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Bank profitability: Liquidity, capital and asset quality

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Abstract The liquid assets to deposit ratio (LADR) is often cited as a key structural metric for deposit-taking institutions (DTIs). This ratio indicates the extent to which banks have liquidity on hand, funded by relatively stable and predictable (mainly retail) deposits, rather than by potentially more volatile wholesale debt funding. Of course, a bank's balance sheet may also include deposits from large non-bank companies, which often behave like wholesale funding, but these tend to account, on average, for a lesser proportion of total deposits for a typical DTI. An LADR of at least 5 to 10 per cent, for an average DTI, is usually seen as a prudent level, as reinforced by the Basel III liquidity buffer stipulations.¹ A low percentage could suggest bank vulnerability to liquidity risk, especially if there is relative reliance on short-term wholesale debt funding, and less on retail deposits, regarded as stable, despite being short-term. In a primarily wholesale debt funding strategy, what the bank might gain in terms of better matching asset with liability maturities could be outweighed by rollover funding risks. Moreover, while retail liabilities tend to have a short contractual maturity, they also usually have a much longer behavioural maturity, so can provide effective funding for longer-term loans as well. Yet banks may also face an opportunity cost associated with holding liquidity. Retail deposits tend to be relatively cheap, in terms of absolute interest rate, compared to long-term wholesale debt, but investment in liquid assets accordingly offers relatively low returns. A higher percentage of LADR theoretically should translate into lower net interest margin (NIM), the primary driver of most banks' profitability, and hence a lower return on average assets (ROAA) compared to a bank maintaining low liquidity. A negative relationship on average might be expected between LADR and ROAA. This brief study examines this dynamic, using data over the most recent available year (2014–2015) over a large sample (around 13,000) of the world's largest deposit-taking banks. Linear regression is performed of ROAA, not only against LADR, but also including other internal bank measures: non-performing loans (NPLs) to total gross loans and equity to assets (EQUITY). The most powerful relation with ROAA is seen to be NPLs, negatively correlated with profitability. Equity to assets shows a positive relation with profitability, while the reverse may have been expected due to the general ability of leverage to boost returns. LADR shows a slightly negative relation with profitability, as hypothesised. This could suggest that banks may be doing well by maintaining adequate liquidity and capital, in line with regulatory requirements, and in contrast to what bankers often claim. This could have implications for bank managements in considering liquidity and capital strategies, in the context of profitability.

Keywords: *liability management, asset management, banking, treasury, liquidity, profitability*

INTRODUCTION

The liquid assets to deposit ratio (LADR) is used as an analytical tool to help assess the relative risk profile of a deposit-taking institution (DTI).² It measures the extent to which a bank has adequate liquidity on hand, typically funded by customer deposits, which show a history of stability (especially on the retail side, which tends to account for the majority of deposits in most DTIs), in contrast to wholesale debt funding, including interbank funding, which tends to be less predictable and less 'sticky'.³ Levels of LADR approaching or exceeding 5–10 per cent tend to result in a perception of a safer bank, at least in terms of overall funding and liquidity profile.⁴ A low LADR percentage may suggest that a DTI is either lacking in liquidity, or possibly less dependent on wholesale debt funding, and more reliant on safer deposits (also given the presence in most developed markets of deposit insurance⁵), or both. This paper first hypothesises that the main impact on profit of holding liquidity is due to low-earning assets, resulting in a negative relation between LADR and return on average assets (ROAA). Another angle to be explored would be the effect of relative customer deposit levels alone on profitability in order to try and separate the two potential effects, that of high deposits having an expected positive impact on profitability, especially if they fund higher earning assets, versus the negative effect of holding substantial liquid assets.

The relationship between LADR and bank profitability is driven by the fact that liquid assets tend to be low-earning — despite retail customer deposits being relatively cheap — at least in terms of net interest income. Theoretically, a higher percentage of the LADR might be expected to translate into a lower ROAA for a bank, other things being equal.

DTIs with high LADRs could be balancing their risk in terms of liquidity by holding high levels of liquid assets, and in terms of funding by maintaining low levels of customer deposits. Although better matching of maturities of assets and liabilities theoretically occurs with more long-term debt funding, there is potentially a price to be paid in terms of reliance on wholesale debt and interbank markets, especially during stress periods. During the crisis of 2008, the relative stability of retail customer deposits (helped no doubt by deposit insurance⁶),

in comparison with the marked liquidity shortage in wholesale debt and interbank funding markets, was noted.

Given this dynamic, a sensible approach may be to utilise less costly and protected retail deposit funding to the greatest practical degree, as permitted by competitive forces. The rollover risk of other liabilities would be mitigated, as would the effect of low-earning liquid assets on profitability and capital accumulation.

The paradoxical mismatch of assets and liabilities in the traditional banking model has been noted many times.³ Yet there is abundant evidence to show that retail deposits (the majority of deposits for most banks) do not disappear from banks' balance sheets as quickly as wholesale debt funding does in a period of stress.⁷ In the UK, statistics show that an average couple is more likely to divorce than switch deposit accounts to another bank.⁸ This is the behavioural underpinning for retail deposits typically remaining the largest funding source for most deposit-taking institutions.³ This 'stickiness' of deposits is further enhanced by the existence of deposit insurance in most developed markets.⁵ As the history of UK building societies shows, this strategy is seen to be low-risk.⁹ The relatively low-risk loan books of such institutions (consisting mainly of retail mortgage loans) are not the highest earning assets conceivable (like liquid assets), but building societies and similar institutions still earn an acceptable profit margin because of their cheap and low-risk deposit funding.⁸ Why do customers accept a low rate of return on their deposits? This could be due to a combination of trust in the bank pursuing a low-risk strategy operationally and financially, and government insurance against retail deposits, which can provide support in the event of a crisis.³

Nonetheless, an element of longer-term wholesale funding could make sense for a DTI, enabling it to better match its asset maturities (predominantly long-term loans) with its liability maturities (eg, some long-term bonds in the funding mix, or other forms of term debt, both senior and subordinated). It is a fundamental principle of funding diversification. Yet, during times of stress, it can prove difficult for a bank even to roll over existing wholesale debt liabilities, much less access more, the example of Northern Rock in 2007 being illustrative in this respect.¹⁰

Long-term funding in the bond or other wholesale debt markets can also heighten a bank's visibility among investors, from both debt and equity perspectives.² Banks may also consider such a strategy for capital purposes, where issuance of very long-term instruments may count as regulatory capital.³

The impact of bank liquidity and funding strategies on profitability must be considered. In competitive markets, as experienced by most banks, there must be careful assessment of both asset and funding mixes, in order to maintain adequate net interest margin without jeopardising asset quality or funding stability. With the prevalence of deposit insurance, this can perversely impel bank managements to take more risk, the 'moral hazard' problem,¹¹ in an effort to meet profitability expectations. Similarly, by loading up on more expensive long-term wholesale debt funding, banks can see net interest margins eroded, leading them to make riskier and potentially more remunerative loans. Is this really necessary? Can stable deposit funding and adequate liquidity actually contribute, on average, to better profitability? Of course, net interest margin is only part of the bank profitability equation. Fee income and costs associated with raising deposits would need to be considered for a full picture.

LITERATURE REVIEW

Numerous studies have been carried out on the drivers of bank profitability.¹² In the context of asset and liability management, liquidity is identified as a factor, with varying degrees of importance. The importance of liquidity, not only for bank sustainability but also for survival, has been reinforced in the 2008 crisis, leading regulators to incorporate liquidity measures into the global bank regulation framework of Basel III.¹ It is often claimed by bank managements, however, that too much liquidity eats into profit, given the low returns earned on liquid assets such as cash and equivalents compared with long-term loans and other assets.¹³ With regard to deposit structure, Sundaresan and Wang¹⁴ found that banks strove towards an optimal mix of deposits and debt funding to maximise profitability. Smirlock¹⁵ confirmed that demand

deposits were a cheaper source of funds and had a positive impact on bank profits.

Bourke¹⁶ was the first researcher to include internal variables in a profitability study involving cross-country data. The internal variables used were capital ratios, liquidity ratios and staff expenses. Dependent variables were net pre-tax profit against total capital ratio and net pre-tax profit against total assets ratio. Bourke reported that all internal variables were positively related to profitability. Molyneux and Thornton¹⁷ duplicated Bourke's study using all European banks as their sample and found similar results. Stienherr and Huvencers¹⁸ studied the performance of banks in the USA, UK, western Europe and Japan. They concluded that overhead expenditure was positively correlated with profitability. Liquidity relationship was significant only in certain countries.

Berger¹⁹ found that balance sheet structure had a meaningful impact on profitability and, depending on the nature of the balance sheet items, the relationship could be either negative or positive.

The objective of this study is to examine a few determinants of bank profitability, incorporating liquidity, capital and asset quality measures.

METHODOLOGY

The framework adopted here is one of secondary data collection of the average ROAAs and LADRs of the world's largest DTIs (around 13,000 of them), over a recent period (2014–2015). ROAA is defined as net income divided by average total assets, as taken from the historical income statements of the banks. The LADR is derived from the balance sheets of the banks, using the ratio of liquid assets to customer deposits. A DTI is defined for this purpose as an institution with up to a 50 per cent ratio of liquid assets to deposits and short-term funding. Outliers beyond this benchmark are characteristic of securities firms, finance companies, public sector entities (such as federal home loan providers) and other special-purpose institutions, which cannot always be considered as true profit-oriented institutions driven by net interest margin. In addition, non-performing loans (NPLs) to total gross loans, and equity to assets, drawn from the bank's annual reports, are included as independent

variables in the investigation. Overwhelmingly, the accounting standard used is International Financial Reporting Standards (IFRS), but that is not to say that different jurisdictions will not have somewhat different accounting interpretations. These data, derived from Bankscope, are assembled, and a simple multiple linear regression is performed based on the equation

$$\text{ROAA} = \alpha + \beta_1 \text{NPLs} + \beta_2 \text{EQUITY} + \beta_3 \text{LADR}$$

ANALYSIS AND FINDINGS

The following are the mean ratios obtained from the sample:

NPLs/gross loans: 3.122 per cent
Equity/assets: 11.482 per cent
LADR: 15.065 per cent
ROAA: 1.015 per cent

It is interesting to note that both the equity ratio and LADR look fairly robust compared to most regulatory requirements. The reciprocal of the equity/assets ratio can be looked at as the leverage ratio, equating on average to 8.7X. Note that this measure of leverage excludes off-balance-sheet items, which are included in the Basel III version of leverage. The average level of NPLs to gross loans also looks manageable. An average ROAA of slightly above 1 per cent is largely in line with expectations too.

The regression as performed shows an *R* square and adjusted *R* square of 0.15 (see below). Although this is not a particularly strong relationship, interestingly, the most pronounced effect, positively related to return, is book equity to assets. This could be because banks that take a lot of risk have large margins but require a lot of capital (eg, African banks). This is in contrast to contentions that higher debt leverage contributes to higher asset returns. Another driver, negatively correlated with returns, as expected, is NPLs to gross loans. In support of our hypothesis, a slightly negative relationship between the LADR and asset returns is observed.

Adjusted *R* square: 0.148, *F* value = 764,
P value = 0.0036
Significant at 0.05
NPLs (−0.0084), Equity (0.054), LADR (−0.0015)

CONCLUSIONS AND RECOMMENDATIONS

This brief study has noted a negative correlation between profitability (ROAA) and level of liquid assets to deposits (LADR) in the world's 13,000 largest deposit-taking institutions for which recent information is available. This reinforces a view that keeping excess liquidity has a mildly negative impact on profitability, but a more significant negative influence is the level of non-performing to total loans. The level of book equity to assets, however, is positively correlated with profit, contradicting the argument that increased leverage boosts returns. This relationship is certainly worthy of further investigation.

These preliminary findings may have implications for bank managements in planning their capital structure, asset quality and liquidity strategies. There seems to be a clear message that selection and monitoring of assets is of paramount importance. Not far behind, however, is the level of liquid assets. Although banks globally have less flexibility following the implementation of the Basel 3 liquidity rules, tests could be run on the optimal level of liquid assets in terms of its impact on profitability, also in relation to deposits. Of further importance is a strong equity to asset ratio, which in this sample has a positive influence on profit. This might be explained by banks with strong solvency having a wider franchise, and thus a competitive advantage over others in attracting and keeping customers, or simply generating more profit through greater risk, which tends to require more equity. This is a dynamic that also deserves further attention. Further work could be done around limiting the samples to contrast, for instance, developed versus developing world, and US versus European or Asian banks.

References

- 1 Bank for International Settlements (2013), available at: <http://www.bis.org> (accessed 15th June, 2016).
- 2 Fitch Rating (2016), available at: <http://www.fitchratings.com> (accessed 15th June, 2016).
- 3 Choudhry, M. (2012) *Principles of banking*, John Wiley & Sons, Singapore.
- 4 Nikolaou, K. (2009) 'Funding liquidity risk: Definition and measurement', Working Paper

- Series no. 1024, available at: <http://www.ecb.int/pub/pdf/scpwps/ecbwp1024.pdf> (accessed 15th June, 2016).
- 5 Allen, F., Carletti, E. and Leonello, A. (2011) 'Deposit insurance and risk taking', *Oxford Review of Economic Policy*, Vol. 29, pp. 464–478.
 - 6 Micajkova, V. (2013) 'Deposit insurance in times of financial crisis', *South Eastern European Journal of Economics*, Vol. 2, pp. 165–176.
 - 7 Goodhart, C. (2008) 'Liquidity risk management', *Financial Stability Review*, Vol. 11, No. 6, pp. 39–44.
 - 8 Anderson, R., Ashton, K. and Hudson, R. (2013) 'An examination of bank deposit interest rate setting', Working Papers in Responsible Banking and Finance, no. 13-008, Bank for International Settlements, Basel, Switzerland.
 - 9 HM Treasury (2012) 'The future of building societies', available at: <http://www.gov.uk> (accessed 15th June, 2016), London, UK.
 - 10 Bruni, F. (2009) 'The failure of Northern Rock: A multi-dimensional case study', available at: <http://www.suerf.org> (accessed 15th June, 2016).
 - 11 Hull, J. (2010) *Risk management in financial institutions*, John Wiley & Sons, Hoboken, NJ.
 - 12 Ogunleye, R. W. (2001) 'Sensitivity of bank stock returns to market and interest rate risks: An empirical investigation', *NDIC Quarterly*, Vol. 11, pp. 57–77.
 - 13 De Young, R. and Roland, K. (1999) 'Product mix and earnings volatility at commercial banks: Evidence from a degree of leverage model', Working Paper Series, no. WP-99-6, Federal Reserve Bank of Chicago, Chicago, IL.
 - 14 Sundaresan, S. and Wang, Z. (2016) 'Bank liability structure', Columbia Business School Research Paper no. 14-41, Columbia Business School, NY, NY.
 - 15 Smirlock, M. (1985) 'Evidence on the (non) relationship between concentration and profitability in banking', *Journal of Money, Credit and Banking*, Vol. 17, pp. 69–83.
 - 16 Bourke, P. (1989) 'Concentration and other determinants of bank profitability in Europe, North America and Australia', *Journal of Banking and Finance*, Vol. 13, pp. 405–431.
 - 17 Molyneux, P. and Thornton, J. (1992) 'Determinants of European bank profitability: A note', *Journal of Banking and Finance*, Vol. 16, pp. 1173–1178.
 - 18 Stienherr, A. and Huveneers, C. (1994) 'On the performance of differently regulated financial institutions: Some empirical evidence', *Journal of Banking and Finance*, Vol. 18, pp. 271–306.
 - 19 Berger, A. N. (1995) 'The relationship between capital and earnings in banking', *Journal of Money, Credit and Banking*, Vol. 27, pp. 404–431.