



## Do Irish households respond to deposit rates?

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### Abstract

The recent financial crisis highlighted the importance of stable funding and, in particular, customer deposits for the Irish banking sector. To ensure future viability, the domestic banks must maintain and grow their household deposit books. This letter focuses on the Irish household deposit market, describing some of the key developments in this segment during the crisis. It also tests if deposit movements are affected by differences in deposit rates across the banks, over the period 2003Q1 through 2013Q2. The key findings are that Irish householders are sensitive to differences in rates across the banks, but this relationship only holds in the pre-crisis period (i.e., up to 2007Q4).

## 1 Introduction

The recent financial crisis highlighted the importance of stable funding and, in particular, customer deposits for the Irish banking sector. Kelly *et al.*, (2012) document the dangers posed by Irish banks' pre-crisis reliance on short-term wholesale funding and the measures introduced to narrow the gap between loans and customer deposits as part of the Financial Measures Programme<sup>2</sup>. To ensure future viability and meet forthcoming liquidity regulations, the domestic banks must maintain and grow their customer deposit books. In addition to effectively dealing with the problem of mortgage arrears, a stable funding profile is necessary to allow banks to be in a better position to resume normal lending activities and support a recovery

in the real economy. A deeper understanding of deposit dynamics in the domestic market, therefore, is warranted in view of the importance of this source of funding.

In addition to repairing their balance sheets, the Irish banks face a number of challenges in growing their deposit books. First, the flow of new deposits may be limited in the near term. The Irish private sector remains highly indebted with high levels of unemployment. Recent research shows that precautionary savings by Irish households have generally been used to reduce debt levels rather than increase deposits (Cussen, O'Leary and Smith, 2012). Also, the current monetary policy environment means that average deposit rates are low by historical comparison which may deter new depositors. During the crisis, however, banks

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<sup>2</sup>This initially included targets for a reduction in loan-to-deposit ratios from 180 per cent on average at end-2010 to 122.5 per cent by end-2013 for the banks in question.

operating in the Irish market offered some attractive rates on longer-term deposit products to gain new customers and to lengthen the average maturity of their liabilities. This strategy had a negative impact on margins. Given the impact on earnings and future viability, we are, therefore, interested in examining if banks can realistically increase deposit levels by engaging in competition on rates. We focus on the Irish household deposit market over the period 2003Q1 to 2013Q2 and ask do Irish households respond to differences in deposit rates across the banks? Also, if a relationship exists between volumes and rates, has the financial crisis had an impact, i.e., at a time of household deleveraging and banking sector challenges, have depositors become more or less sensitive to deposit interest rates?

Section 2 provides an overview of the Irish household deposit market and trends between 2003 and 2013Q2. Section 3 introduces the data used in the empirical analysis and presents the key results. Section 4 concludes and considers the implications for financial stability.

## 2 Irish deposit market

Prior to the recent crisis reliance on volatile sources of wholesale funding by banks increased significantly.<sup>3</sup> Financial innovation and easier access to international capital markets allowed banks to engage in liability management to fund asset growth (see Matthews and Thompson (2008)). During the crisis, however, Irish-owned banks' funding sources fell significantly. In 2008, a Government guarantee on liabilities was introduced<sup>4</sup>. As a share of total liabilities, customer deposits and Central Bank borrowing increased as wholesale funding decreased. Customer deposits<sup>5</sup> comprised 62 per cent of total funding of the domestic banks as at 2013Q2 compared to 46 per cent in 2010Q4<sup>6</sup>.

Policy responses to the Irish financial crisis resulted in significant restructuring across the banking sector. One consequence of this was the increased reliance on domestic operations by Irish banks. Therefore, the Irish deposit market has

become even more important for domestic banks as a source of funding. Of particular interest to this paper is the household deposit market. From a pre-crisis level of double the size of the non-financial corporate (NFC) deposit market, the domestic household market was approximately three times the size of the NFC market as at 2013Q2. This reflects greater outflows from the NFC sector since the beginning of the crisis. The household market is found to be quite concentrated as domestic banks accounted for two-thirds of the market, based on value. In terms of new deposit products, households seem to favour overnight maturities, at around 60 per cent of the total (Figure 1). Despite attractive term rates in recent years, the share of agreed maturity deposits has fallen while the share of redeemable at notice accounts has risen. This reduction in longer-term deposits since the crisis may reflect higher levels of risk aversion or a greater need by households to access their deposits to fund consumption or pay-down debt.

The systemic nature of the Irish banking crisis appears to have created an environment where "flight to quality" issues may have affected deposit flows. Although Irish-owned banks dominate the market, the data show that Irish households continued to increase their deposit holdings with foreign-owned banks during the crisis while deposits at domestic banks declined over this period (Figure 2). This result may be due to negative sentiment towards the domestic banks. McQuinn and Woods (2012) show that corporate deposit flows reacted negatively to an increase in the median credit default swap spread of the listed domestic banks between 2009 and 2010. This perceived increase in credit risk by the markets may also have affected retail deposit holders.

In line with policy rates, deposit rates across all banks followed a general upward trend between 2005 and end-2008 (Figure 3). Further, the dispersion among the banks' rates during this period is evident. Relative to policy and market rates, new business rates rose sharply from mid-2008. At the peak in April 2012, household rates were 1.7 percentage points above benchmark wholesale rates with a 3 month maturity, whereas up until 2009

<sup>3</sup>See Coates and Everett (2013) for a discussion of foreign funding of the Irish banking system.

<sup>4</sup>The government issued a two-year guarantee of certain Irish banks liabilities in September 2008. This was succeeded by a narrower five-year guarantee covering new liabilities such as deposits, certificates of deposit, commercial paper, senior unsecured bonds and notes and other senior debt. See <http://www.centralbank.ie/regulation/industry-sectors/credit-institutions/Pages/GovernmentGuaranteeScheme.aspx>.

<sup>5</sup>Retail and corporate deposits

<sup>6</sup>Bank of Ireland, Allied Irish Banks plc (incl. EBS), Permanent TSB.

they were below market rates (Figure 4). While offering premiums over wholesale money market rates for term deposits was not uncommon internationally during the crisis, the spreads paid by domestic banks were at the upper end of the scale in an effort to retain and attract deposits. This strategy put considerable pressure on margins across the system as interest income was, and remains, weak due largely to the inability of Irish banks to re-price a significant proportion of their mortgage loans which are based on tracker-style rates.<sup>7</sup> There is also some evidence of pass-through from higher deposit rates to higher mortgage lending rates (see Goggin *et al.*, (2012)).

More recently, average new household deposit rates have declined, in part reflecting the removal of loan-to-deposit ratio targets under the EU/IMF programme<sup>8</sup> in 2012 and banks' recognition of the unsustainable impact on profits from offering high rates.

### 3 Deposits and Interest Rates

In order to investigate the relationship between interest rates and deposits prior to, and during, the financial crisis, we specify a panel data model of deposit growth, similar to that tested in Kraft and Galac (2007). That study explores the experience of Croatia in the 1990s, a period which included financial deregulation in the early part of the decade and a systemic banking crisis<sup>9</sup> in the latter part, including the failure of numerous medium sized banks. The results show that banks were able to increase deposit rates and fund rapid expansion in the pre-crisis period. The relationship between deposits and interest rates was positive and significant in this period. However, this relationship did not hold during the banking crisis as a flight to quality occurred. There are some important similarities with Ireland, which merit this approach, although the domestic banks also relied on foreign

wholesale funding to expand their balance sheets.

We estimate the following equation:

$$\Delta d_{i,t} = \alpha r_{i,t} + \beta \Delta d_{i,t-1} + \gamma X_{i,t-1} + u_t \quad (1)$$

where  $d_{i,t}$  is the quarterly change in log deposit volumes for bank  $i$  in quarter  $t$ . The panel comprises only five banks but they currently account for, on average, 86 per cent of the entire Irish deposit market over the sample period of 2003Q1 to 2013Q2.<sup>10</sup> In addition to normal acquisitions, the restructuring of the Irish banking sector in response to the crisis has involved significant consolidation in the market. Where a bank has subsequently merged with, or was acquired by another bank, the individual data for both entities are combined for the entire sample period. In the Irish case this applies to AIB and EBS, BOI and ICS, Anglo and INBS, and Ulster Bank and First Active.

Our key explanatory variable  $r_{i,t}$  is the difference in the new business interest rate of each individual bank *relative* to the other competing banks during each quarter of the sample period (see Table 3 for a description of the data series used). Specifically, as per Kraft and Galac, we use the differential between the log of the individual bank's deposit rate and the log of the average rate across all banks in the sample. This approach is also consistent with the findings of Acharya *et al.* (2011) that a banks deposit rates are not set in isolation of other banks. During the 2007-09 financial crisis, they demonstrate that US banks offering higher deposit rates were those most exposed to liquidity shocks and weak balance-sheets but that other banks in the local market responded by raising their deposit rates<sup>11</sup>.

For the purpose of this analysis, we aggregate the new business rates offered on all deposit categories except overnight deposits, using each category's share of total deposits as the respective weight. This is preferred to a simple average across the product categories as high rates in unpopular

<sup>7</sup>See Holton *et al.*, (2013) for more on net interest margins.

<sup>8</sup>In order to minimize risks to core lending and pressures on deposit interest rates, the Irish authorities agreed with the external programme partners to discontinue using loan-to-deposit ratios to guide deleveraging, and instead use nominal targets for the disposal and run-down of non-core assets. The monitoring of bank level Liquidity Coverage Ratios and the Net Stable Funding Ratios was enhanced to track progress towards the relevant Basel III requirements. See Economic Adjustment Programme for Ireland, Summer 2012 Review, p 25.

<sup>9</sup>According to a systemic banking crises database by Laeven *et al.*, (2012) fiscal costs related to the restructuring of the Croatian financial sector amounted to 6.9 per cent of GDP and non-performing loans peaked at 10.5 per cent of total loans.

<sup>10</sup>AIB, BOI, IBRC, ILP and Ulster Bank. All but Ulster Bank were covered by the Irish government guarantee. Ulster Banks' parent, Royal Bank of Scotland also received substantial support from the UK Government. This is a representative sample of interest rate data but does not include state savings, credit unions and some foreign banks for which data are not available.

<sup>11</sup>They also show that the weaker institutions lost deposits as they approached failure, despite offering higher rates

categories may skew the bank level rates used in the estimation. Overnight deposits, such as current accounts, are excluded from our measure as this category's trends are not representative of depositors' saving behaviour (they traditionally have very low rates as they tend to be used for transactional purposes and are measured on a daily basis).

A number of controls  $X_{i,t-1}$  are included in the regressions. To investigate if bank-specific risk may have contributed to the distribution of Irish deposits, a proxy for financial soundness, namely the ratio of provisions to gross assets, is included in the specification.<sup>12</sup> An increase in the level of provisioning by the bank indicates a deterioration in asset quality with a potential adverse impact on solvency. Therefore, we expect a negative relationship between this variable and household deposit growth.

The log of total assets for each bank is also included to control for the impact of bank size, in common with other studies. These studies generally find a positive relationship between bank size and deposit growth. The relationship between the sensitivity of depositors to bank risk and bank size has also been explored. Berger and Turk-Ariss (2010) find depositors of smaller institutions were more sensitive to bank risk, consistent with a hypothesis of larger institutions being too-big-to-fail (TBTF). This contrasts with the findings of Hori *et al.*, (2009) who found stronger depositor discipline effects in larger institutions reflecting the fact that deposits at smaller institutions tended to be for smaller amounts and therefore more likely to be covered by deposit insurance. Acharya and Mora (2011) also use bank size to construct a proxy for solvency based on an indicator of TBTF status.

It was further necessary to add a dummy variable, which takes the value of one in 2011Q1 and zero elsewhere, to control for one-off deposit transfers between the former Anglo Irish Bank and Allied Irish Banks plc and between the former Irish Nationwide Building Society and Permanent TSB in February 2011.

<sup>12</sup>While it would have been useful to include alternative measures such as loan impairments or arrears rates to proxy for banks' credit risks, this was not possible due to data limitations. Regulatory solvency ratios are also used in some market discipline papers to proxy for bank risk. Bank level Tier One ratios were found to be insignificant or incorrectly signed in our empirical studies and are not included. Despite the significant recapitalisation of the Irish banks from 2009, market sentiment remained negative towards Irish banks amidst concerns regarding asset quality.

<sup>13</sup>Specifically, with regard to choosing savings products, respondents said the rate of interest was a factor in their decision in just 15 per cent of cases. Further, over 60 per cent said they were not sure of the rate of interest payable on their savings account at the time of the survey. The financial crisis, however, may have changed this attitude among some households.

<sup>14</sup>Although the first Irish bank guarantee was introduced in September 2008, market sentiment had already turned negative towards the Irish banks in early 2008 as evidenced by the heavy selling of Anglo Irish Bank shares on 17 March 2008.

A lagged dependent variable is included to allow for dynamics and the evidence of persistence in the series for each bank across this estimation period. A study of financial capability in Ireland (based on data from 2007/2008) showed that consumers often displayed 'inertia', i.e., frequently renewed existing policies and products without considering alternatives which may provide better value for money, better product features or be more suited to the individual's needs (O'Donnell and Keeney, (2009))<sup>13</sup>.

To allow for the impact of economic activity, macro-economic controls such as quarterly changes in real GDP and consumer prices are also included. Economic growth is related to household deposits through the personal savings rate. There remains much debate about the nature of the relationship between savings and growth and the direction of causality between them in both the empirical and theoretical literature (See Deaton, 1999).

Given the systemic nature of the Irish financial crisis, we further investigate if depositors react differently pre and post 2007Q4. Two binary variables are interacted with the interest rate term to ascertain how the elasticity relative to deposit volumes may have changed between the two sub-periods. The pre-crisis dummy variable takes on the value of one from 2003Q1 to 2007Q4 and zero elsewhere while the crisis dummy is one from 2008Q1 to the end of our sample.<sup>14</sup> Table 1 shows the performance of the Irish household deposit market, domestic economic activity and the banks' asset quality during these distinct sub-periods. With regard to deposit growth, Table 1 shows that there were significant deposit outflows during the crisis period peaking at an average of 7.9 per cent per annum. Further, economic output declined and the credit quality of the Irish banks' loan portfolios deteriorated between 2008 and 2013Q2.

## 4 Results

Following Kraft and Galac (2007), we employ a number of different panel data estimators to ensure robustness of our results. The estimation results are shown in Table 2.

Specifications 1 and 2 are based on pooled OLS.<sup>15</sup> Regression (3) contains a set of bank fixed effects to control for the possible impact of unobserved differences across the banks that may have influenced depositor behaviour. A dynamic model is used in (4) as the fixed effects model may be inconsistent with a lagged dependent variable.<sup>16</sup> In all cases, the interest-rate variable is contemporaneous in the regressions but the bank risk variables and the macroeconomic controls are lagged by one quarter to capture possible delays in information transmission to customers.

The results in specification 1 indicate that there is a positive relationship between the prevailing interest-rate differential and the change in deposits in that quarter, all other things being equal. However, using the crisis interaction terms, the positive relationship only remains statistically significant in the pre-crisis period, which is line with Kraft and Galac (2007). This result is consistent across all of our specifications and estimators. Households appear sensitive to relative changes in deposit rates across our sample of banks up to 2007Q4 only. This suggests banks could attract deposits by varying rates relative to their main competitors during this time. By contrast, the results indicate that householders were invariant to rate differentials between 2008Q1 and 2013Q2.

The Irish crisis seems to have led to a change in depositor behaviour in the domestic household market.<sup>17</sup> As noted in section 2, there were deposits outflows during the Irish crisis, possibly driven by flight to quality concerns around the domestic banks. Without volume and rate data for the remaining deposit institutions not covered by our data (i.e., state savings, credit unions and other foreign banks), we cannot, however, test the flight to quality hypothesis. Banks' ability to increase retail deposits may have been further constrained by heavily-indebted households choosing to pay-

down debt with their savings rather than increase deposits (see section 1). Both factors (i.e., risk aversion and indebtedness) may, therefore, have reduced the importance of interest rates for household depositors during the crisis.

As expected, the provisioning ratio is found to be negatively related to deposit growth. This relationship, however, is not statistically significant in all equations. With regard to the macroeconomic factors, only quarterly inflation is found to be significant and is negatively signed. This contrasts with Kraft and Galac (2007) which finds inflation to be statistically insignificant. Kraft and Galac, however, find a positive relationship with economic growth.

In all specifications, the change in the previous period's deposit level is positively related to current deposit growth signalling persistence in the deposit series. As discussed in section 3, this finding of persistence is not surprising based on survey results. Bank size, as proxied by the log of bank assets, is found to be insignificant or negatively signed in the regressions. This result, which is in line with that of Kraft and Galac (2007), implies that bank size was not an important factor in driving deposit growth over our sample period. This result may be due to the relatively concentrated nature of the Irish market as a result of consolidation both before and during the crisis.

## 5 Summary and Conclusion

The key finding of our paper is that, although Irish households reacted positively to changes in average deposit rates offered by banks relative to their main competitors until 2007Q4, no relationship is found between 2008 until 2013Q2 using our sample. Irish households, therefore, appear more sensitive to rates in normal times. Funding problems in the Irish banks began to emerge in 2008 before escalating into a full systemic banking crisis in the following years. Irish households also began the process of deleveraging in an effort to repair balance sheets. Negative market sentiment and weak consumer balance sheets may, therefore, explain

<sup>15</sup>Given that  $T$  is larger than  $N$ , we adjust the covariance matrix to control for possible autocorrelation and cross-sectional dependence.

<sup>16</sup>The one-step Arellano/Bond is preferred given the overly optimistic standard errors of the two-step specification (Verbeek, 2008).

<sup>17</sup>Our analysis uses share-weighted rates for term deposits to construct our interest rate differential. It may be possible that a number of individual deposit products with attractive rates and terms did attract depositors during the crisis but any such effect was not strong enough to be evident in the data we use.

the lack of a statistical relationship between deposits and interest-rate changes after the onset of the crisis. The results also show a high degree of persistence in household deposit levels (i.e., agreed maturity and redeemable at notice accounts) between 2003Q1 and 2013Q2.

In terms of policy conclusions, unsustainable

deposit pricing should be closely monitored as, on average, it appears that banks cannot increase their deposit base by offering relatively higher rates during a period of severe financial stress. The potential negative impact on future earnings from such a strategy could constrain future recovery.

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Table 1: Financial and Economic Overview

	Pre-crisis period	Crisis period
Deposit Growth %	13.3	0.1
(max / min)	(16/ 9.1)	(9.5 / -7.9)
Real GDP %	4.9	-1.4
(max / min)	(7.3 / 1.1)	(3.5 / -7.4)
Provisions ratio	0.4	5.1
(max / min)	(0.6 / 0.3)	(11.1 / 0.3)

Notes: Pre-crisis period refers to data from 2003 Q1 to 2007 Q4. Crisis period is 2008 Q1 onwards. Data refer to the banks mentioned in this Economic Letter only. IBRC is excluded from the sample from 2011 Q1. Above growth rates are an average of the year-on-year percentage changes for each quarter. The maximum and minimum are calculated on the averaged series.

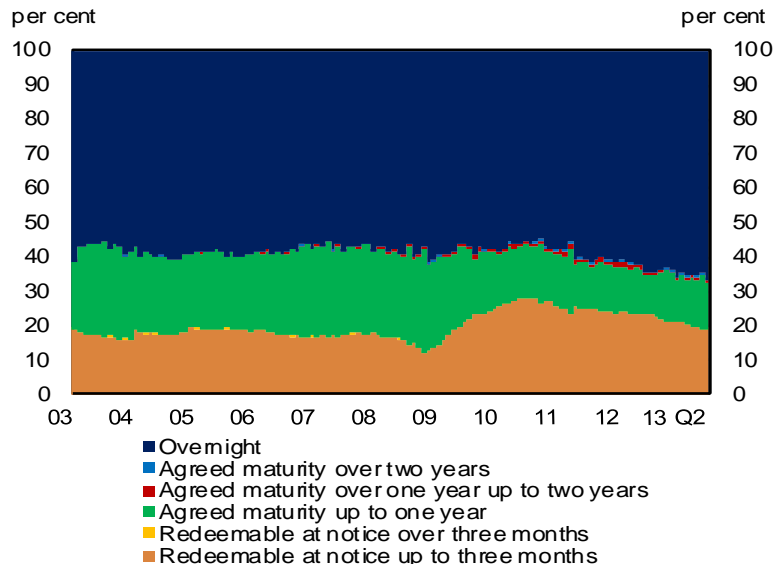
Table 2: Modelling Irish Household Deposits: 2003Q1-2013Q2

	(1) OLS	(2) OLS	(3) BANK FE	(4) ARELLANO BOND
<i>RateDifferential<sub>t</sub></i>	0.029*			
<i>RateDifferential<sub>t</sub> * pre – crisis<sub>t</sub></i>		0.038*	0.080**	0.084***
<i>RateDifferential<sub>t</sub> * crisis<sub>t</sub></i>		0.012	0.020	0.020
<i>ProvisioningRatio<sub>t-1</sub></i>	-0.001*	-0.002**	-0.001	-0.001
<i>LogtotalAssets<sub>t-1</sub></i>	-0.006*	-0.007*	-0.005	-0.005
<i>RealGDPGrowth<sub>t-1</sub></i>	-0.045	-0.046	-0.049	-0.047
<i>Inflation<sub>t-1</sub></i>	-0.501**	-0.507**	-0.576**	-0.595**
<i>DepositGrowth<sub>t-1</sub></i>	0.194**	0.185**	0.161**	0.150**
<i>CrisisDummy</i>	-0.025***	-0.024***	-0.031**	-0.032***
<i>TransferDummy</i>	0.127***	0.125***	0.121	0.120**
<i>Constant</i>	0.099**	0.113**	0.090	
N	190	190	190	185
R <sup>2</sup>	0.32	0.32	0.34	

**Note:** \*p<.1, \*\*p<.05, \*\*\*p<.01. Data are quarterly and dependent variable is the change in log household deposits volumes. Specifications (1) and (2) use pooled OLS. The covariance matrix of the pooled OLS estimates are corrected for autocorrelation and possible serial correlation as time dimension T is greater than cross-sectional dimension N. Bank fixed effects used in (3). Tests on the Arellano-Bond one-step specification in (4) cannot reject the null hypothesis of no autocorrelation in first-differenced errors and the Sargan test cannot reject the null hypothesis that the overidentifying restrictions are valid.



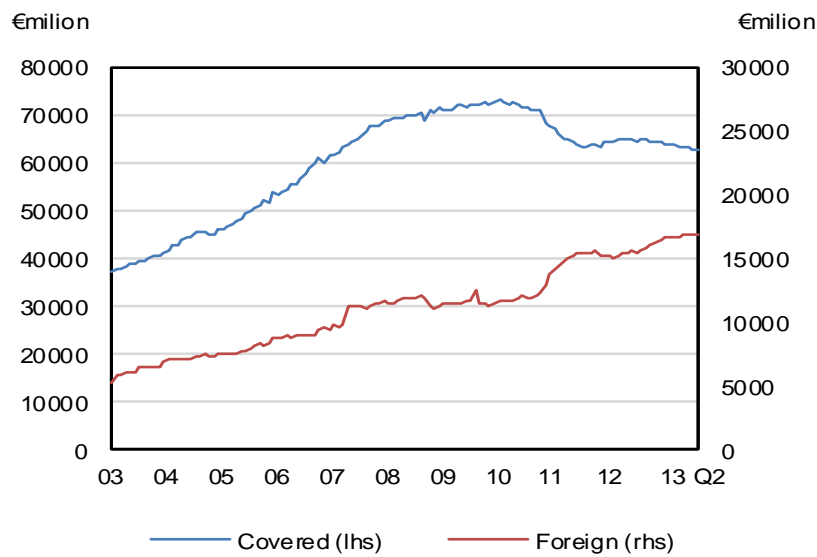
Figure 1: Deposit market structure



Source: Authors calculations based on Central Bank of Ireland data.

Notes: Data refer to the share of new business volumes of the Irish household deposit market conducted through a representative sample of resident offices of credit institutions for which we have interest rate data.

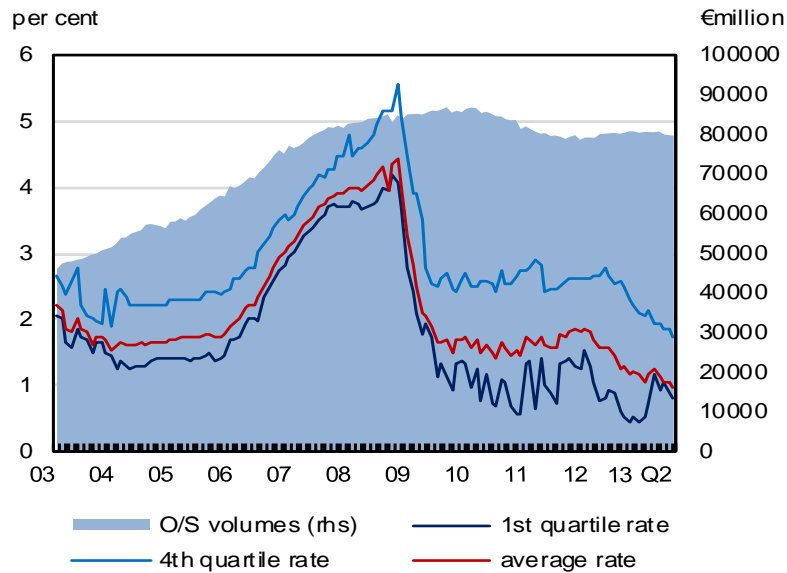
Figure 2: Foreign versus domestic banks, outstanding volumes



Source: Authors calculations based on Central Bank of Ireland data.

Source: Data relate to outstanding volumes of the Irish household deposit market for all resident offices of credit institutions, excluding credit unions. Volumes have been adjusted to account for reclassifications, revaluations and exchange rate changes. Covered banks refer to the banks covered under the Financial Measures Programme (FMP) and foreign banks refer to institutions with a foreign parent operating in the Irish market.

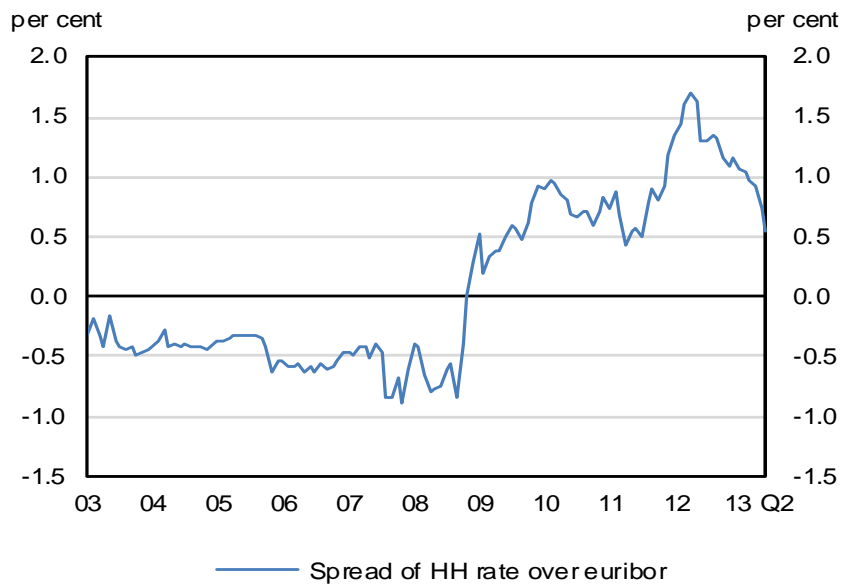
Figure 3: Household rates and outstanding (o/s) volumes



Source: Authors calculations based on Central Bank of Ireland data.

Notes: Quartile and average data refer to share weighted rates based on new business deposit rates (excludes overnight category) multiplied by new business volumes and relate to a representative sample of resident offices of credit institutions for which we have interest rate data. O/S volumes refer to outstanding volumes of the Irish household deposit market for all resident offices of credit institutions, excluding credit unions.

Figure 4: Spread of new household deposit rates over the three-month euribor



Source: Bloomberg and Central Bank of Ireland.

Notes: Data are from Central Bank of Ireland's Quarterly Bulletin, Table B.2.1. Data refer to a representative sample of resident offices of credit institutions. Credit union data are not included in the interest rates tables.

Table 3: Data summary

Variable	Description
Household deposit volume, by bank	Outstanding amount, adjusted to account for reclassifications, revaluations and exchange rate changes, euro and non-euro denominated deposits for Irish residents, unconsolidated MFI data. As per Central Bank of Ireland Table A.1 which comprises all credit institutions resident in Ireland (dependent variable).
New business household deposit rate, by bank	Share weighted by maturity, excluding overnight rates, vis-a-vis Irish and euro area residents, unconsolidated MFI data. As per Central Bank of Ireland Quarterly Bulletin Table B.2.1 which comprises a representative sample of credit institutions.
EURIBOR	Three-month interbank offered rate. End of month observation.
Provisions ratio, by bank	Ratio of provisions to total assets gross of impairments, internal confidential dataset, calculations based on unconsolidated MFI data.
Assets, by bank	Total balance sheet assets, Central Bank of Ireland regulatory statistics, consolidated data.
Gross Domestic Product (GDP)	Real GDP, not seasonally adjusted, Central Statistics Office (CSO) data.
Inflation	Inflation based on the Consumer Price Index (CPI), Index 2011=100, CSO data.