

In our framework, it is the combination of a rising quantity and subdued price movements that indicate a rising vulnerability in the form of excess supply (push) factors. Hahm and others (2011) argue that a large stock of noncore liabilities can indicate an erosion of risk premiums and hence a possible crisis vulnerability. This is also consistent with Bruno and Shin (2011), who argue that as long as global banks do not internalize the marginal price of an increase in funding, they will increase their liabilities to finance additional lending.

### **C. Historical Developments of Core and Noncore Liquidity by Country**

Applying the same approach as above, it is possible to decompose the dynamics of liquidity at the regional level, with some interesting differences between U.S., the euro area, Japan and the United Kingdom.

In the United States and the euro area, the dynamics of core liquidity were largely demand-driven. In the United States, the demand for core liquidity (relative to trend) fell in the run-up to the crisis, as banks were increasingly shifting to wholesale markets as a source of funding. It rose sharply during the height of the global financial crisis in 2008, as alternative funding markets dried up. Since then, it started to fall again, reflecting perhaps deteriorating fundamentals or expectations. In contrast, in the euro area, the contribution of core liquidity demand shocks remained positive throughout the precrisis period, peaking at the onset of the global financial crisis in 2008. Since then, the demand for core liquidity has fallen, possibly reflecting weak fundamentals and banks' ability to rely on official funding markets.

In the United Kingdom, core liquidity dynamics before the crisis were driven largely by supply factors. As in the United States and the euro area, strong demand shocks characterized the global financial crisis, first positive (as wholesale markets dried up), then turning negative (as the levels of economic activity declined).

Japan followed an overall different pattern. Partly, this can be explained by the fact that it is the only economy in the G4 sample that experienced falling nominal GDP throughout the sample. Thus, after experiencing a progressive fall since early 2000, driven primarily by liquidity supply factors, the ratio of core liquidity to GDP in Japan (relative to trend) rose sharply at the onset of the global financial crisis, reaching record high levels by end-2011. The increase was also supply driven, possibly also reflecting a substitution away from noncore to core funding (Figure 2).

A simple review of pairwise correlations between quantity and price measures for different countries supports the view that developments in the core liquidity are more dependent on country-specific factors, whereas noncore liquidity developments are more global in nature. Excluding Japan<sup>20</sup> from the sample, the average pairwise correlation coefficient for quantity

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<sup>20</sup>Japan has distinctly different dynamics for both core and noncore liquidity, but especially for noncore. In part, this is explained by the different path of the nominal GDP—our normalizing variable.