

expectations of higher returns—would result in increases in both price and quantity measures.

Important caveats are in order. First and foremost, there is no theoretical framework to determine an optimal level of global liquidity, nor do we know how global liquidity should behave to promote sound, sustainable global growth with financial stability. Second, financial markets are undergoing rapid transformation, the underlying reality that these indicators try to capture is therefore constantly evolving, at a rapid pace. Finally, serious data shortcomings remain—for example, only a few countries compute flow of funds data while cross-country reporting consistency is still lacking. Thus, any policy conclusions from our measurement exercises should depend on a thorough analysis of the underlying developments. More research is needed to improve the measurement of liquidity and develop a theoretical basis for understanding its economic and financial implications.

The paper is structured as follows: in section II, we review the literature on liquidity, summarizing findings that connect narrow money with broad money, and assess the impact of liquidity on output, price level and commodity prices. We also discuss findings on the developments in collateral-based funding markets where the shadow banking system has played an increasingly important role. In section III, we propose a new approach to measuring liquidity, offering complementary quantity and price measures that provide a more complete assessment of liquidity developments. Using these price and quantity indicators for core and noncore liquidity, in section IV, we identify supply and demand drivers of liquidity changes. In section V, we assess the drivers of liquidity on growth and find that the nature of shocks—supply or demand—and the types of liquidity affected—core or noncore—matter greatly in the effect on growth. Lastly, we conclude in section VI.

## **II. LITERATURE REVIEW**

Traditionally, the literature has used monetary aggregates as proxies for the quantity of liquidity, focusing on the money multiplier connecting narrow money (cash and other claims on the central bank) with broad money (the deposit liabilities of the banking sector). One strand of literature explores the impact of monetary aggregates from major countries on real economic variables. Sousa and Zaghini (2004) find that changes in global (excluding euro) liquidity explain an important share of the euro area price and output fluctuations. Ruffer and Stracca (2006) find that a positive shock to global excess liquidity (defined as the ratio between broad money to nominal GDP) leads to a significant rise in domestic real output and price level for the euro area and Japan. Additionally, global liquidity has a significant impact on asset and commodity prices (Darius and Radde, 2010, for global house prices; Thomas, Muhleisen and Pant, 2010, for world oil prices; and Psalida and Tao, 2011, for the impact of G4 liquidity expansion on asset prices in the rest of the world).

As financial systems move away from traditional deposit-based funding to capital and, more recently, collateral-based markets, standard monetary aggregates have become less suited to