



Global liquidity "glut" and asset price inflation

May 29, 2007

Fact or fiction?

Global liquidity has become abundant over the past few years mainly owing to extremely accommodative monetary policies in the US, Euroland and Japan between 2002 and 2005. However, since this liquidity "glut" has barely shown up in headline or core consumer price inflation, it is often said that it must have swept into asset markets and thus has boosted asset rather than consumer price inflation.

It appears that abundant global liquidity has at least partly contributed to well-performing stock and bond markets. However, when looking at fundamentals such as the price-earnings ratio for developed equity markets it is hard to say that stocks are especially overvalued. In contrast to stocks, it seems that government bond markets have been relatively expensive over the past few years. Furthermore, "excess" liquidity has likely contributed to overheated real estate markets in the US and the UK.

Monetary tightening in recent years has already lowered global "narrow" money growth drastically (primarily driven by the US and Japan), while global "broad" money growth has continued unabatedly. Should global broad money growth follow narrow money growth on its downward trend, this may increasingly weigh on the performance of riskier asset markets.

There are basically two scenarios (or more realistically a combination of both) for how global liquidity could be brought back to more "normal" levels over the longer term: (1) continued global monetary tightening – especially further rate hikes by the ECB, the BoE or the BoJ – or at least no monetary easing soon, and (2) global nominal GDP expanding faster than the money stock over time.

The first scenario still seems to be in the cards and could eventually trigger a pronounced re-pricing of risks in world credit and equity markets. The second scenario, in which global nominal GDP expands faster than the money stock, would be the more benign scenario for financial markets.

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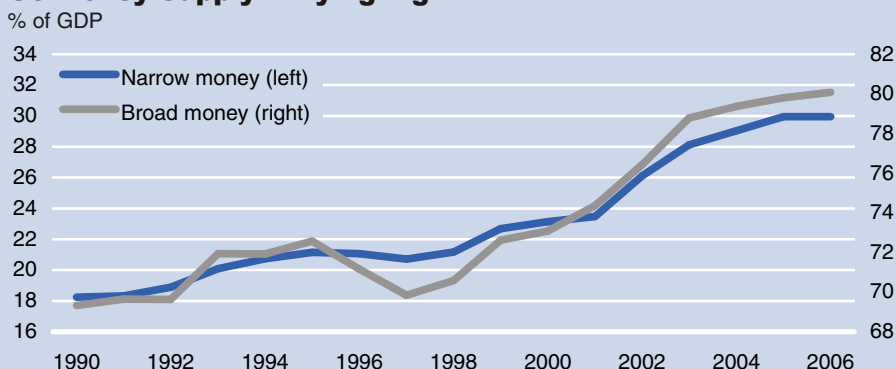
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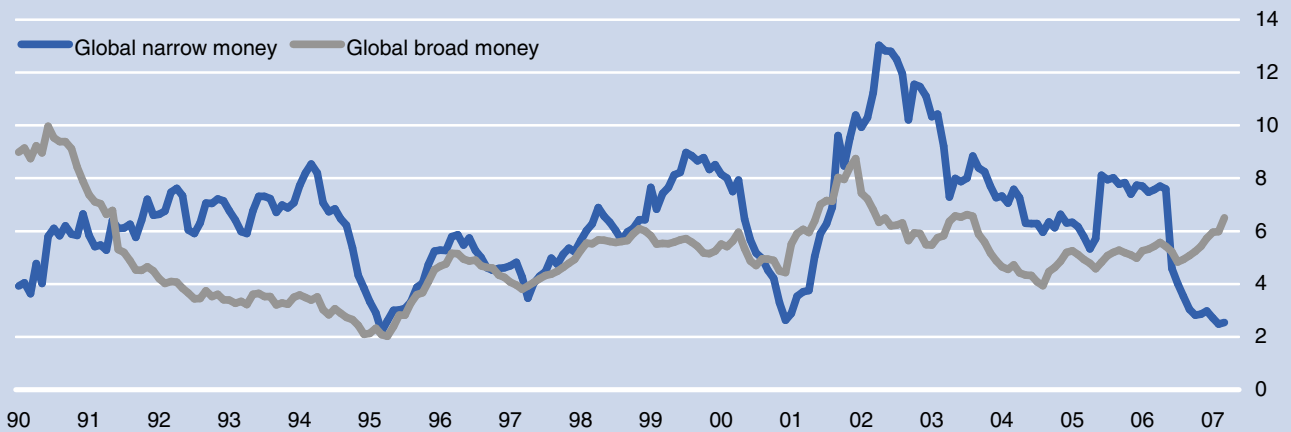
G5 Money Supply*: Flying high



*Refers to the G5 economies (US, Euroland, Japan, UK and Canada) and is calculated on USD basis and period averages. Sources: Global Insight, DB Research, BoE

Global* narrow and broad money growth: At the crossroad

% yoy

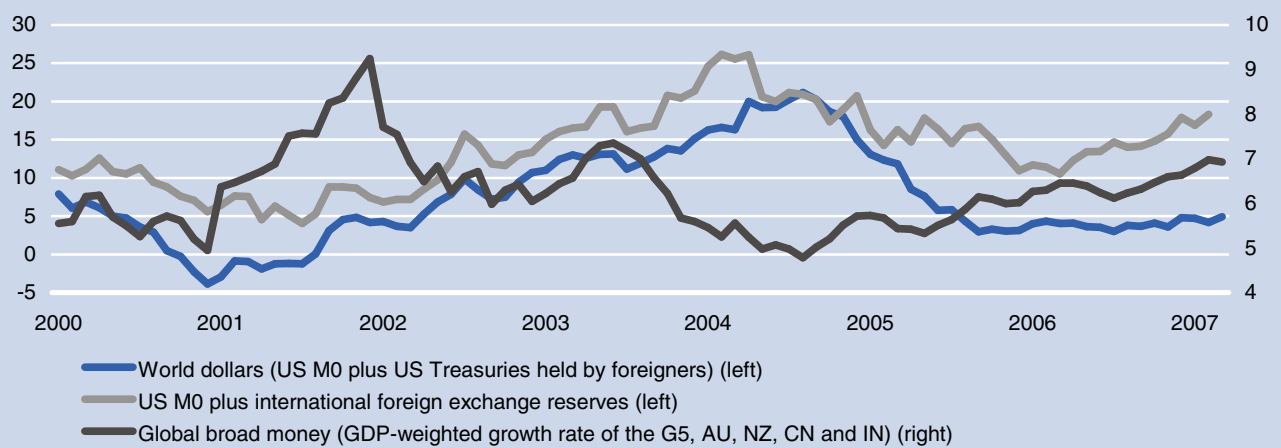


*G5 GDP-weighted growth rate of narrow and broad money supply (G5: USA, Euroland, Japan, UK and Canada). Sources: DB Research, Global Insight, BoE

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Alternative global liquidity proxies

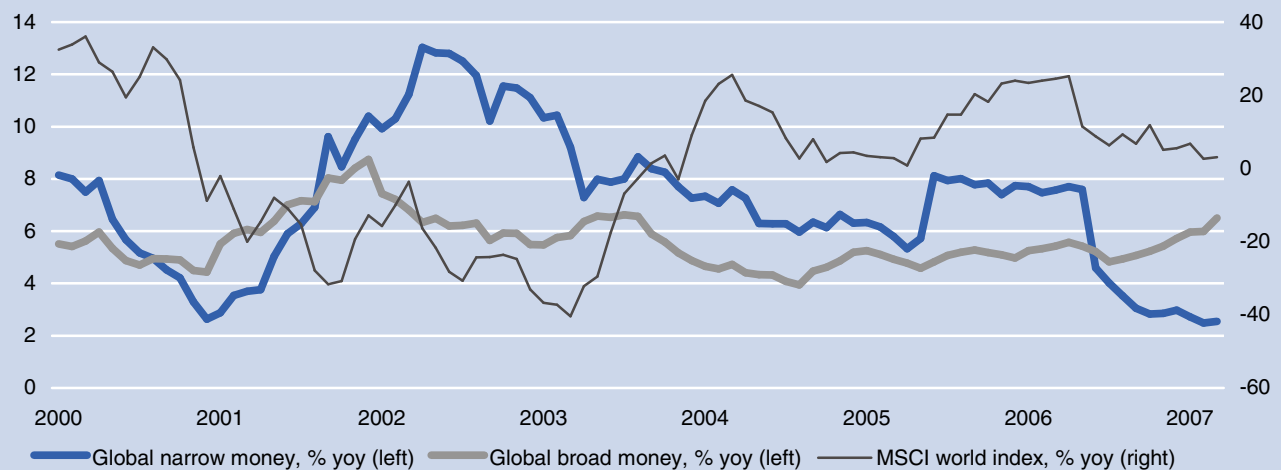
% yoy



Sources: DB Research, Federal Reserve, Global Insight, BoE, Datastream

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Global money growth and MSCI world index

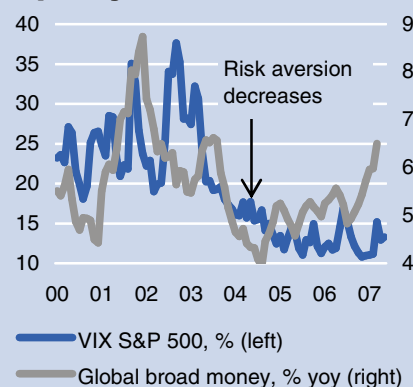


Sources: Global Insight, DB Research, BoE

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Monetary liquidity is not necessarily market liquidity!

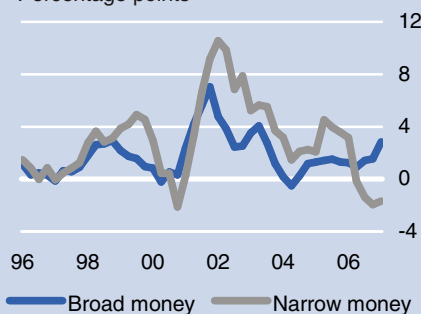


Sources: Global Insight, DB Research, Bloomberg

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G5 excess liquidity creation*

Percentage points



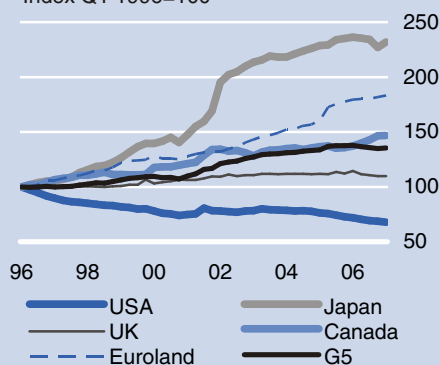
*As measured by yoy money growth minus yoy nominal GDP growth.

Sources: Global Insight, DB Research, BoE

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Excess narrow money stock*

Index Q1 1996=100



*As measured by qoq broad money growth minus qoq nominal GDP growth

Sources: Global Insight, DB Research, BoE

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It is widely asserted that extremely accommodative monetary policies in the US, Euroland and Japan between 2002 and 2005 coupled with firmly managed exchange rate regimes in many Asian economies, as e.g. China, Taiwan and South Korea, have led to abundant or even "excessive" liquidity on a global level. Many market participants believe that an overabundance of liquidity has been chasing assets around the globe and that this search for yield has in turn importantly contributed to well-performing asset markets (including rising world equity prices, low long-term risk-free interest rates, narrow sovereign emerging market (EM) and corporate bond spreads as well as rising real estate prices). Given that much of the current liquidity debate seems to be based on gut feelings rather than on facts or a well-defined concept, we aim to assess what exactly is meant by global liquidity, how we can measure it and whether the "liquidity glut" thesis serves well in explaining overall low refinancing costs and bullish stock markets.

Monetary versus market liquidity

Although there is no agreement on the proper measurement of liquidity, one could basically distinguish between two concepts¹: "monetary" liquidity and "market" liquidity. Monetary liquidity is associated with macroeconomic variables such as short-term interest rates or aggregates of money supply. Money supply is usually generated by central banks and multiplied by the so-called credit channel²; another source is the bond channel where banks buy longer-term assets from the money-holding sector (households, companies). Market liquidity could be best understood as the degree to which large transactions can be carried out in a timely fashion with a minimal impact on prices.³ While the first concept is related to financial conditions in short-term credit markets, the second one involves "micro" measures such as market depth, breadth and resiliency in various financial segments. In a broader sense liquidity has also to do with the sentiment and perceptions of financial investors. The above liquidity concepts are often related to each other, though not necessarily all the time. For instance, an economic recovery may generally lead to increasing monetary and market liquidity as not only the demand for money but also the risk appetite of investors (and thus e.g. the depth and breadth of risky asset markets) will increase. However, monetary liquidity may not necessarily translate into higher market liquidity in riskier asset markets (e.g. high-yield bond markets) if investors remain pessimistic about current and future developments in general and/or in certain market segments in particular. In the following we focus on monetary liquidity rather than market liquidity.

Measuring global monetary liquidity: A catchy task

It is difficult to measure global monetary liquidity precisely and even more challenging to diagnose at what point it becomes excessive,

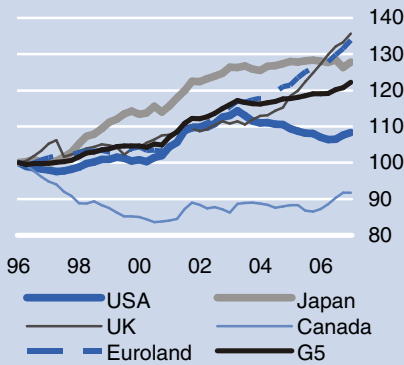
¹ See Baks, Klaas and Charles Kramer (1999). "Global Liquidity and Asset Prices: Measurement, Implications and Spillovers". International Monetary Fund WP/99/168.

² This could be best understood by looking at the micro level where a bank lends to a company or a household in order to finance investment or consumption. As a certain amount of this money ultimately flows back to the banking sector, banks can extend credits to other customers on the back of these new deposits ("bank multiplier effect").

³ See Fernandez, Frank A. (1999). "Liquidity Risk – New Approaches to Measurement and Monitoring". Securities Industry Association Working Paper.

Excess broad money stock*

Index Q1 1996=100



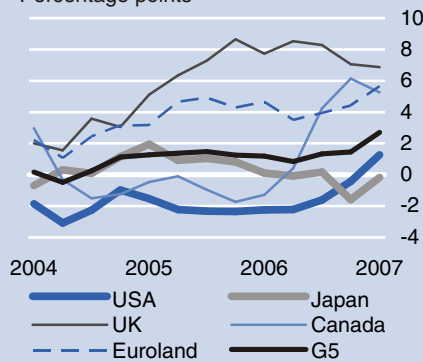
*As measured by qoq broad money growth minus qoq nominal GDP growth

Sources: Global Insight, DB Research

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Excess broad money creation*

Percentage points

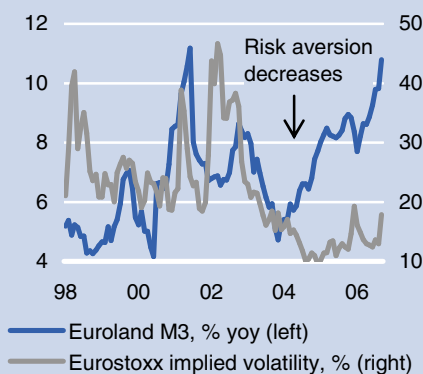


*As measured by yoy broad money growth minus yoy nominal GDP growth

Sources: Global Insight, DB Research

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EMU: Strong M3 growth in 2001-2003 largely due to portfolio effects



Sources: Global Insight, DB Research, Bloomberg

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i.e. when it poses a medium or long-term threat to price stability⁴ or starts to boost asset prices to levels not supported by economic fundamentals (“asset price inflation”).

ECB’s definition of euro area monetary aggregates

M1	Narrow money	Currency in circulation + overnight deposits
M2	Intermediate money	M1 + deposits with an agreed maturity up to 2 years + deposits redeemable at a period of notice up to 3 months
M3	Broad money	M2 + repurchase agreements + money market fund (MMF) shares/units + debt securities up to 2 years

Source: ECB 8

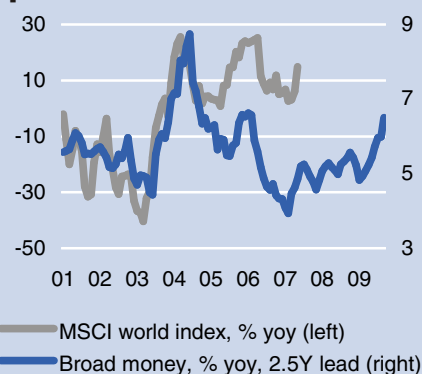
There are two proxies for monetary liquidity: price measures (short-term interest rates) and quantity measures such as “narrow”, “intermediate” and “broad” aggregates of money supply (see box for the ECB’s definition of euro area monetary aggregates). As high-powered or central bank-created money only represents a tiny fraction of monetary and credit aggregates which are normally relevant in explaining aggregate demand, it is arguably the best approach to look at broad money growth. However, as narrow money is one slice of broad money (that is more or less directly controlled by central banks) it may at least sometimes have a leading character for broad money supply. The fact that the definitions and the availability of data for narrow, intermediate and broad money vary across countries does not make it easier to build those aggregates on a global level. Nevertheless, we propose two global liquidity measures based on monetary aggregates, i.e. one proxy based on narrow money (using M1 if available⁵) and a second proxy built upon broad money supply (using the broadest available measure for each country). When constructing these global measures, our focus is on advanced economies with well developed financial markets only, namely the G5 economies (i.e. the US, Euroland, Japan, the UK and Canada)⁶. We calculate the year-on-year growth rate for global narrow and broad money using nominal USD-based GDP weights⁷. As shown, both narrow and broad money supply showed a strong surge in their respective growth rates from 2001 onwards, i.e. with the start of aggressive monetary easing in the US. While the year-on-year growth rate of narrow money peaked in April 2002 at 13%, broad money reached its peak already in December 2001 at almost 9%. Although the growth rate of global narrow money supply is currently decelerating, monetary tightening has not yet been able to prevent growth in broad money supply from reaccelerating since mid-2004.

Our G5 GDP-weighted money growth measures do not include China (which is often said to have boosted global liquidity through its tightly managed exchange rate regime and the resulting

⁴ In this context, there has been intense debate over whether strong growth in Euroland’s broad money aggregate M3 is a reason for concern or mainly reflects a structural break in the demand for money.
⁵ For the UK we used M0 until Q1 2006 and notes & coins in circulation thereafter as M1 is not available and the BoE discontinued the publication of the UK’s monetary base M0 in April 2006.
⁶ Note that those economies account for around 2/3 of world nominal GDP in USD.
⁷ USD nominal GDP weights are as of 1995. The results would not change significantly if USD nominal GDP weights of alternative years, as for example 2000 or 2005 were used.



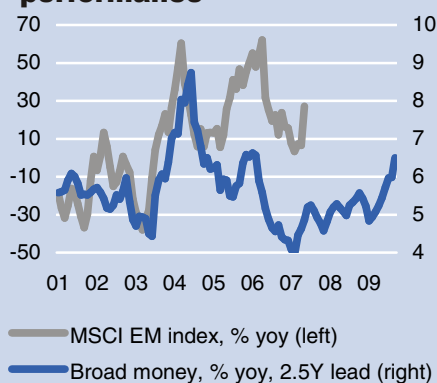
Broad money growth and MSCI world stock market performance



Sources: Global Insight, DB Research

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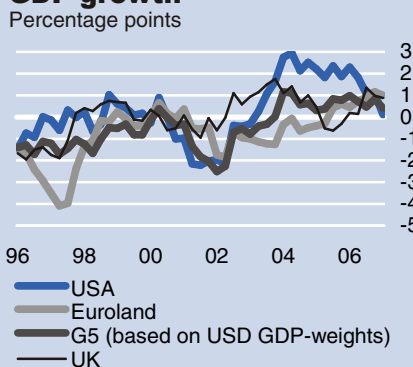
Broad money growth and MSCI EM stock market performance



Sources: Global Insight, DB Research

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Government bond yields coming back in line with GDP growth*



*According to the differential between yoy nominal GDP growth and nominal 10Y govt bond yields.

Sources: Global Insight, DB Research

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accumulation of foreign exchange reserves), so for the sake of completeness we also want to look at three alternative proxies: (1) US monetary base plus international foreign exchange reserves, (2) US monetary base plus US Treasuries held by foreigners (labelled "world dollars") and (3) the GDP-weighted growth rate of broad money based on G5 plus Australia, New Zealand, China and India⁸. All three indicators have in common that they are able to capture the boost in global liquidity due to China's accumulation of foreign exchange reserves (to already more than USD 1 trillion) and the associated strong monetary growth (although this is partly offset by the People's Bank of China's sterilisation measures). Moreover, all liquidity indicators have come down from their peaks in earlier years. However, all three proxies are currently indicating an acceleration in global liquidity growth, with the growth of our extended GDP-weighted indicator having reaccelerated from 4.8% yoy in August 2004 to almost 7% yoy in March 2007.

Is there global "excess" liquidity?

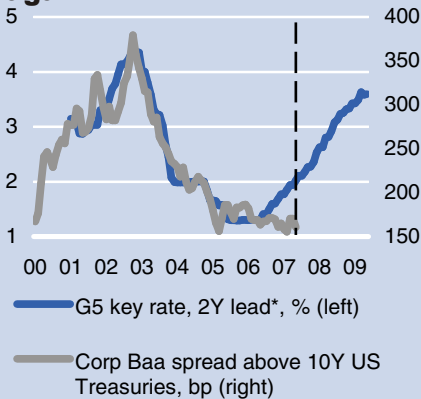
To answer this question it is not enough to look at global liquidity growth rates, as expanding economies need more money for transaction purposes. Therefore, it makes sense to investigate the ratio between money and nominal GDP growth over time. Should the money supply expand permanently faster than nominal GDP (assuming that the velocity of money remains constant and that nominal GDP is a good proxy for transaction demand for money – which admittedly nobody knows), excess liquidity is created. Our calculations indicate that global liquidity has indeed grown much faster than global nominal GDP since 1996. Especially between 2001 and 2003, when world economic growth dipped and central banks started to pump massive amounts of liquidity into the system, our excess liquidity indicators jumped to around 7 percentage points for broad money and 10.5 percentage points for narrow money. Country-level data on narrow money show that all economies except the US have created excess liquidity since 1996 (especially between Q3 2001 and Q2 2002). In this matter, Japan is a prominent example, owing to its long-standing zero-interest rate policy.

According to broad money readings, all economies apart from Canada have built up excess liquidity since 1996. However, there have been substantial cross-country differences with regard to the stock of broad excess liquidity.⁹ As apparent from chart 7, Euroland, Japan and the UK have created the highest stock of excess broad liquidity since early 1996. In the US, broad excess liquidity was created in particular between early 2001 and late 2003 but was cut back significantly between Q4 2003 and Q4 2006. Only recently, broad excess liquidity has again been produced in the US, mainly owing to the slowdown in nominal GDP growth. In Europe the picture is different: Euroland has been creating broad excess liquidity for more than 6 years now and there is no indication of a slowdown. Moreover, in the UK broad excess liquidity is currently being created at the fastest pace among the five economies studied, owing to rapid credit expansion and correspondingly fast broad money supply (M4) growth. Although Japan still has by far the highest ratios of narrow and broad money to GDP (around 75% and 140%, respectively), the end of quantitative easing there in July

⁸ Covering 75% of world nominal GDP in USD.

⁹ Please note that readings are never 100% comparable across countries due to different national definitions of money supply aggregates.

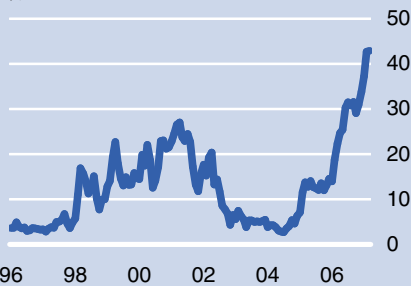
G5 key rate & corporate spreads: All the way up again?



*Based on USD GDP weights.
Sources: Moody's, Global Insight, DB Research

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JPY carry trades: Adding to global liquidity growth



Percentage share of foreign banks' borrowings in total amounts outstanding in the Japanese money call market.

Sources: BoJ, DB Research

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Strong profit growth kept p/e ratios at modest levels



Sources: Global Insight, DB Research

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2006 is already having a cooling impact on narrow and broad money growth, and – together with robust GDP growth – this is finally cutting back excess liquidity in that economy. On the global scene broad money is still expanding faster than nominal GDP (mainly owing to Euroland). However, on the narrow money side, the build-up in global excess liquidity has been gradually brought down and finally turned negative since Q2 2006 thanks mainly to worldwide monetary tightening.

What does this tell us for the future? Given that broad money tends to move in sync with narrow money over the long term, it seems likely that the build-up in broad excess liquidity will at least decrease or may even turn negative temporarily. But so far robust credit expansion in Euroland and the UK indicate that there won't be an imminent slowdown in broad money growth in those economies over the near term.

Has "excess" liquidity boosted asset prices?

Although CPI inflation rates (in particular in the US and the UK) have tended to increase with a time lag to higher money growth rates even in this cycle, CPI headline and core inflation rates have still been moderate. Hence, it is reasonable to ask where all the money has gone if not into the consumption of goods and services¹⁰. A widespread answer is that it swept into asset markets (mainly bonds, stocks and real estate) and thus has led to asset rather than consumer price inflation.

A look at our global money supply aggregates suggests there is no immediate effect of money growth on world stock returns as measured by the MSCI World or MSCI Emerging Markets Index.¹¹ However, there seems to be a lagged effect (see charts 11 and 12). This has to do with the fact that higher monetary liquidity may not necessarily translate immediately into improved investor sentiment and thus market liquidity. As long as investors' risk aversion (gauged by for instance the VIX implied volatility index) was high, this abundant monetary liquidity was not used for purchases of riskier assets such as shares or corporate bonds. Indeed, looking for example at Euroland between 2001 and 2003, portfolio shifts between the non-financial sector and domestic financial institutions as well as non-residents have significantly inflated the monetary stock in this economy on account of high economic, financial and geopolitical uncertainty (see chart 10).¹² Back on the global scene: According to our calculations, more than two years of sharp global broad money growth were needed for a positive impact to feed through to world stock market returns.

Government bond yields were too low on a global level in comparison with what the economies yielded in the past few years. Our G5 GDP-weighted 10Y government bond yield has been below nominal GDP growth since late 2003 (but in Q1 2007 the growth-yield gap largely closed due to the US slowdown and rising yields, see chart 13). US government bonds in particular appeared to be overvalued from mid-2003 until end-2006. Moreover, the

¹⁰ One possible explanation for today's low inflation rates despite the surge in global liquidity is that developed economies are caught in a disinflationary environment due to the effects of globalisation, with stronger competition in product and labour markets preventing significant price increases.

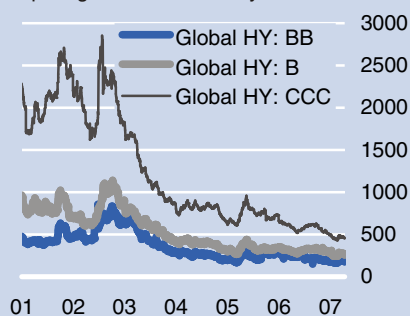
¹¹ Indeed there is a negative contemporaneous correlation with our global broad liquidity measure.

¹² See European Central Bank. Monthly Bulletin, October 2004.



Global HY spreads have tightened further

bp vs government bond yield

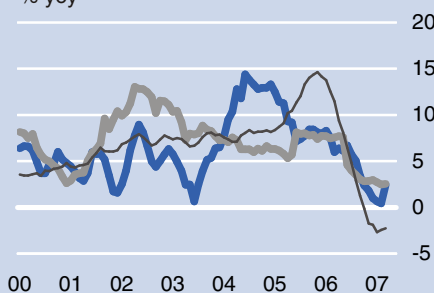


Source: DBIQ, Global Markets

17

Slowing liquidity growth weighs on US house prices

% yoy



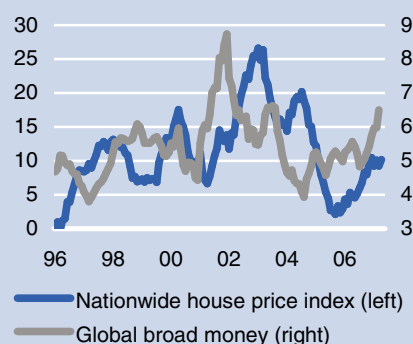
— Median new home price*
— Global narrow money
— Median existing home price*

*6M moving average.
Sources: Global Insight, DB Research

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UK housing market: Broad money and house prices have picked up together

% yoy



— Nationwide house price index (left)
— Global broad money (right)

Sources: Global Insight, DB Research, Datastream

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comparison between US 10Y government bond yields and the S&P500 earnings yield suggests that bonds are still relatively expensive in relation to stocks. For the corporate bond market it seems that global liquidity has helped to bring yields down and spreads to very tight levels. As shown in chart 14, US Baa corporate bond spreads drastically increased in early 2000 from around 160 bp to a peak of 380 bp in October 2002. It needed roughly 2 years of sharp monetary easing until the positive effects of low short-term rates (as measured by the G5 GDP-weighted central bank rate) spilled over to the corporate bond market and finally led to a gradual tightening of spreads. Overall, it seems that both liquidity and fundamental factors (high earnings growth and improved corporate balance sheets) contributed to keeping refinancing costs at low levels. However, Deutsche Bank Global Markets Research¹³ recently found that current spreads on single-B-rated bonds and below are not compensating investors for historic default risk (thus indicating an overvaluation of this asset class).

Another factor that may have additionally boosted asset prices is the increased activity in yen carry trades (where Japanese and/or non-Japanese investors borrow cheaply in yen in order to reinvest in higher-yielding foreign assets). By looking for instance at the Japanese call money market, one finds that foreign banks in Japan have drastically increased their short-term borrowings from around JPY 290 bn in July 2004 to almost JPY 9.5 tr (roughly USD 80 bn) in March 2007 (i.e. the share of foreign banks' borrowing in total borrowing in this market shot up from only 2.7% to 42.9%) in order to take advantage of ultra-low interest rates in Japan.

The US and UK real estate markets seem to offer evidence that ample liquidity has boosted house prices. For the US housing market we find that the sharp rise in existing and new home prices responded with a lag to the strong growth in our G5 monetary aggregates. The recent slump in US house prices may be partly due to decelerating global narrow money growth. In the UK, sharp global money growth seems to have boosted house prices as well with a time lag, though in contrast to the US the recent deceleration in global narrow money growth has not yet affected UK house price inflation. Moreover, it seems that UK house price inflation has responded with a lag to global broad money growth. Interestingly, there seems to be a stronger relationship between UK house prices and our global broad liquidity measure than with the UK's broad money supply M4. This finding may reflect the UK's status as a world financial centre.

Conclusion and outlook

So what are the conclusions? According to our analysis monetary liquidity is indeed abundant on a global level. Although monetary tightening led to a sharp deceleration of global narrow money growth it has not yet significantly cooled global broad money growth. In fact, growth in our G5 USD GDP-weighted global liquidity indicator has been accelerating again since mid-2004.

Having said that liquidity is abundant, have we also seen an overheating of asset markets? Overall, it seems pretty clear that abundant liquidity has positively contributed to well-performing asset markets. However, a huge part was also reached on the back of

¹³ See Reid, Jim and Nick Burns (March 7, 2007). "Fundamental Credit Strategy", Deutsche Bank Global Markets Research.

Monetary tightening is finally dragging down narrow money growth



*Based on USD GDP weights.
Sources: Global Insight, DB Research, BoE

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better fundamentals (strong profitability growth and improved corporate balance sheets). While share prices in developed markets don't seem to be particularly overvalued according to fundamentals such as the price-earnings ratio, government bonds still look relatively expensive. In a cross-country context, US government bonds were the most expensive according to the differential between nominal GDP growth and the 10Y nominal government bond yield over the past few years. While US government bond yields mostly trended above nominal GDP growth from the early 1980s, they have fallen short of nominal GDP growth for more than three years now. However, the US growth-yield differential nearly closed in Q1 2007 on slower US growth and somewhat higher yields. Government bonds in Euroland and the UK are currently the most expensive according to the national growth-yield differential.¹⁴ Over in the corporate bond market, spreads on single-B or lower rated bonds appear unusually low according to the fundamentals as well. Thus, it seems that liquidity has boosted this asset class in particular. Another source of global liquidity, namely JPY-funded carry trades, may have also played a role in keeping risk premia low¹³. Regarding the real estate market, it seems that ample liquidity at least partly contributed to both US and UK house price inflation over the past few years, especially via exceptionally low mortgage rates.

There are basically two scenarios (or more realistically a combination of both) for how global liquidity could be cut back to more "normal" levels over the medium to long term: (1) continued monetary tightening by major central banks, or at least no monetary easing soon and (2) global nominal GDP expanding faster than the money stock over time. While the first scenario still seems to be in the cards (with the ECB, the BoE and the BoJ set to hike its key rate further), it could trigger downward pressure on riskier asset classes that have been greatly supported by liquidity factors in the past (such as high-yield corporate bonds). More aggressive monetary tightening could finally lead to a re-pricing of risks, or in the worst case to a longer-lasting market correction. The second scenario, in which the economy expands faster than the money stock, would be the more benign scenario for financial markets.

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¹³ How long this source of global liquidity will last depends crucially on how quickly the BoJ will be able to further normalise interest rates.

¹⁴ Of course we are aware that such a national relationship may have lost relevance in an even more integrated global market.