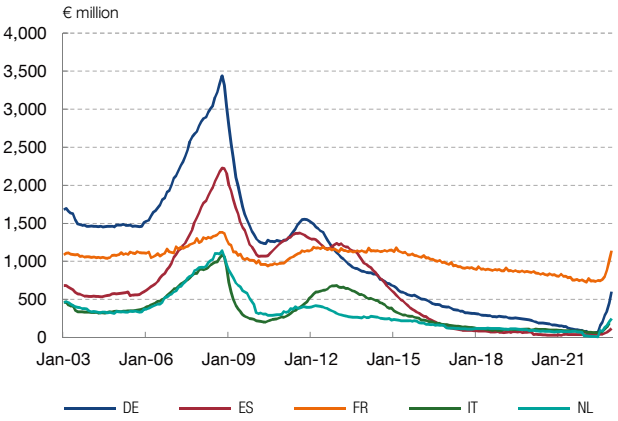
1 WEIGHTED AVERAGE INTEREST RATE FOR SIGHT AND TERM DEPOSITS. NFCs AND HOUSEHOLDS



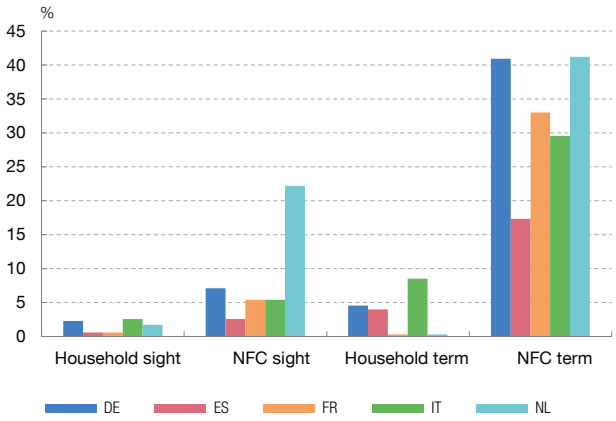
2 TOTAL SIGHT AND TERM DEPOSITS. NFCs AND HOUSEHOLDS



3 MONTHLY COST OF DEPOSITS. NFCs AND HOUSEHOLDS



4 PASS-THROUGH OF EURIBOR TO DEPOSIT RATES. DECEMBER 2021-DECEMBER 2022



SOURCE: ECB.

Chart 9.1). There are, however, some cross-country differences. For one, the average rate on deposits in France shows greater stability over time and since 2014 placed it at the top in terms of deposit rates.[11] On the other hand, deposit rates were historically lower in Italy, although these differences moderated and completely disappeared throughout the years of expansionary monetary policy.

Second, the volume of deposits in the countries analysed grew over the last two decades (see Chart 9.2). According to these data, the volume of deposits tripled in

11 The greater stability shown by the average interest rate on deposits in France is probably due to the inclusion of household deposits under the *Livret A*, a savings product whose characteristics (interest rate, maximum balance payable, etc.) are set by the French Government.

Germany, France and Italy. Deposit growth in Spain is close to these figures, although somewhat lower (+178%). Only in the Netherlands was deposit growth significantly below the average growth rate (+113%). The upward trend in deposit volumes was not interrupted in the low interest rate environment.

Finally, the total cost of deposits for credit institutions declined in all the countries analysed. In fact, the monthly cost of deposits reached the lowest values in the series at the end of 2021, despite the aforementioned increase in the total volume of deposits, standing below €70 million in Germany, Spain, Italy and the Netherlands (see Chart 9.3). By contrast, these costs remained above €700 million in France.

There are currently some cross-country differences in the strength of the pass-through of the 12M EURIBOR to deposit rates (see Chart 9.4). The pass-through of the 12M EURIBOR to interest rates on household deposits has been very limited (below 5%) in all countries, and practically zero in the case of sight deposits. Pass-through to NFC deposit rates has been larger and notably heterogeneous across jurisdictions, proving stronger in Germany and the Netherlands and weaker in Spain. Term deposits show the highest pass-through, with values ranging from 41% in Germany and the Netherlands to 17% in Spain.

The cost of bank deposits has reversed its trend in the second half of 2022, reaching a monthly cost of €600 million in Germany, €116 million in Spain, €250 million in Italy and the Netherlands and €1.14 billion in France.

4.2 Empirical analysis

To investigate whether the current period is substantially different from what historical evidence in each country tells us, we have estimated the VAR model in Section 3.1 for our sample of euro area countries. In each case, we used the country-specific IPI and HICP price level (both from Eurostat), and deposit rates and volumes, while the 12M EURIBOR is naturally common to all countries and models.[12]

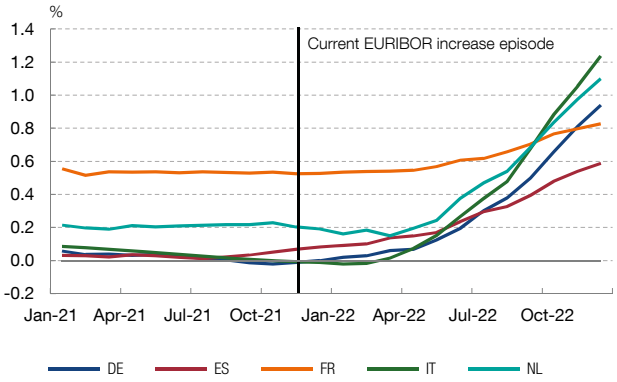
For the sake of brevity, we focus only on the counterfactual predictions produced similarly to those in Section 3.3, specifically those of the average deposit rate, total deposit volume and total deposit costs. The left-hand side panels of Chart 10 show the predictions of these variables, while the right-hand side panels display the relative gap between the out-of-sample forecast and the actual value of each variable in each country in December 2022, divided by this latest observation (hence, positive

12 We downloaded seasonally adjusted IPIs, while we performed the seasonal adjustment of the HICP series using the TRAMO-SEATS procedure (see, for example, Gómez and Maravall (1996)), implemented in the JDemetra+ software available at https://ec.europa.eu/eurostat/cros/content/software-jdemetra_en. Deposit volumes showing seasonal patterns were also adjusted prior to analysis.

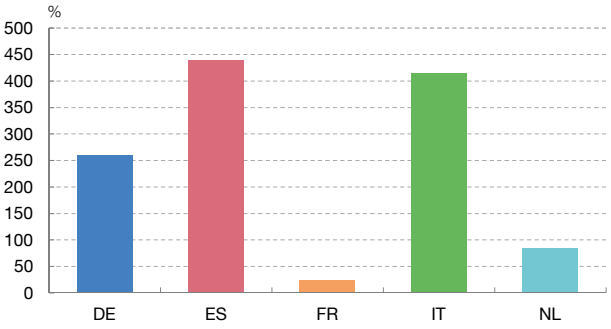
Chart 10

MODEL FORECASTS AND FORECASTING ERRORS FOR MAIN EURO AREA COUNTRIES IN THE CURRENT 12M EURIBOR SURGE EPISODE

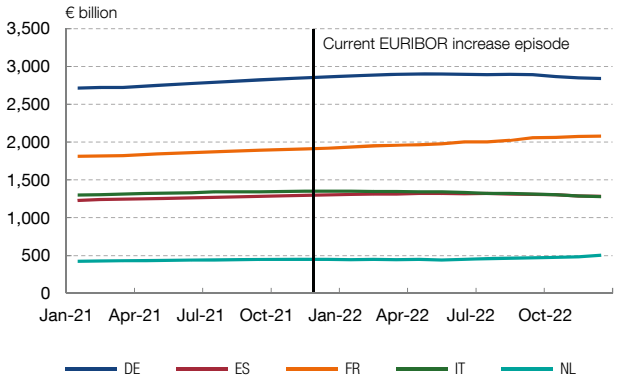
1 AVERAGE DEPOSIT RATE FORECAST (JAN-21 TO DEC-22)



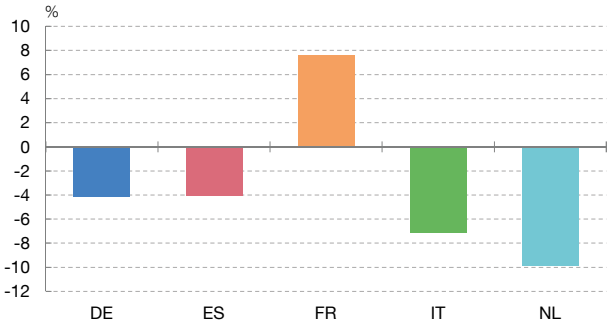
2 DEC-22 AVERAGE DEPOSIT RATE FORECASTING ERROR AS A % OF ACTUAL VALUE



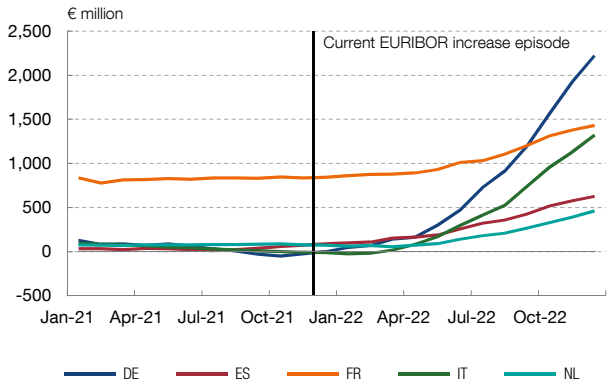
3 TOTAL DEPOSIT VOLUME FORECAST (JAN-21 TO DEC-22)



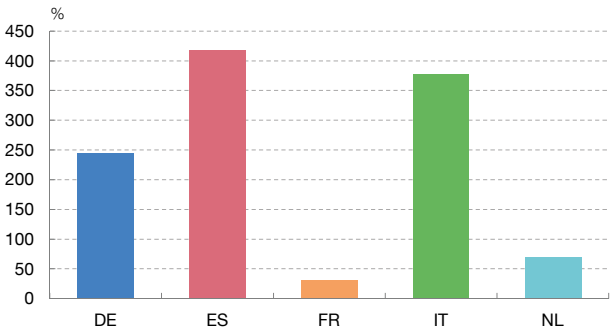
4 DEC-22 TOTAL DEPOSIT VOLUME FORECASTING ERROR AS A % OF ACTUAL VALUE



5 TOTAL DEPOSIT COST FORECAST (JAN-21 TO DEC-22)



6 DEC-22 TOTAL DEPOSIT COST FORECASTING ERROR AS A % OF ACTUAL VALUE



SOURCE: ECB.

values correspond to overpredictions). These gaps are qualitatively similar to those in Spain. First, deposit rates behave in a historically unusual way (except for France, see footnote 11), as the model appears to suggest a considerably higher average deposit rate. Second, deposit volumes increased substantially in the last two years[13] (see Chart 9.2), while the model predicted a more stable path, once again supporting that the period analysed does not fit the historical pattern well. Finally, deposit costs are growing less than predicted by the model, similar to the pattern observed in Spain.

Yet there are quantitative differences in the gaps across countries. Specifically, the expected increase in deposit rates in Spain is taking place even slower than the one observed in peer countries, such as Germany and the Netherlands.

Next, we further explore whether there are changes in the sign of the co-movement between deposit rates and the 12M EURIBOR. First, we assess potential changes in correlations, which measure the sign of the changes in the variables. Chart 11.1 documents that the historical correlation of deposit rates with the 12M EURIBOR has generally been strong across countries.[14] In the last year, the correlation between deposit rates and the 12M EURIBOR has remained, in general, strong, leaving to one side some unusual patterns in household term deposits, which account for a small fraction of the total.[15] In NFC term deposits, correlations have remained strong across all countries.

We conclude that linkages of the 12M EURIBOR are moving in the same direction, despite the fact that the strength of their linkages has decreased, as shown in previous sections.

In addition we conduct a principal component analysis to further study the co-movement of interest rates among different deposit portfolios within the same country, as well as among countries within each of the portfolios considered.[16] In the period 2003-2021, the proportion of the total variance of the series explained by the first principal component amounts to almost 90% in all countries (see left-hand side of Chart 11.2). In the last year, the intensity of the co-movement has remained broadly similar – it has decreased somewhat in France and the Netherlands, and increased in Spain and Italy. Similarly, the deposit rates considered moved in tandem across

13 In addition, although not shown in the chart, in 2022 Q4 a modest rebalancing of volumes from sight to term deposits began to be observed in some of the countries in the sample. This trend is expected to intensify in the coming months.

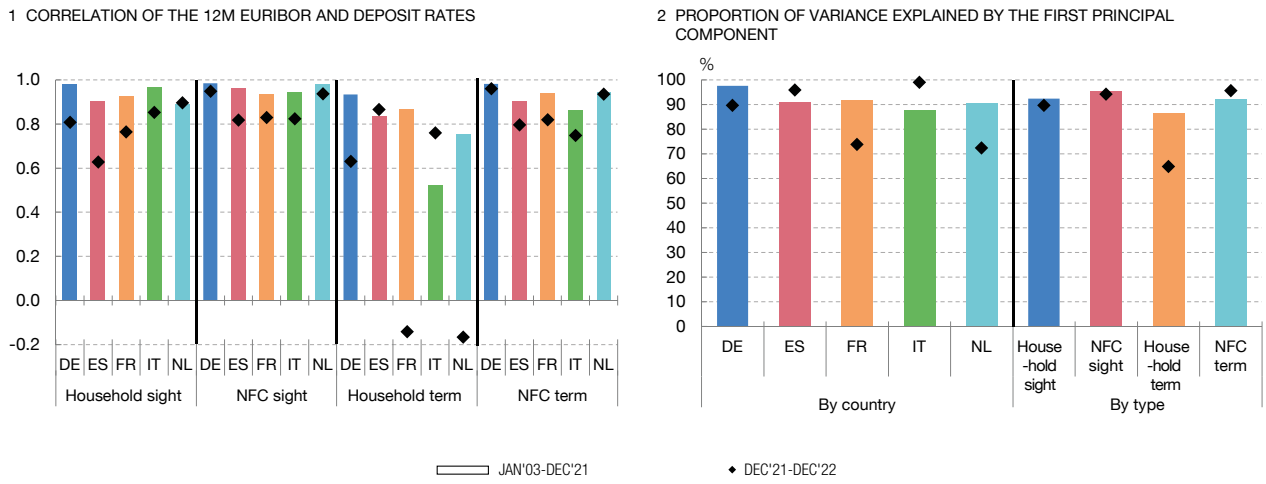
14 Correlations were around 0.9 in most portfolios and countries; interest rates on household term deposits exhibit the lowest correlation (values range from 0.52 in Italy to 0.93 in Germany).

15 In the case of household sight deposits, the correlation observed in Spain (0.63) is particularly low. In NFC sight and term deposit rates, Germany and the Netherlands have maintained correlation levels similar to those of their time series, while those in Spain, France and Italy have been somewhat lower.

16 We use the weight of the first principal component, which can be interpreted as the first common trend, in the total variance of the considered set of variables as an intuitive measure of the degree of co-movement present in that set.

Chart 11

CO-MOVEMENT BETWEEN RETAIL DEPOSIT RATES AND THE 12M EURIBOR IN MAIN EURO AREA COUNTRIES



SOURCE: ECB.

countries for a given portfolio in the period 2003-2021, as the first principal component explains around 85-90% of the joint variance (see right-hand side of Chart 11.2). In 2022, there are no major changes in co-movement patterns, leaving aside household term deposits.

4.3 Potential drivers of cross-country differences: liquidity and market concentration

The previous analysis underscores the cross-country differences in the quantitative impact of the current 12M EURIBOR surge on retail deposit rates, and not a complete decoupling. Many factors may certainly be behind the divergences relative to historical patterns, and a fully fledged analysis remains beyond the scope of this article. However, we explore the role played by factors often deemed to be drivers of pass-through speed. We first look at the impact of excess liquidity, which could reduce banks' incentive to raise deposit rates in order to obtain funds through retail deposits. In addition, we analyse market concentration, which could signal more power for banks to moderate or postpone deposit rate increases.

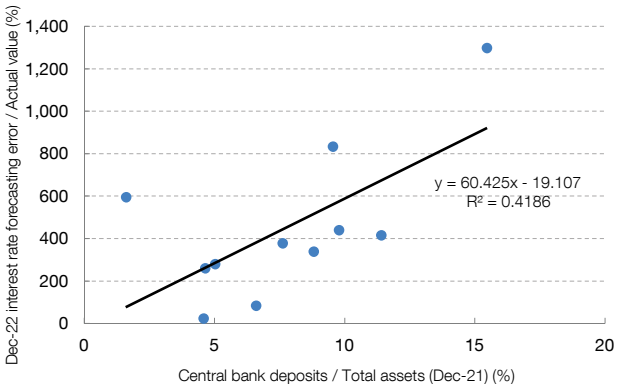
To this end, Chart 12.1 presents, for an extended sample of countries,[17] the relationship between the weight of deposits from the ECB that banks had on their

17 The expanded sample of EU countries considered for this analysis includes 11 euro area founding countries: Belgium (BE), Germany (DE), Ireland (IE), Spain (ES), France (FR), Italy (IT), the Netherlands (NL), Austria (AT), Portugal (PT) and Finland (FI). Greece (GR), having joined the euro area only two years after its foundation, is also included in the sample.

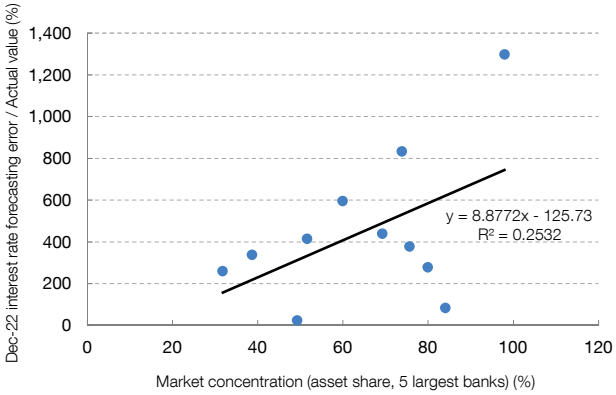
Chart 12

LIQUIDITY AND MARKET CONCENTRATION AS POTENTIAL DRIVERS OF CROSS-COUNTRY DIFFERENCES IN 12M EURIBOR PASS-THROUGH

1 EFFECT OF EXCESS LIQUIDITY ON DEPOSIT RATE FORECASTING ERRORS



2 EFFECT OF MARKET CONCENTRATION ON DEPOSIT RATE FORECASTING ERRORS



SOURCE: ECB.

balance sheets[18] as of December 2021 – as a percentage of their total assets – and the forecasting error of the average interest rate on retail deposits modelled for December 2022 – normalised by the value actually observed in that same period. As discussed above, the excess liquidity of certain banking systems would be overstated had we gauged it using deposits held at the ECB, due to operational issues related to liquidity management by foreign banks operating in Germany and Luxembourg. In the other European banking systems there is a closer connection between deposits from and at the ECB. As can be seen in the chart, the countries with greater excess liquidity are those that in turn show a greater deposit rate forecasting error, i.e. they are the countries that increased their rates the least with respect to what was expected based on previous historical experience.

Next we check the role of market concentration, measured via the asset market share of the five largest banks (C5).[19] We also observe a positive relationship, although it is weaker than in the previous case, with the model forecasting errors for average interest rates (see Chart 12.2).

According to this analysis, a decrease in the funding obtained by Spanish banks from the Eurosystem would have a material impact on the strength of the pass-through from the 12M EURIBOR to deposit rates. Moving from the 9.8% excess

18 The weight of deposits from the ECB relative to total assets constitutes a good proxy of the excess liquidity held by banks with relevant retail deposit activity, but excluding that held by institutions domiciled outside the euro area and kept in the ECB through subsidiaries located in certain countries, such as Germany or the Netherlands.

19 Information on market shares is obtained from the ECB's SSI Banking Structural Financial Indicators Statistics database.

liquidity ratio recorded in December 2021 to zero would narrow the estimated gap in the pass-through by 85%.

5 Conclusions

The EURIBOR surged in 2022, as monetary policy tightened to dampen inflation. According to historical experience, such a strong rise in the EURIBOR should have pushed up deposit rates, triggering shifts from sight to term deposits, which are costlier, and ultimately driving up deposit costs. Our conclusion is warranted by both descriptive analyses and a formal estimation employing an SVAR model fitted on the period 2003-2019.

We document that, in 2022, the pass-through of the EURIBOR to bank deposit rates in Spain was weaker than expected according to model results. Specifically, deposit rates failed to increase; the discrepancy was more striking in the case of term deposits, which have historically responded more strongly. Overall, and up to December 2022, bank deposit costs remained broadly stable.

In 2022 the pass-through of the EURIBOR was also weak in other euro area countries, yet there were quantitative cross-country differences. Simple correlation analyses suggest that the EURIBOR pass-through is particularly weak in banking systems with a high volume of deposits from the ECB as of December 2021 and high market concentration.

Going forward, jointly modelling deposit rates and volumes will remain useful to assess the impact of the EURIBOR on bank deposit costs. In addition, once the EURIBOR pass-through gains momentum, differences across banks will likely appear and bank-level analyses will help to understand which factors determine bank responses.

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Annex Technical details of the (Structural) VAR model

This annex summarises the econometric techniques we used to estimate the (S)VAR models in the article.

The reduced-form VAR model assumes a linear relationship between an $(N \times 1)$ vector of variables y_t and its p lags as

$$y_t = c + A_1 y_{t-1} + A_2 y_{t-2} + \ldots + A_p y_{t-p} + \epsilon_t ,$$

where c is an $(N \times 1)$ vector of intercepts, A_js denote $(N \times N)$ coefficient matrices, while ϵ_t is an $(N \times 1)$ vector of independent and identically distributed innovations following a normal distribution with mean zero and covariance matrix $\sum$.

We estimated the VAR model with maximum likelihood. Visual inspection of the autocorrelations of the estimated error terms (that is, the difference between the fitted values and the realisations) suggested using at least two lags. The Akaike Information Criterion (AIC), a commonly used model selection criterion, suggested two lags when considering potential lag lengths between $p=1$ and $p=6$. The Bayesian Information Criterion (BIC), a more parsimonious alternative to the AIC, suggested $p=1$ lag only, but due to the presence of strong serial correlation in the residuals, we discarded this suggestion. However, when considering potential lag lengths between $p=2$ and $p=6$ only, the BIC also suggested $p=2$.

As described in Section 3.1 of the main text, our estimation sample spans the period between January 2003 and December 2019. The sample starting date is determined by data availability. By ending the estimation sample before the COVID-19 pandemic, our results are not contaminated by the extreme macroeconomic volatility observed during that period. Furthermore, we avoid potential biases due to the possibly unusual behaviour of deposits due to administrative restrictions affecting mobility and business hours. Considering the rather short period between 2003 and the Global Financial Crisis (GFC) of 2007-2008 could potentially alleviate issues related to negative interest rates and macroeconomic and financial turbulence, leading to a more appropriate benchmark pass-through. However, time-varying parameter regression analysis reveals that the relationship between deposit rates and the 12M EURIBOR was markedly different during that early period relative to the full-sample constant-parameter estimates. Furthermore, for outstanding rather than new deposits, estimates based on a longer sample potentially capture composition effects better.

To construct the impulse-response functions and turn the reduced-form VAR into an SVAR model, we relied on contemporaneous restrictions: variables ordered before

the 12M EURIBOR (i.e. industrial production growth and HICP inflation) are not allowed to respond contemporaneously to an unexpected change in the 12M EURIBOR. Technically, after estimating the VAR model, the impulse-response functions are identified via the lower triangular Cholesky decomposition of the covariance matrix of the error terms (the estimate of $\sum$). The 90% confidence intervals reflect estimation uncertainty, and we generated them via a resampling method known as the bootstrap.

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