

aggregates and macroeconomic variables. At the same time, the global financial crisis has made clear that traditional monetary aggregates on a national level may not capture the full range of liquidity-creating instruments nor the full impact of the activities of large cross border financial intermediaries, which play an increasingly important role in globally integrated capital markets. In particular, the source of funding—whether via deposit funding or wholesale funding—matters. The crisis has also highlighted that financial structure does matter—especially in times of stress, in sharp contrast to the frictionless financial market hypothesis underlying modern monetary theory (Tirole, 2011).

Approaches to liquidity measurement generally fall along two lines: the asset side or the liability side. From the asset side, efforts involve measuring the amount of global credit extended to the private sector, providing valuable insights about the liquidity cycle through the private sector balance sheet expansion.<sup>3</sup> The liability side approach, adopted in this paper, focuses on the funding available to expand financial institutions' balance sheets and the risks associated with sudden funding reversals, as manifested during the global financial crisis. Put differently, “liquidity” as measured here, is the degree to which institutions can borrow—as measured by the liability side of the balance sheets—and to expand and contract balance sheets through increases in leverage or consolidation based on collateral valuations. A key advantage of the current funding-based approach is that it aims at capturing not only bank-based financial intermediation but also the broader range of wholesale intermediation, something which has proven difficult to do on the credit side.

The use of price and quantity measures together can help better understand developments in liquidity conditions. Quantity indicators, which reflect the size of the risk exposure, tend to be slow-moving, making them ill-suited as forward-looking indicators of crises.<sup>4</sup> Similarly, price indicators are coincident indicators, spiking only when the crisis is already underway, making them equally poor early warning indicators.<sup>5</sup> Combining the behavior of prices and quantities provides a richer framework of analysis. It sheds light on the paradox of risk management, where risk (as reflected by the size of exposures) is often at its highest when its perception (as reflected by the price of funding) is at its lowest. Additionally, analyzing price and quantity measures together helps disentangling the pull- and push-factors driving the behavior of liquidity. Persistent increases in liquidity supply—for example, driven by financial innovations—would result in growing liquidity (quantity) and falling interest rates (prices). By contrast, higher demand for liquidity—driven by rising risk appetite and

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<sup>3</sup>Recent work using this approach include, for example, Borio, McCauley, and McGuire, 2011; Borio and Disyatat, 2011; CGFS, 2012; Domanski, Fender, and McGuire, 2011; and Jorda, Schularick and Taylor, 2011.

<sup>4</sup>The slow-moving nature of quantity-based indicators is true even after removing linear trends and when considered on a gross basis (i.e., not as a ratio of liquidity to GDP).

<sup>5</sup>This finding is robust across a variety of global liquidity price indicators (e.g., VIX considered by CGFS, various spreads and asset price based indicators considered in IMF 2011a, 2011b, 2011c).