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The impact of liquidity regulation on banks[☆]

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ABSTRACT

We estimate the causal effect of liquidity regulation on bank balance sheets. We take advantage of the heterogeneous implementation of tighter liquidity regulation by the UK Financial Services Authority in 2010. We find that banks adjusted the composition of both assets and liabilities, increasing the share of high quality liquid assets and non-financial deposits while reducing intra-financial loans and short-term wholesale funding. We do not find evidence that the tightening of liquidity regulation caused banks to shrink their balance sheets, nor reduce the amount of lending to the non-financial sector.

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1. Introduction

During the international financial crisis which started in mid-2007, liquidity in short-term money markets dried up and banks suffered severe funding problems, including secured funding for highly-rated assets. By September 2007, Northern Rock experienced the first bank run by retail depositors in the UK since 1878. The significant reduction in market liquidity forced major central banks across the globe to provide huge amounts of liquidity assis-

tance to their banking systems. At the same time, bank supervisors evaluated the need for stricter liquidity regulation. In 2010, the UK Financial Services Authority (FSA) introduced a new quantitative liquidity requirement called the Individual Liquidity Guidance (ILG). Internationally the Basel Committee on Banking Supervision agreed on the Liquidity Coverage Ratio (LCR) in 2013, which is similar in design to the ILG. Following the global agreement on the LCR, the ILG was superseded by the LCR from 1st October 2015.

This paper estimates the average treatment effect on banks from the introduction of the ILG in the UK. We estimate the impact on bank balance sheet size, composition and average interest rates on loans and deposits by exploiting the heterogeneous implementation of tighter liquidity regulation in the UK. In particular, when the FSA introduced the ILG in 2010, it granted certain ILG modifications which exempted some banks from this new regulation. These exempted banks provide a control group which enables identification of the average treatment effect. However, as selection into treatment was not random, care needs to be taken to address sample selection bias.

Similar to the LCR, the ILG aims to make the banking system more resilient to liquidity shocks by requiring banks to hold a minimum quantity of high quality liquid assets (HQLA) consisting of cash, central bank reserves and government bonds to cover net outflows of liabilities during stressed funding condition and hence ensure the immediate survival of the bank.

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Although more stringent liquidity regulation can reduce the risk of bank runs and freezing of the interbank market, there has been a vigorous debate about the potential negative impact of liquidity regulation due to its impact on bank lending to the real economy and bank profitability. As with the LCR, the ILG is designed to encourage banks to increase the ratio of HQLA relative to other assets and reduce the share of short-term wholesale funding relative to more stable deposit and equity funding. Beyond that, the design does not provide predictions about how banks will respond along other dimensions, including its impact on bank balance sheet size.

Banks can respond in a myriad of ways to meet these new liquidity requirements which are likely to have different welfare implications. For example shrinking the size of a bank's balance sheet by cutting lending to the non-financial sector would increase the ratio of HQLA to stressed liability outflows. Alternatively, banks could increase the size of balance sheets by issuing equity to acquire HQLA to meet liquidity requirements without affect lending to the real economy. But a bank could also meet the regulation without changing balance sheet size but by changing the composition of assets or liabilities. In short, there are many possible ways for banks to meet tighter liquidity requirements, each with different welfare implications.

The multiple potential adjustment dimensions and scarcity of historical episodes to evaluate the response of banks to a tightening of liquidity regulation has created a wide range of views about the impact of liquidity regulation. Financial industry groups have argued that liquidity regulation will substantially increase the cost of bank funding and damage the real economy as banks reduce credit supply and pass on higher costs to the real economy (IIF, 2011). Others have argued that liquidity regulation will have a more limited impact (MAG, 2010).

This paper empirically identifies the dimensions along which banks responded to the tightening of liquidity regulation in the UK. We find that banks adjusted both their asset and liability structures to meet tighter liquidity regulation. We do not find evidence that the tightening of liquidity regulation had an impact on the overall size of bank balance sheets. Given the broad similarities in the design of the ILG and the LCR, our results suggest that the introduction of the LCR could result in a similar adjustment by banks.

On the asset side of bank balance sheets, banks subject to the ILG increased the share of HQLA to total assets by 12 percentage points on average relative to those with exemptions. Within the possible menu of HQLA, cash and central bank reserves constituted around 75% of the increase with 25% in UK T-bills and longer-maturity gilts. The increased share of HQLA was matched by an almost equal reduction in the share of short-term intra-financial loans. We do not find evidence that banks reduced the quantity of lending to the non-financial sector in response to tighter liquidity regulation.

On the liability side of bank balance sheets, banks increased funding from sources considered more stable under the ILG such as UK non-financial deposits and reduced their dependence on less stable short-term wholesale funding and non-resident deposits by a similar magnitude.

Turning to the price impact of the ILG, for the limited balance sheet items for which data are available, we do not find evidence that banks significantly increased the average interest rate on loans to the non-financial sector. Although ILG banks increased the share of funding from more stable UK non-financial deposits, surprisingly we do not find significant evidence that ILG banks increased the interest rate paid to attract those deposits. Our finding that the ILG had a significant impact on balance sheet composition but only a limited interest rate impact suggests that tougher liquidity regulation affects bank profitability primarily

through the substitution towards lower yielding HQLA and more expensive non-financial deposit funding.

Since the selection of banks into control and treatment groups was not purely random, we are aware that our results could be affected by sample selection bias. In our estimation method we make significant efforts to control for selection bias. Even though it is not possible to formally test whether we have completely purged bias from our results, when examining our results in their entirety, they are unlikely to be contaminated by serious treatment selection bias. In particular it is difficult to explain how sample selection bias could consistently explain our set of estimation results for different dependent variables, different end-points and for a subset of non-UK banks as we discuss in the later sections.

We are also aware that our results could be dependent on the specific macro-financial environment, especially the relative cost of holding HQLA when liquidity regulation was tightened. Because banks chose to meet their liquidity requirements in large part by increasing their holdings of central bank reserves, it is important to consider the influence of operational procedures related to the quantitative easing (QE) programme. Changes to Bank of England operational procedures allowed commercial banks to deposit an unlimited quantity of reserves at the Bank of England that were remunerated at Bank rate. This facility created a perfectly elastic HQLA supply curve. If this facility had not existed, the tightening of liquidity regulation could have been more costly as the higher demand for other forms of HQLA such as T-bills and gilts would have increased the prices of those assets.

We do not think our estimated impact of the ILG is contaminated by the effect of quantitative easing (QE) asset purchases mechanically increasing central bank reserves in the banking system. The introduction of the ILG was sufficiently far *after* the first round of asset purchases ended in January 2010 and most of our estimated effect occurs *prior* to the second round of QE which started in October 2011. For this reason, we do not think our results are biased by any asymmetric effects of the QE programme on control and treatment groups.

There has only been limited empirical research which evaluates the impact of liquidity regulation on banks. The principal reason is the scarcity of recent instances of demanding prudential liquidity regulation. For example liquidity regulation was excluded from both Basel I and Basel II regulations. A notable exception is the Dutch Liquidity Ratio introduced in 2003 (DNB, 2003).

Bonner (2012) and Bonner and Eijffinger (2012) test how the Dutch Liquidity Ratio affects interbank funding costs and corporate lending rates by exploiting the variation between banks that are just above or below their regulatory liquidity requirements. Consistent with our results they find that banks below their liquidity requirements do not charge higher interest rates on corporate loans. They also find that banks below their liquidity requirements pay higher interest rates on unsecured interbank funding, even though there is no public disclosure of this regulatory information.

Duijm and Wierds (2014) use a panel error correction framework to examine how banks adjust their balance sheets to meet the Dutch Liquidity Ratio following liquidity shocks. They find that when the gap between a bank's actual liquidity ratio and its required ratio is below its long-term average, banks adjust their balance sheets by increasing the share of stable forms of funding, while the response of liquid assets is insignificant. This result is broadly in line with our study although we find banks adjusted the composition of assets in addition to the composition of liabilities following a tightening of liquidity regulation.

De Haan and van den End (2013a) find that Dutch banks hold more liquid assets than required by liquidity regulation and that more solvent banks had smaller liquid asset buffers. However, they find that the relationship between solvency and liquidity buffers disappeared during the 2007–08 financial crisis.

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