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Liquidity and transparency in bank risk management



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ABSTRACT

Banks may be unable to refinance short-term liabilities in case of solvency concerns. To manage this risk, banks can accumulate a buffer of liquid assets, or strengthen transparency to communicate solvency. While a liquidity buffer provides complete insurance against small shocks, transparency covers also large shocks but imperfectly. Due to leverage, an unregulated bank may choose insufficient liquidity buffers and transparency. The regulatory response is constrained: while liquidity buffers can be imposed, transparency is not verifiable. Moreover, liquidity requirements can compromise banks' transparency choices, and increase refinancing risk. To be effective, liquidity requirements should be complemented by measures that increase bank incentives to adopt transparency.

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1. Introduction

Banks use short-term debt to invest in long-term assets (Diamond and Dybvig, 1983). This creates liquidity risk: a bank unable to roll over maturing debt can fail despite being solvent. A majority of recent bank liquidity crises in developed economies were caused by increased uncertainty over a bank's solvency and played out primarily in wholesale funding markets (Gatev and Strahan, 2006; Shin, 2009; Goldsmith-Pinkham and Yorulmazer, 2010; Huang and Ratnovski, 2011).¹ The new Basel

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¹ Some notable examples include: Citibank and Standard Chartered in Hong Kong in 1991 (rumors of technical insolvency), Lehman Brothers in 1998 (rumors of severe losses in emerging markets), and Commerzbank in 2002 (rumors of large trading losses). In the recent crisis: Northern Rock and Countrywide in 2007 and IndyMac in 2008 (concerns about mortgage exposures), Bear Stearns in 2008 (concerns about CDS exposures). Note that in most of these cases the solvency (hypothetical long-term viability) of a bank was still uncertain at the time of the crisis. Yet a banks' inability to refinance prompted distressed liquidations and was a proximate cause of the collapse. The bankruptcy of Lehman Brothers in 2008 led to endemic counterparty solvency concerns, and an inability to refinance in a large number of institutions.

III accord aims to address liquidity risk in banks through the Liquidity Coverage Ratio (a liquidity requirement) and the Net Stable Funding Ratio (a restriction on maturity mismatch that limits the volume of refinancing coming due each period; see [Basel Committee, 2010](#)).

The purpose of this paper is to offer a model of bank liquidity risk driven by solvency concerns and to study its regulatory implications. In particular, we want to understand the interaction between liquidity requirements, access to refinancing (which we link to bank transparency), and liquidity risk.

We model liquidity risk driven by a sudden increase of uncertainty over the bank's solvency. A bank has a valuable long-term project, which with a small probability can turn out to be of zero value. Because the risk is small, it does not prevent initial funding. At the intermediate date, the bank needs to refinance an exogenous random withdrawal. Yet its ability to do so can be compromised by informational frictions. In most states of the world, the bank is solvent, and refinancing is available. Yet, with some probability, the world is in a "bad" state, where the posterior probability of insolvency is high (but less than one). Then, investors may become unwilling to lend to the bank, creating liquidity risk and the possibility of a failure of a potentially solvent institution.

We observe that a bank can hedge liquidity risk in two ways. One, traditional, is to accumulate a precautionary buffer of easily tradeable assets: a liquidity buffer. In a liquidity crisis, a bank can dispose of such assets and cover the refinancing needs internally. Another, less conventional, is to enhance the ability to communicate solvency information to outsiders. A bank that can "prove" its solvency will be able to attract external refinancing. We label the mechanisms by which a bank can establish effective communication "transparency". We take the standard corporate governance view on transparency ([Doidge, 2003](#); [Leuz et al., 2003](#); [Anderson et al., 2009](#)), formalized by two assumptions: (i) banks can choose the level of transparency (the amount of information available to outsiders), and (ii) higher transparency reduces the owner–manager's private benefits of control.

Liquidity buffers and transparency are complements, yet strategic substitutes. They are complements because they hedge the same risk with different imperfections. A liquidity buffer can only cover small refinancing needs because its size is limited. Transparency improves access to external refinancing for liquidity needs of any size, but is only effective with a probability. The reason is that transparency relies on *ex post* communication to market participants, which may sometimes fail, and then refinancing will not be forthcoming. A bank can therefore combine liquidity buffers and transparency in its risk management, to fully hedge small refinancing needs, and partially hedge large ones. Yet liquidity buffers and transparency are strategic substitutes, because for a bank that adopts one hedging instrument, the value of another diminishes.

Liquidity and transparency are costly hedges, and most of their cost is borne by the bank's shareholders. Holding liquidity buffers is costly because their maintenance requires effort from bank managers (or other administrative cost); the cost of effort cannot be compensated by a low return on highly liquid assets. With transparency, the owner–manager sacrifices private benefits. Yet some of the benefits of hedging accrue to creditors in the form of lower risk and are not internalized by shareholders ([Jensen and Meckling, 1976](#)). As a result, a leveraged bank may under-invest in liquidity buffers and transparency.

Suboptimal risk management (insufficient hedging) justifies government intervention in the form of bank liquidity regulation. We make two observations. First, while liquidity buffers can be imposed, transparency is not easily verifiable and is harder to regulate. Then, liquidity requirements may have unintended consequences: compromise the bank's endogenous transparency choices. We show that for some parameter values the deterioration of transparency may more than offset the positive effect of larger liquidity buffers, so that liquidity regulation will unintentionally *increase* the overall refinancing risk.

Second, while transparency cannot be regulated directly, the model identifies a number of indirect mechanisms by which policy can address it. One mechanism is to encourage transparency by reducing its alternative cost, the bank owner–manager's private benefits of control. This can be achieved, for example, by stronger corporate governance. Another mechanism is to accept insufficient transparency, but reduce the risk of large refinancing needs that exceed the size of the liquidity buffer. This can be implemented through maturity mismatch limits (such as the Net Stable Funding Ratio of Basel III). These solutions may be essential complements to liquidity requirements.

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