CrossBorderCapital
Implementing Insight

CrossBorder Capital Ltd
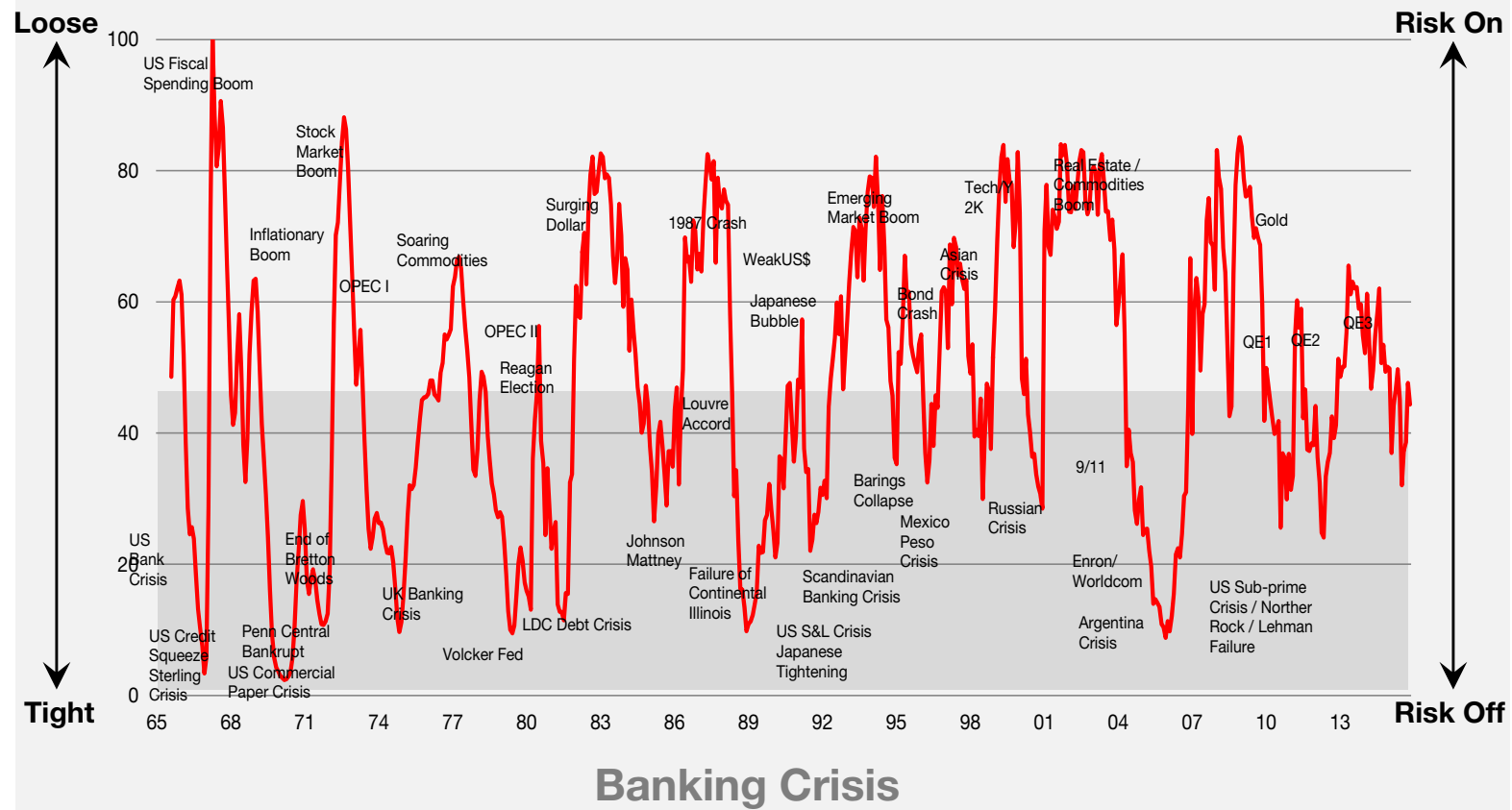Marble Arch Tower , 55 Bryanston Street
London W1H 7AA

www.liquidity.com

2016 Data

Global Liquidity Indexes (GLI™)

Accurate and prescient investment data

The Global Liquidity Cycle

Asset Market Boom

Banking Crisis

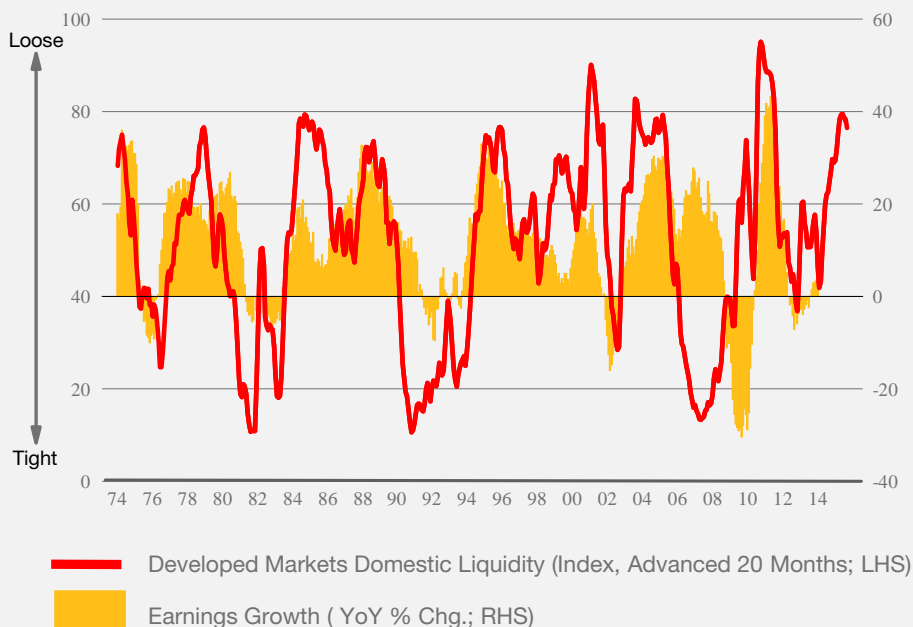# CrossBorderCapital
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Global Liquidity Indexes (GLI™) are comprehensive monthly surveys of carefully selected financial variables compiled by CrossBorder Capital. They provide an advance indicator of *'financial stress',* and of what will happen to financial markets and the real economy by tracking data on credit spreads, credit growth and leverage, available funding, cross-border flows and Central Bank interventions across some 80 countries worldwide.

CrossBorder Capital's Liquidity Indexes are regularly available within 10 working days of each month end, and typically lead financial markets and economies by between 6 – 12 months. These Indexes have been continuously refined and developed since their inception in the early 1980s.

Global Liquidity Cycle and Corporate Earnings Growth

Developed Markets Domestic Liquidity (Index, Advanced 20 Months; LHS)

Earnings Growth (YoY % Chg.; RHS)

"... CrossBorder Capital provides the most comprehensive and most considered evaluation of Global Liquidity available anywhere"

"There is a vast pool of liquidity, much of it borrowed, under-pinning share prices and ready to move in on any setback. Only when the credit markets are disrupted ... is the buying power undermined. The investment fundamentals now play little role …"

Financial Times

"Global liquidity has become a key focus of international policy debates over recent years. This reflects the view that global liquidity and its drivers are of major importance for international financial stability... In a world of high capital mobility, global liquidity cannot be approached as it used to be a few decades ago. It has both an official and a private component...These two concepts both capture one common element, namely the ease of financing."

Bank for International Settlements

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Philosophy

- CrossBorder Capital's *Global Liquidity Cycle* and its national and regional sub-indexes define fluctuations in both the quantity and quality of money. It is a leading and predictive component of the broader financial and economic cycles that are marked by asset price swings, movements in interest rates and changes in the tempo of business activity.

- 'Liquidity' reflects financial intermediation beyond the traditional banking system. Structural change renders once useful money supply measurement out-dated. Alternatively, some look to so-called 'financial condition indexes', but these are price-based barometers and not leading indicators. Therefore, we dig deeper into flow of funds statistics to find the roots of this 'new liquidity' among the shadow banks, wholesale money markets and Central Bank balance sheets. This we dub 'funding liquidity'. It provides an unambiguous gauge of true monetary conditions worldwide.

"…the major thing we look at is liquidity … looking at the great bull markets of this century, the best environment is a very dull, slow economy that the Federal Reserve is trying to get going…"

**Stanley Druckenmiller,
Barron's Interview**

"…with respect to crises, the results of our analysis are clear: credit matters, not money … financial crises throughout history can be viewed as 'credit booms gone wrong' … [and] *past growth of credit emerges as the single best predictor of future financial instability…"*

**Schularick, M and Taylor, A,
in *Credit Booms Gone Bust*,
NBER Working Paper**

Citibank Major Economies 'Economic Surprise' Index: Actual and Forecast Using Global Liquidity (Lagged)
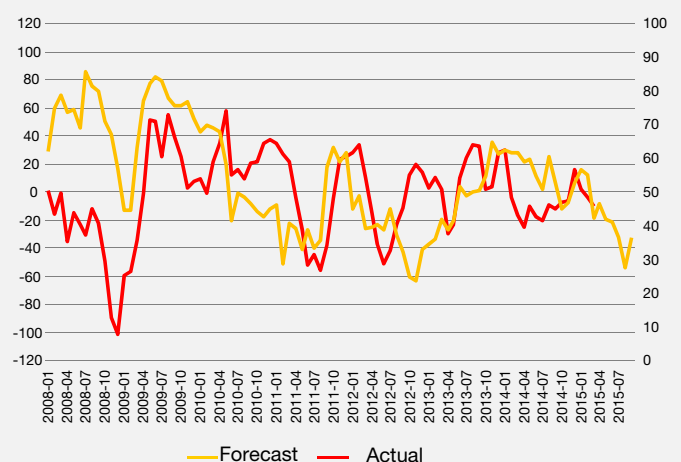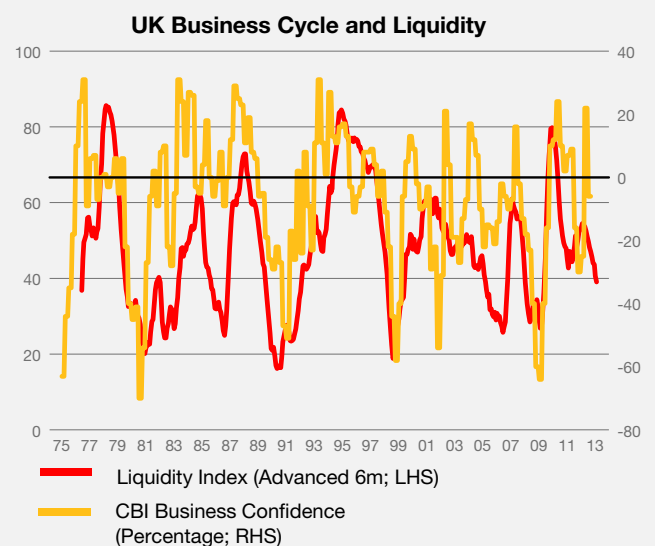
Philosophy

- *'Liquidity'* is a consistent quantitative measure of *'funding sources'* taken from national flow of funds accounts and using standardised IMF-definitions: it is a far broader measure than money and a far better measure than interest rates. Liquidity consists of all cash and credit available to financial markets, once the immediate transactions needs of the real economy have been fulfilled.

- *Liquidity* (flow of funds) data gives an alternative and often different view to traditional National Accounts and business surveys. *CrossBorder Capital's* liquidity data is available for all major developed and emerging markets Worldwide in nominal terms and monthly in index form, with a near-forty year history.

"...financial crises create and are then perpetuated by illiquidity...concerns about liquidity rapidly become concerns about solvency...the evolution of the financial system away from traditional banking [and] towards a system dominated by a complex network of collateralized lending relationships serves only to increase the primacy of liquidity."

US Federal Reserve

"...most of the channels through which QE [monetary policy] might work...are entirely independent of the accompanying level of nominal interest rates."

Banque de France

UK Business Cycle and Liquidity

— Liquidity Index (Advanced 6m; LHS)
— CBI Business Confidence (Percentage; RHS)

Index Construction

- Using clear definitions, we take our knowledge of available liquidity data, established and refined over 25 years to carefully select the critical sources of information from the swelling mass of published data. We collect and clean the chosen data, passing it through filters to ensure its consistency and quality, and then setting it into standard templates. Finally, we construct proprietary liquidity indexes to help interpret, improve inter-market comparisons and to aid further analysis of the underlying data.

We gather monthly and, when available, weekly raw data from three main sources:

Supra-national Organisations, such as the IMF, UN and BIS

☞ National Treasuries and Central Banks

☞ Trade Organisations and major lending corporations

We cover some 80 economies monthly, including developed and emerging economies and frontier markets, and gather on average around 30 key data series from each, totalling some 300,000 new data points annually. These data consist both of quantitative measures of overall balance sheet size and qualitative measures of specific balance sheet ratios.

The *Global Liquidity Indexes*, or GLI™, are a family of composite indexes that are calculated each month and measure 'liquidity' conditions across the same economies Worldwide. The GLI™ are constructed from four component diffusion indexes that are weighted according to a principal components analysis. Each sub-index is based on around 8-10 underlying data series that measure the volume of credit; the availability of funding and the degree of leverage. They are derived from flow-of-funds data, cover both traditional banks and shadow banks and calculated as normalised z-scores (0-100):

A GLI™ index over 50 represents an increase in liquidity within the financial sector of that economy compared to its 41-month trend. A reading under 50 represents a decrease in liquidity below trend.

An increase (decrease) compared to the previous month indicates an acceleration (deceleration). The larger the index value, the faster the implied rate of change.

Index Construction

The GLI™ are diffusion indexes. Given that it is difficult to compare what is 'loose' or 'tight' across indicators, we calculate how spread-out the standardised data is. A diffusion index measures the extent that this data is dispersed 'diffused' within each specific group. The more dispersed the collective readings, the greater the confidence we should have in concluding whether liquidity is 'loose' or 'tight'. Multi-dimensional measurement of liquidity and this broad coverage adds to accuracy and conviction, and eliminates 'false' signals.

Global Liquidity Index (GLI™) construction involves several choices: (1) data frequency; (2) number of variables included; (3) time span covered in reference period and (4) weighting system. Since an index is a benchmark it needs to be scaled either relative to its own fluctuations or compared to some specific historic reference point: both involve the choice of appropriate time-scale. A longer span might seem better, but this is more likely to include periods of structural change that may compromise the index. In contrast, a shorter period may be more stable, but too little history will give insufficient perspective. Because we monitor liquidity through stable flow of fund channels rather than via financial instruments and investors, both of which are more likely to change, we have more confidence reaching back several decades when constructing our

GLI Sub-Index	Definition	Weight
Central Bank Liquidity (CBLI)	*measures the size and composition of the Central Bank balance sheet, net of own-name bill issuance and Government deposits, and with an emphasis on transactions with the financial sector*	32%
Private Sector Liquidity (PSLI)	*measures of funding from savings deposits and from wholesale markets. These lead loan advances, which, in turn, lead traditional money supply measures as a result.*	32%
Cross-Border Flows (XFI)	*all net financial flows, but excluding FDI*	20%
Financial Conditions/ Lending Terms (FCI)	*This latter sub-index differs from the other three which solely comprise quantity data. The credit spread sub index is included as a 'cross-check' and carries a smaller weight in the overall index as a result*	16%

indexes. Similarly, high frequency data, say daily, might be preferable to monthly or quarterly because it facilitates more frequent decision-making. However, the cost to the index is that daily data probably contains more 'noise' and so is less reliable. We compromise by using monthly data. The number of signalling variables to include in the index is subject to a similar paradox because again more might seem better than less. However, the problem with gathering lots of variables is that the sample could become lop- sided, including too many of one type that correspondingly bias the index in a certain direction and so 'over signal'. We mitigate this problem by grouping variables according to type into separate sub-indexes and by considering the statistically significant number of around thirty different variables by economy, rather than say 100. In summary, the GLI™ cover 80 economies monthly over the period 1975-date, using around 30 variables using around 30 variables per economy, grouped into four sub-indexes: Central Bank, Private Sector, Cross-border Flows and Loan Terms/ Liquidity Spreads (Financial Conditions). The data components that make-up each sub-index are de-trended and volatility-adjusted to ensure they are stationary and then equally-weighted together.

There are essentially two choices with regard to how the sub-indexes, in turn, are weighted together into the aggregate index: (1) size-based weights and (2) weights dependent on data performance. While the former includes the simple case of equal weights, we refer here to weights determined by the outstanding stock of liquidity in each category. Performance weights typically means either regression-based loadings determined by the correlation of the components to a target data series, or principal components where the weights are determined by their contribution to the first principal component, as determined by the common variation in the data. Because both approaches have their advantages and disadvantages, we adopt a hybrid approach by using a combination of principal component weights and weights determined by the outstanding stock of liquidity. In practice, this gives Central Bank Liquidity a higher loading in the index than its size-weighting alone would merit. On average, we ascribe 32% to each of Central and Private Sector Liquidity; 20% to Cross-border flows and 16% to Loan Terms/ Liquidity Spreads.

Coverage

Global

Argentina	India	Poland
Australia	Indonesia	Portugal
Austria	Ireland	Qatar
Bangladesh	Israel	Romania
Belgium	Italy	Russia
Botswana	Japan	Saudi Arabia
Brazil	Jordan	Serbia
Bulgaria	Kazakhstan	Singapore
Canada	Kenya	Slovenia
Chile	Korea	South Africa
China	Kuwait	Spain
Colombia	Lithuania	Sri Lanka
Croatia	Malaysia	Sweden
Czech	Mauritius	Switzerland
Denmark	Mexico	Taiwan
Egypt	Mongolia	Thailand
Estonia	Morocco	Turkey
Finland	Netherlands	UAE
France	New Zealand	Ukraine
Germany	Nigeria	UK
Ghana	Norway	US
Greece	Pakistan	Venezuela
Hong Kong	Peru	Vietnam
Hungary	Philippines	Zimbabwe

Emerging

Argentina	Jordan	Qatar
Bangladesh	Kazakhstan	Romania
Brazil	Kenya	Russia
Bulgaria	Korea	Saudi Arabia
Chile	Kuwait	Serbia
China	Lithuania	Singapore
Colombia	Malaysia	Slovenia
Croatia	Mauritius	South Africa
Czech	Mexico	Sri Lanka
Egypt	Mongolia	Taiwan
Estonia	Morocco	Thailand
Greece	Nigeria	Turkey
Hong Kong	Pakistan	UAE
Hungary	Peru	Ukraine
India	Philippines	Venezuela
Indonesia	Poland	Vietnam
Israel	Portugal	Zimbabwe

Coverage

Eurozone	Austria	Germany	Netherlands
	Belgium	Greece	Portugal
	Finland	Ireland	Spain
	France	Italy	

Emerging Asia	Bangladesh	Korea	Sri Lanka
	China	Malaysia	Taiwan
	Hong Kong	Pakistan	Thailand
	India	Philippines	Vietnam
	Indonesia	Singapore	

Latin America	Argentina	Colombia	Venezuela
	Brazil	Mexico	
	Chile	Peru	

EMEA	Bulgaria	Kenya	Russia
	Croatia	Kuwait	Saudi Arabia
	Czech	Lithuania	Serbia
	Egypt	Mauritius	Slovenia
	Estonia	Morocco	South Africa
	Hungary	Nigeria	Turkey
	Israel	Poland	UAE
	Jordan	Qatar	Ukraine
	Kazakhstan	Romania	Zimbabwe

Frontier	Argentina	Kuwait	Saudi Arabia
	Bangladesh	Lithuania	Serbia
	Bulgaria	Mauritius	Slovenia
	Croatia	Mongolia	Sri Lanka
	Estonia	Nigeria	UAE
	Jordan	Pakistan	Ukraine
	Kazakhstan	Qatar	Vietnam
	Kenya	Romania	

Methodology

Japan: Real Monetary Base Growth (z-score)
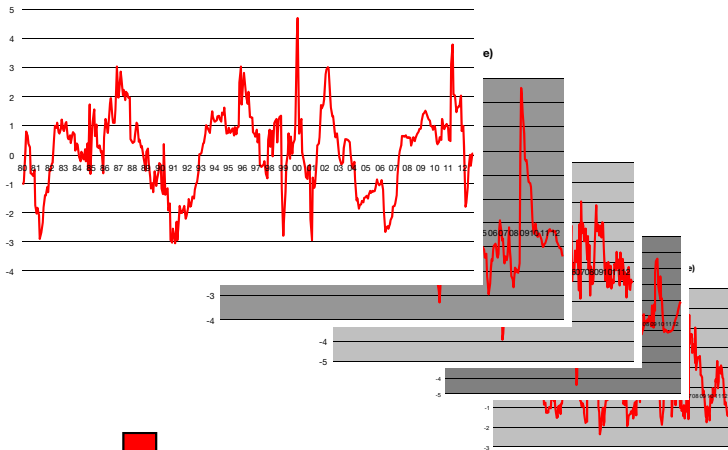
Singapore: Deposit/Loan Ratio (z-score)
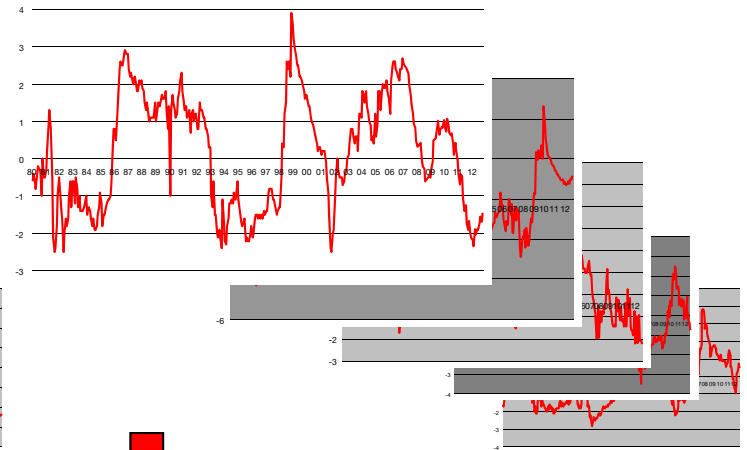
World: Central Bank Liquidity (Index 0-100)
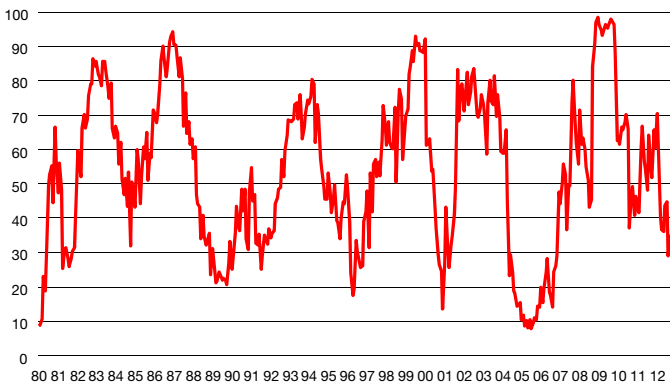
EM: Private Sector Liquidity (Index 0-100)
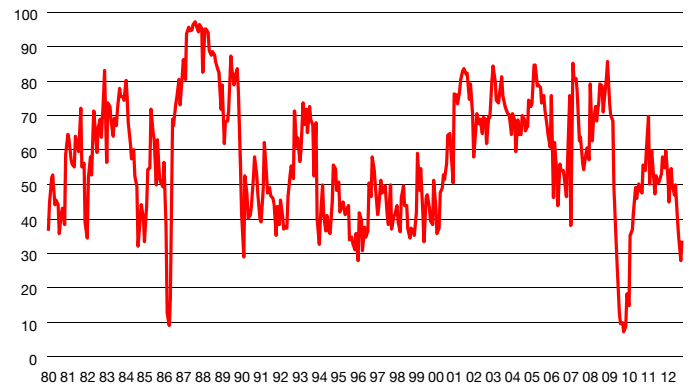
GLI (18-month lead) & CESI G10
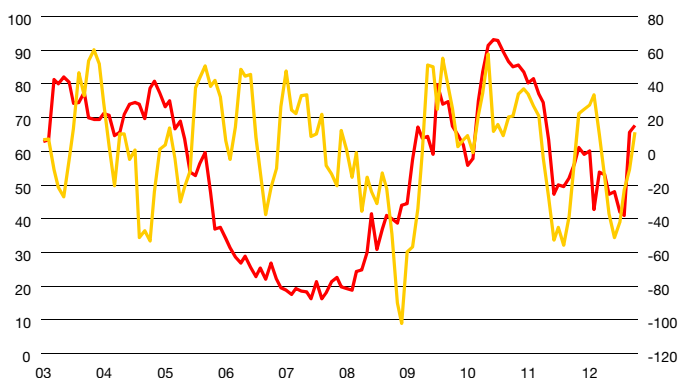

Global Liquidity and the G20 Yield Curve
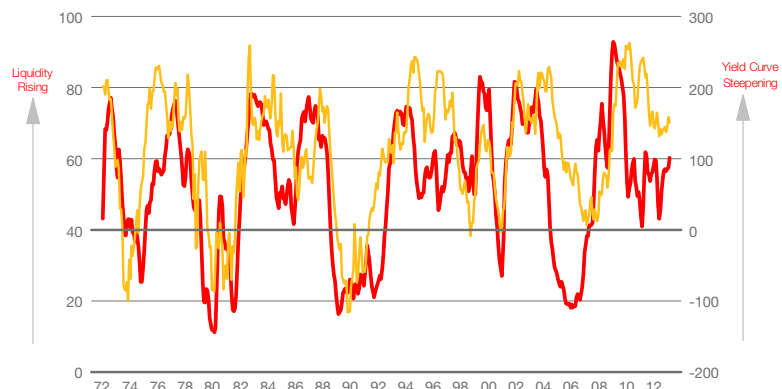
Why Liquidity and not Money?

➢ 'Liquidity' is defined by funding sources: Bank deposits, Central Bank money, repo and wholesale markets are all sources of funding, or 'means of purchase' money

➢ Traditional 'money' or 'means of settlement is too narrow : it comprises only Bank Deposits. USM2 ('Money') is US$8trillion. US 'Liquidity' is around US$24-25trillion or 2¾ times bigger. Liquidity includes so-called 'velocity' effects.

➢ The 'new liquidity' view and its significant collateral base means that financial systems have become more leveraged and more pro-cyclical

Funding Liquidity
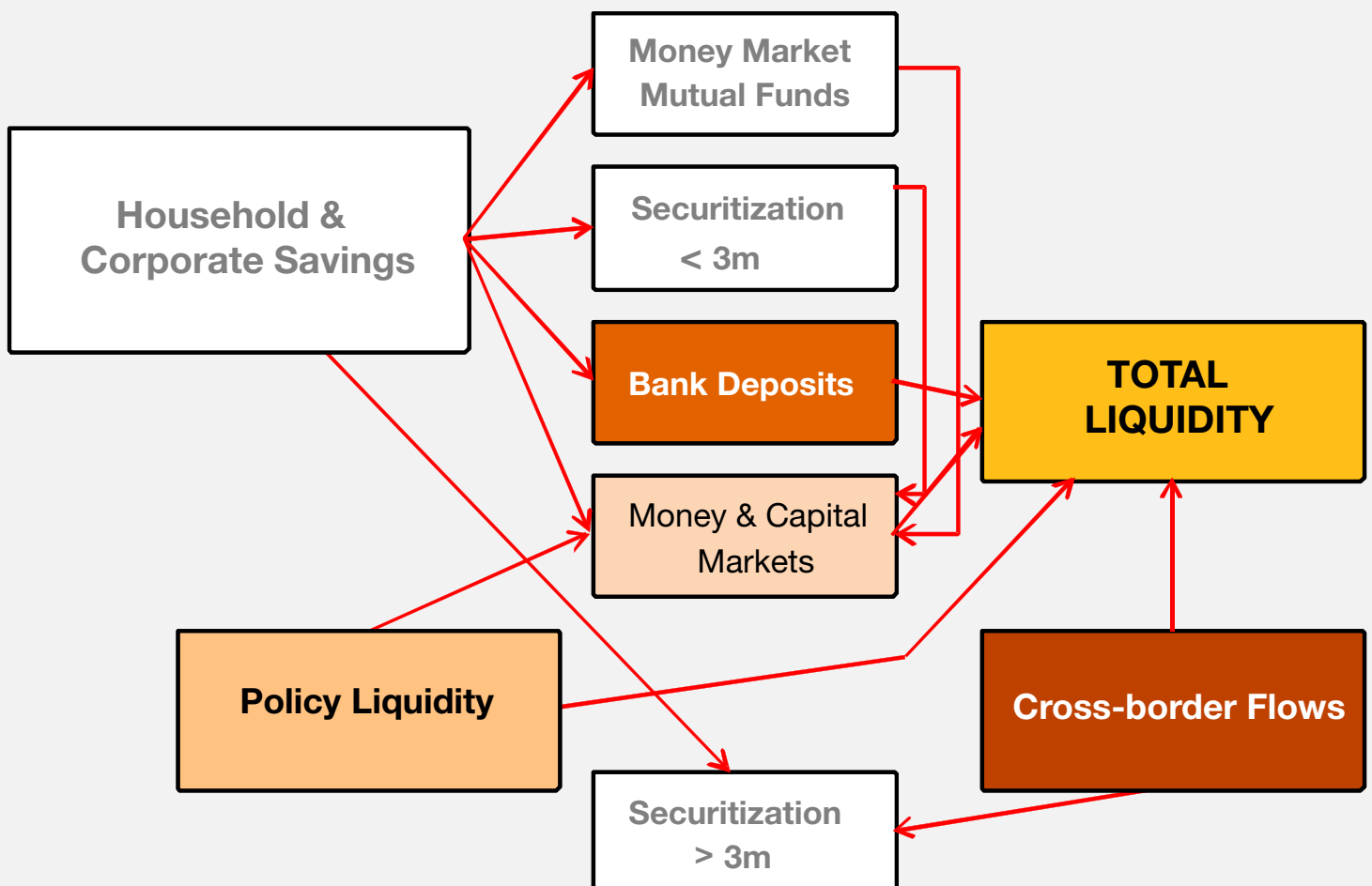
Methodology

Q: What is 'liquidity' and how are the CrossBorder Capital liquidity indexes calculated?

A: Liquidity is a quantitative measure of all cash and credit available to financial markets, once the immediate transactions needs of the real economy have been fulfilled. It is based on flow of funds data for 'sources' rather than 'uses'.

We provide flow data in nominal local currency and US dollar terms, as well as in z-score format to ease comparisons. Thus, our monthly indexes are normalised statistical data series that fluctuate between a range of 0 and 100, with an average value set at 50.

The z-score approach chooses and combines sets of plausible liquidity variables based on their normalised deviations from their rolling 41-month means and trends. We emphasise economic plausibility in the pre-selection process. We start with around 30 variables by economy, conscious that several may be overlapping and collinear. This approach produces a 'weight of evidence' where the more confirming signals the higher the resulting index. We have no prior criteria for the relative importance of different variables, apart from their initial selection and save for half-weights given to the 'very short-term' credit spread factors. This decision we justify on the grounds that they are anyway only included as 'cross-check' factors and our intension is to create a quantitative measure of liquidity.

Methodology

The criteria we used to devise the index are: (1) transparency; (2) coverage and (3) predictability. We regularly apply the index to some 80 economies, including most so-called emerging markets and many frontier markets.

There are six types of variables available for inclusion: (1) asset prices and credit costs; (2) credit spreads/ risk premia; (3) leverage and credit growth; (4) off-balance sheet lending ('shadow banks', securitisation); (5) lending surveys, and (6) security new issuance data and ETF and mutual fund flows. We focus on #3 and #4 and part of #2. Credit costs and asset prices are variables we are trying to predict, so they cannot be included. Similarly, this cut off applies to anything apart from very short-term credit spreads, such as LIBOR-OIS and TED, which we use largely as a 'cross-check'. Lending surveys provide useful information, but experience shows that they are not predictive and tend to follow other credit measures with a long lag. Issuance data and ETF and mutual fund flows are also useful, but are a 'use' not a 'source' of funds and again they tend to be non-predictive.

There are three available methods for index construction: (1) principal components; (2) least-squares factor models and (3) z-score models. Collinearity problems and the instability of model weights in the first two cases persuade us to focus on creating credible z-scores, although the results from all these approaches turn out to be similar. We supply liquidity sub-indexes for each economy that measure: (a) Central Bank liquidity injections; (b) private sector/ domestic institutions liquidity flows; (c) net cross-border financial flows, and (d) wholesale market funding conditions. We also produce data in nominal currency terms, e.g. in US dollars, Euros, sterling, for the first three sub-indexes and for Total Liquidity. The basic difference between the nominal flow data and the indexes is that the indexes are trend-adjusted; they are measured relative to current economic activity and they are more comprehensive because they include certain key balance sheet ratios that plainly cannot be expressed as quantities. As such our indexes incorporate 'monetary velocity'.

Methodology

Each of these indexes aims to give an unambiguous measure of funding liquidity conditions that is consistent with the flow of funds identity, but one that also recognises and avoids data problems, i.e. measurement, timing and structural change.

We build our liquidity indexes and sub-indexes on 3 levels - (a) main variable; (b) available components, and (c) confirming correlated variables. Each data series is first 'normalised' to give a z-score. These sub-components are next combined into an aggregate, weighted index. The specific weights and the choice of variables to include represent our proprietary knowledge. This second index is then re-normalised again to ensure a consistent z-score at the aggregate level.

These z-scores are next combined using a likelihood based methodology that produces its strongest signals when all measures are aligned and is not biased by large extreme readings from one or two sub-components. The resulting aggregate z-score is not a simple sum of components, but it incorporates a 'confidence' effect.

This means that it is non-linear. Thus, if all sub-components have 'high' z-scores, the aggregate z-score will be much higher because it works from joint probabilities. Each z-score is expressed as a 'normal' index range 0%-100%, with its mean set at 50%; 1sd drawn at 60% and 2sd at 80% (-1sd 40%, -2sd 20%).

Our analysis puts most emphasis on quantity (80% weight) measures rather than the short-term credit spread (20% weight) measure of liquidity. The latter term largely indicates qualitative changes in the access to credit, i.e. wide credit spreads could suggest that money is only available to a specific fringe of borrowers. The quantity measures show how much money in general is circulating within the financial sector. In short, we stress the importance of money not interest rates, and we focus on a strict financial definition of money.

Methodology

Q: Does Liquidity include the activities of so-called 'Shadow Banks' and derivatives?

A: Where appropriate it does. Not surprisingly both categories are most important in the US, and of some importance in Europe and Asia, e.g. China. Essentially, the shadow banks cover all sources of credit that are not supplied by the traditional banks. They include: (1) commercial paper issuance; (2) lending by mortgage banks and government agencies, e.g. Fannie Mae and Freddie Mac; (3) securitisation; (4) credit cards, hire purchase and other forms of consumer finance; (5) derivatives, but only where the transaction increases credit.

As an example, our US liquidity measures stand at around US$24-25 trillion, compared to some US$8-9 trillion for traditional money supply and measures of conventional bank credit. In short, our data pool is some two-to-three times bigger.

Some analysts try to include full data on derivatives that often runs into hundreds of trillions. This is bogus. First, as we noted earlier, not all derivative transactions create credit; many (indeed the vast bulk) simply reshuffle risk. Second, the wilder estimates of the value of derivatives grossly exaggerate the true exposure, or leverage. For example, an interest rate swap that exchanges a fixed interest stream of, say, 5% for another floating rate stream currently struck at 6%, will each be valued at par, i.e. at $200 rather than $1.

Methodology

Q: Do your liquidity estimates suffer major revisions?

A: Compared to most economic series, liquidity is a relatively stable series. However, there are revisions. The bulk of these occur within the first month following release. This is because of the nature of the estimation process. To maximise time sensitivity we produce a 'flash' estimate of liquidity roughly 10 days after the end of the month in question. This 'flash' figure contains around two-thirds of the full data sample for each country plus extrapolated numbers for the other components. The first 'full' estimate is available some two-to-three weeks later. The table shows the average percentage differences in absolute terms (i.e. without regard to sign) between the 'flash', 'full' and 'final' estimates. See Figure below.

	"Flash" to "Full"	"Full" to "Final"	Total Revision
Global	4.3	0.6	4.9
USA	5	0.9	5.9
Japan	6.2	1.1	7.3
UK	6.1	0.8	6.9
Eurozone	6.4	1	6.5
Emerging Markets	3.6	0.8	4.4

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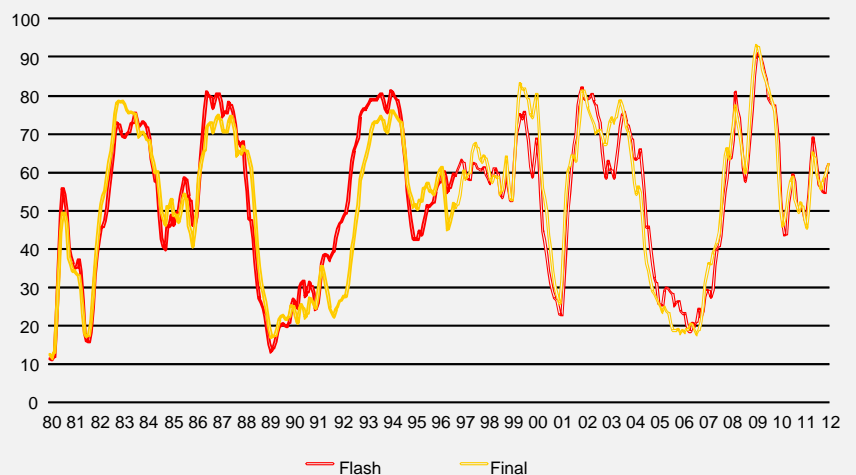
Methodology

Q: What underlying data do you use to construct the Global Liquidity Indexes (GLI)?

A: The data are largely measures of liquidity flow such as detailed in the screenshot (below). We also collect short-term credit spreads and interest rates to construct financial conditions indexes (FCI) that serve as cross-checks. The table shows the standard sources. This template is applied across the 80 economies we cover.

Data Series	Source	Type	Freq	Component	Data Series	Source	Type	Freq	Component
Central Bank discount rate	National Central Bank	AL, LMA	D	FCI	Lending by Deposit Banks	National Central Bank	DLN, DLAMA	M	PSLI
3-month Money Market rate	National Central Bank	AL, LMA	D	FCI	Lending by 'Shadow Banks' (various items):	CBC	DLN, DLAMA	M	PSLI
3-month Treasury Bill yield	National Central Bank	AL, LMA	D	FCI	# Mortgage Banks	National Mortgage Bankers Association	DLN, DLAMA	M	PSLI
3-month Eurodollar rate	National Central Bank	AL, LMA	D	FCI	# Finance Companies	CBC	DLN, DLAMA	M	PSLI
3-month bank av. lending rate	Bankers Association	AL, LMA	D	FCI	# Credit Card and Consumer Credit Agencies	CBC	DLN, DLAMA	M	PSLI
3-month bank av. deposit rate	Bankers Association	AL, LMA	D	FCI	# Securitisation	CBC	DLN, DLAMA	M	PSLI
1-year Treasury bond yield	National Central Bank	AL, LMA	D	FCI	# Commercial Paper	National Central Bank	DLN, DLAMA	M	PSLI
2-year Treasury bond yield	National Central Bank	AL, LMA	D	FCI	# Repo and Whalesale money markets	CBC	DLN, DLAMA	M	PSLI
10-year Treasury bond yield	National Central Bank	AL, LMA	D	FCI	Deposit/ Loan Ratio	National Central Bank, CBC	DLN, DLAMA	M	PSLI
Consumer Price Index	National Statistics Office	DLN, DLAMA	M	FCI, PSLI, CBLI	National Retail Sales	National Statistics Office	DLN, DLAMA	M	PSLI
Adjusted B/S Monetary Authority	National Central Bank	DLA, DLAMA	W, M	CBLI	National Industrial Production	National Statistics Office	DLN, DLAMA	M	PSLI
Required Reserves	National Central Bank	DLA, DLAMA	W, M	CBLI	Current Account Balance	National Statistics Office	AL, LMA	M	XFI
Reserves	National Central Bank	DLA, DLAMA	W, M	CBLI	Foreign Direct Investment	National Statistics Office, United Nations	AL, LMA	M, Q	XFI
Gold & Forex Reserves	National Central Bank	DLA, DLAMA	M	CBLI, XFI	Holdings of Liquid Assets (inc. MMMF)	National Central Bank, CBC	AL, LMA	M	IE
Credit Providers' Purchases of Public Sector Debt	National Central Bank	DLA, DLAMA	M	CBLI	Holdings of Government Fixed Income	Finance Ministry	AL, LMA	M	IE
Monetary Authorities' Purchases of Public Sector Debt	National Central Bank	AL, LMA	D	CBLI	Holdings of Corporate Fixed Income	National Central Bank, CBC	AL, LMA	M	IE
Deposit Banks' Demand Deposits	National Central Bank	AL, LMA	D	PSLI	Holdings of Mortgage-backed Securities	National Central Bank	AL, LMA	M	IE
Deposit Banks' Time Deposits	National Central Bank	AL, LMA	D	PSLI	Holdings of listed Equities	National Statistics Office, CBC	AL, LMA	M	IE
Money Market Mutual Funds	National Fund Association	DLN, DLAMA	W, M	PSLI	Holdings of Gold	National Central Bank, CBC, Gold Council	AL, LMA	M, Q	IE

Methodology

Q: Are the GLI component weights optimised? Or do you use principal components analysis?

A: Our approach to studying Global Liquidity uses factor models comprising some thirty financial and credit variable for each of the eighty economies that make-up our database. These factors are combined into our GLIs (Global Liquidity Indexes) using fixed weights. Although these weights do not come directly from an optimisation process, they turn out to be close to principal components. See chart below. For example, the US liquidity index (USL) can also be modelled using 15 principal components to reduce the dimensionality of the overall dataset. The first eight of these account for over 85% of the variation in the data. Moreover, applying the first principal component in a least-squares regression shows that nearly 68% of the variation in USL is explained by this factor alone. More importantly, both series share all major turning points and none are missed. In other words, there is a lot of 'commonality' in US monetary and financial data and this appears to be well-captured by our USL liquidity series.

Residual ——— Actual ——— Fitted
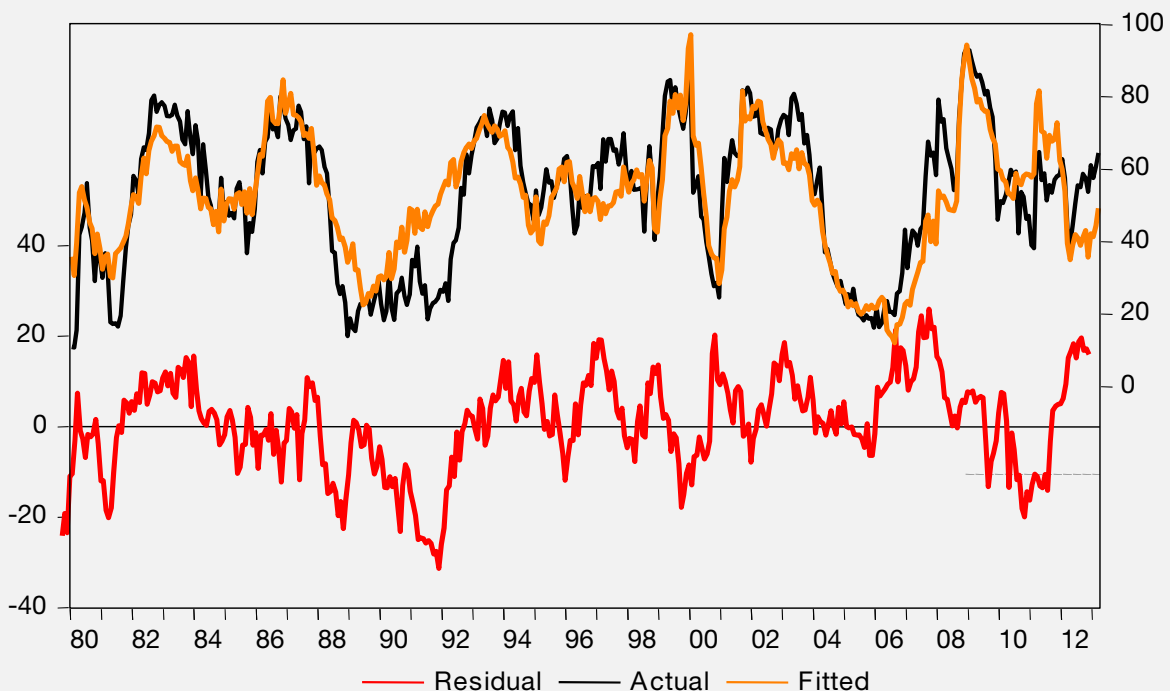
Methodology

Q: Where is your flow of funds data sourced from?

A: Flow of funds data are also known as financial accounts. The following quote from the Bundesbank succinctly describes their origin and importance:

"Financial accounts (FA) are a part of the national accounts, a macroeconomic statistical accounting system that encompasses the entire economy ... The FA, which are usually compiled by central banks because of their access to primary statistics, thus add to the picture provided by the national accounts focusing on the real economy that are supplied by statistical offices by including transactions in the financial sphere that run in parallel with real transactions. The results show who in an economy is providing or drawing what amount of funds in what form, and the financial intermediaries that are involved in the economy's financial flows. This provides an idea both of the basic structure of the economy's financial flows (ie the channels of domestic financial investment and external borrowing) and of financial behaviour, particularly among households and enterprises...The results are used, inter alia*, to analyse the investment and financing behaviour of enterprises and households, which, in turn, provides information about the monetary policy transmission process. For instance, these analyses focus on studies on shifts in financial structures and on the relationship between lending by domestic banks and other sources of financing (such as capital markets and foreign lenders)...."* **Deutsche Bundesbank, 2013**

Frequently Asked Questions

Q: Even if liquidity is important and, in theory, can be forecast, latest data may be hard to get and many countries, especially the emerging economies, are likely to have flaky statistics.

A: Paradoxically, the opposite is true. The emerging economies typically have timely and high quality monetary data. This is because many have become large international borrowers and bankers often judge them on their overall monetary discipline. Global monetary data, in general, are of good quality, being collected and regularly audited by the IMF. These monetary data are more widely available and more timely than conventional National Income Accounts data. Moreover, it is full data, not sample, and consequently less frequently revised. We monitor and contact around 80 central banks each month, and collect over 2,000 separate data items from them in order to compile our liquidity indexes. What's more, unlike earnings definitions, the goal posts do not shift because all participants adopt standard IMF definitions. Therefore, using this alternative data standard we can devise a valuation framework for global financial markets.

Frequently Asked Questions

Q: Don't the GLIs simply confirm that Central Banks create inflation?

A: Not at all. The GLI essentially measure cycles in credit quality. They affect the 'price of money', i.e. the exchange rate, and risk premia, e.g. credit spreads and time spreads. Thus, defaults coincide with the trough of the Liquidity Cycle, but consumer inflation is not correlated with the peaks. Asset prices and commodity prices do respond positively to more liquidity, e.g. 'Risk On', but consumer inflation is predominantly driven by costs and is 'always and everywhere a real economy phenomenon'. Ultimately, our research shows that the key drivers of consumer inflation are large stocks of government debt, not liquidity.

Q: Why 'Flow of Funds' and how does 'Liquidity' relate to the traditional Money Supply concept?

A: Flow of funds accounting ties everything together and enforces a consistency because deficits must be funded and debts cannot accumulate for ever. We define 'Liquidity' as the flow of cash plus credit, but our scope lies far beyond the traditional banking systems in the new shadow banking realm that has benefitted from deregulation and innovation. Looked at more conventional terms we monitor the changes in both money and its velocity. Velocity varies greatly, spurred in particular by financial innovation and by the ebb and flow of funds between the industrial economy and the asset or financial economy, which is our main focus.

Central Banks have only recently put credit back into their models: for too long a period they were (wrongly) persuaded by the 'horizontalist' view that only interest rates matter, I.e. the supply of liquidity is perfectly elastic and no one is ever constrained by a lack of funding. In practice, as anyone who has ever worked in finance must acknowledge, money is not fungible: in crises it is hoarded and rarely flows to where it is most needed.

Frequently Asked Questions

Q: Are the GLIs causal?

A: Using Granger Causality Tests, the GLI tend to lead financial variables by 6 – 9 months (average 7.6 months) and economic variables by 12 – 15 months (average 13.2 months). The chart shows in red the probability of a 'false positive' where the smaller the values the better. The second bar reports the probability of a 'true negative' for the reverse causation.

	Citibank Economic Surprise Index	Profits Growth All Global Listed Cos	Chicago Fed National Activity Indicator	Citibank Chinese Economic Surprise Index	US 10-2 Yield Curve	ECB Bank Default Probability Index
Red bar	1.4	4.6	0.2	2.0	0.2	1.5
Yellow bar	84.8	67.8	78.6	70.0	62.1	98.0
	GLI 11 months	**GLI 27 months**	**USL 11 months**	**CL 7 months**	**GLI 3 months**	**EZL 12 months**
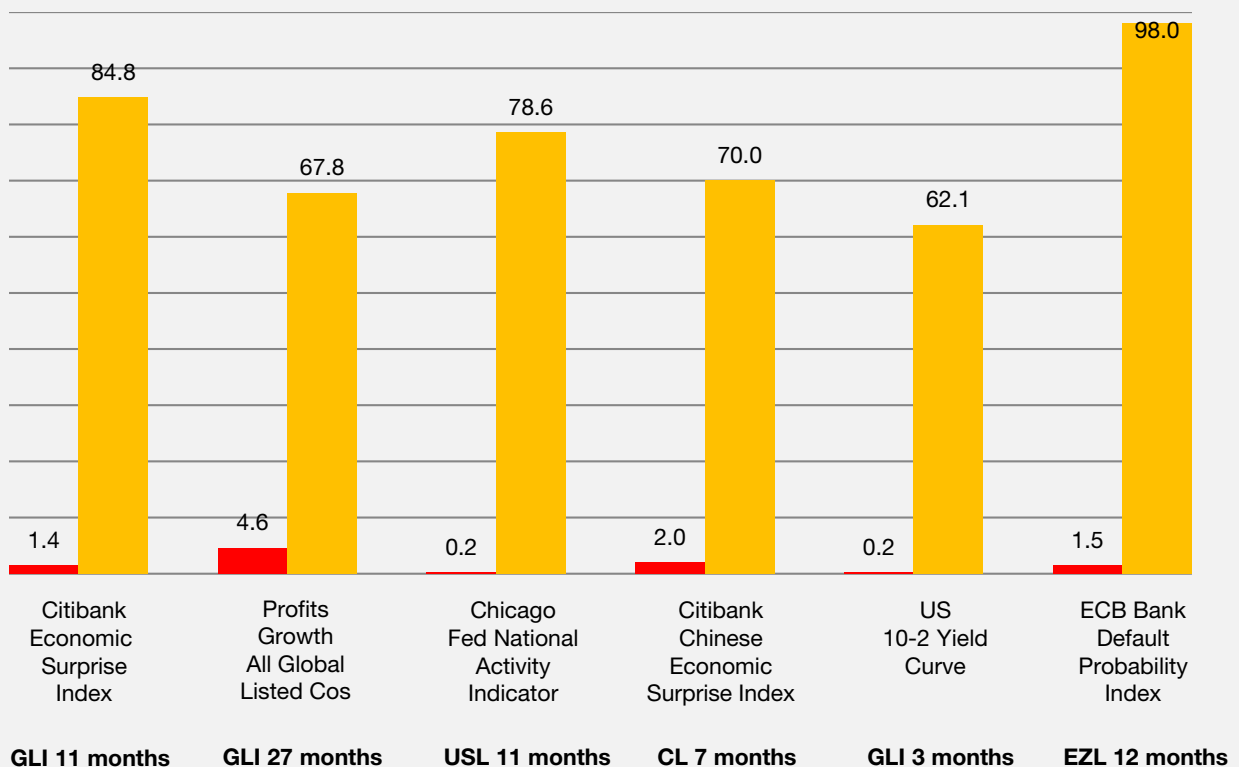
Frequently Asked Questions

Q: Is there academic support for your research?

Global liquidity, both in times of abundance and shortage, has a range of implications for financial stability. Surges in global liquidity may be associated with strong asset price increases, rapidly rising credit growth and – in extreme cases – excessive risk-taking among investors. Shortages of global liquidity may lead to disruptions in the functioning of financial markets and – in extreme cases – depressed investor risk appetite, leading to malfunctioning markets.

There is empirical evidence that during periods of ample liquidity, asset price volatility tends to be low. Abnormally low asset price volatility can have the effect that market participants take on too much risk in their portfolio decisions, which in turn can have adverse consequences for financial stability in the form of misallocations and costly asset price booms and busts.

Baks and Kramer (1999) find that global liquidity is negatively correlated with interest rates and positively related to equity returns. The IMF (2010) has recently examined the linkages between global liquidity expansion, asset prices and capital inflows in emerging economies. This study found that rising global liquidity is associated with rising equity returns and declining real interest rates in 34 "liquidity-receiving" economies.

ECB Financial Stability Review, December 2011

A: Academic studies substantiate and endorse our global liquidity methodology.

Alessi and Detken (2011) compare the performance of a large number of global and domestic variables (real and financial) as early warning indicators of (composite) asset price booms. They find that global liquidity measures (based on the aggregate for 18 OECD countries), notably a global private credit gap or a global M1 gap (defined as detrended ratios to GDP) are the best early warning indicators. We also emphasise credit measures at CBC.

Bierut (2013) shows that global liquidity measures outperform domestic measures as early warning indicators of asset price booms. This study confirms the conclusions of the Committee for Global Financial Stability (CGFS) that quantity measures are better suited to capture the build-up of potential risks (CGFS(2011)). It notes evidence that Basel III capital, leverage and liquidity rules are likely to reduce traditional bank-based intermediation, in favour of non-banks. This implies that the scope of quantitative measures of liquidity may in the future need to be extended to include non-banks in order to support their early warning properties. CBC already include non-banks and shadow banks.

Frequently Asked Questions

Borio and Lowe (2002) use a noise-to-signal approach and show that a domestic credit gap is a better early warning indicator of financial crises than a domestic asset price gap, a domestic investment gap (all gaps are defined as detrended ratios to GDP) or domestic real credit growth in a sample of 34 countries. Drehmann et al. (2011) use data for 36 countries and show that a domestic credit gap achieves the lowest noise-to-signal ratio for predicting banking crises, relative to 14 other indicators, including measures based on GDP, M2,property prices and equity prices. Gerdesmeier et al. (2010) carry out an extensive literature review and conclude that *"…the one robust finding across the different studies is that measures of excessive credit creation are very good leading indicators of the building up of financial imbalances in the economy…"* (p. 383-384); the results regarding excessive money creation are less conclusive. Again this matches CBC research.

References:

- *Alessi and Detken (2011) "Quasi real time early warning indicators for costly asset price boom/bust cycles: A role for global liquidity", European Journal of Political Economy, 27(3), pp. 520–533.*

- *Beata Bierut (May 2013) "Global liquidity as an early warning indicator of asset price booms: G5 versus broader measures", DNB Working Paper No. 377.*

- *Borio and Lowe (2002) "Asset prices, financial and monetary stability: Exploring the nexus", BIS Working Paper No 114, July 2002.*

- *Drehmann, Borio and Tsatsaronis (2011) "Anchoring Countercyclical Capital Buffers: The Role of Credit Aggregates", International Journal of Central Banking, 7(4), pp. 189-240.*

- *Gerdesmeier, Reimers and Roffia (2009) "Asset price misalignments and the role of money and credit", International Finance, 13(3), pp. 377–407.*

- *K. Baks and C. Kramer, "Global Liquidity and Asset Prices: Measurement, Implications and Spillovers," IMF Working Paper, No 99/168, 1999*

- *IMF, "Global Liquidity Expansion: Effects on 'Receiving' Economies and Policy Response Options", Global Financial Stability Report, April 2010*

Application   *Managing Liquidity Risk*

We apply our liquidity data to measure liquidity and exposure risk and produce indexes specifically designed for risk officers. **AIFMD** and **UCITS IV**, for the first time, now require liquidity risk to be explicitly addressed.

> The European Directive defines 'liquidity risk': "*... the risk that a position in the UCITS portfolio cannot be sold, liquidated or closed at limited cost in an adequately short time frame and that the ability of the UCITS to repurchase or redeem its units at the request of any unit-holder is thereby compromised.*" This risk has both internal and external dimensions, such as counter-party risk and macro or general market risk.
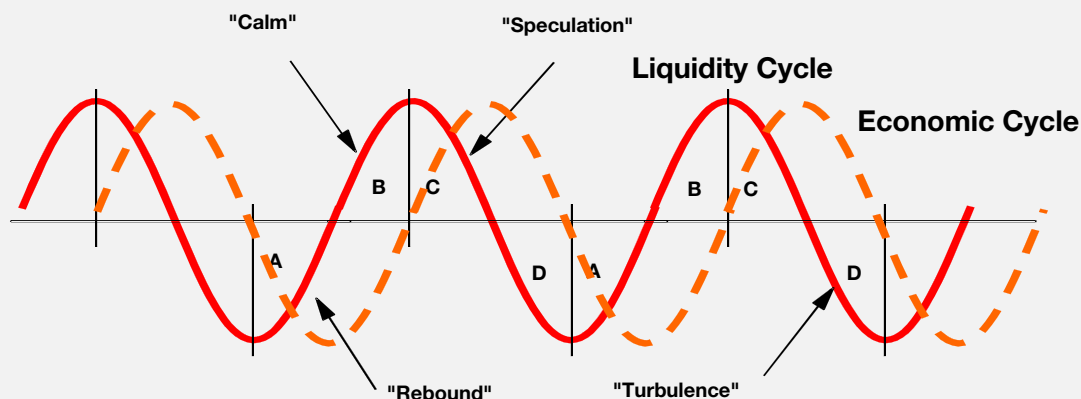
CrossBorder Capital monitors credit markets and measures capital flows to better understand the impact of liquidity on risk. We believe that managers, directors and risk officers of funds need to awareness of these flows and risks.

We measure three types of risks:

*   *Exposure risk* – an index of the concentration of investors is a specific national asset class or currency
*   *Funding Liquidity risk* – the ability of investors in each currency/ market to get funding with ease and in size whenever needed
*   *Forex risk* – the risk that a currency is battered by capital flows

These are combined into a composite monthly risk index (*CBC Composite Risk Index*). The risk index is based on the Liquidity Cycle and designed to move in advance of the business cycle as shown above and to register high values during the *Turbulence* phase (especially if exposure risk is also high) and low values in *Calm* (notably when exposure risk is also low). In the Speculative and Rebound phases, risk should be rising and falling, respectively.

Application   *Liquidity Risk*

Official Definition: "Funding Liquidity"

A gauge of the robustness of financial sector balance sheets or "…*the ability to settle obligations with immediacy. Consequently, a bank is illiquid if it is unable to settle obligations in time." ECB (WP1024, March 2009). The Basel Committee's liquidity definition is similar, adding that banks must also *"…unwind or settle positions as they come due". Market Liquidity*, in turn, is derived from *Funding Liquidity*. Market Liquidity describes the 'liquidity' of an individual investment position and denotes the ease of selling (or buying) a security in size and at short notice, without affecting its 'price'.

How should these risk measures be implemented? Risk is as much a qualitative concept as a quantitative one. Our risk measures are quantitative assessments, but they feed into many dimensions of risk as the following table highlights. In risk there are rarely any unrelated events.

RISK TYPE	Impact of CBC Composite Risk Index
Market volatility	✓✓✓
Operational	
Counterparty	✓
Funding/ Liquidity	✓✓✓
Exposure	✓✓✓
Political	✓
Economic Cycle	✓✓✓
Inflation	✓✓
Exchange Rate	✓✓✓

Application

Liquidity Risk
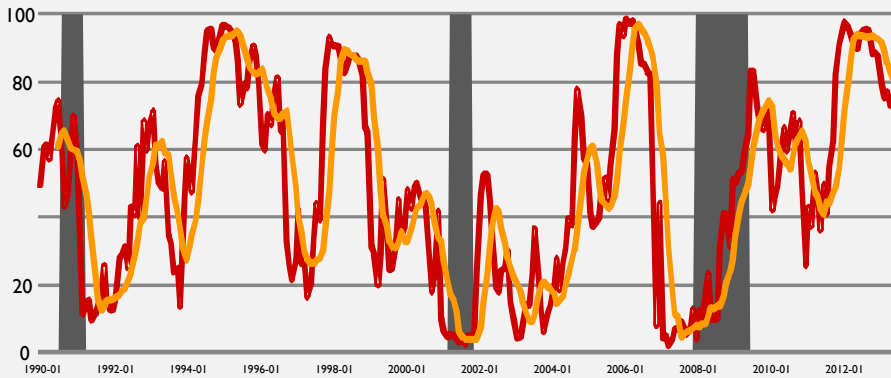
Composite Risk Index — Actual / 6m Moving Average — *World recessions shaded*

CBC Risk Composite
(Normalised Index 0-100, average 50)

… normalised index series comprising measures of liquidity and exposure risk. High reading as poor risk outlook
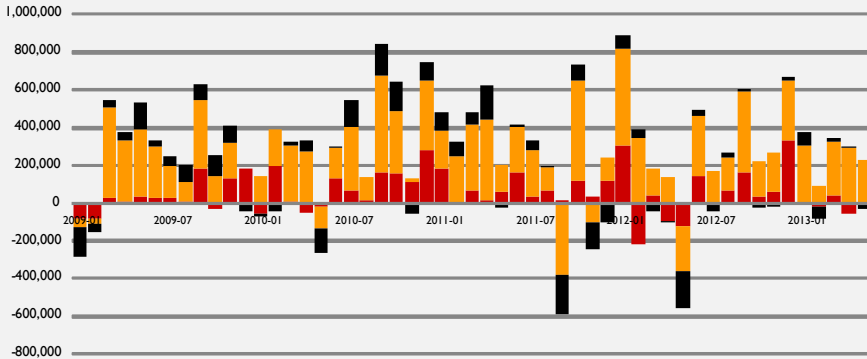
Liquidity Flows
Monthly US$ Millions — Cross-border / Central Bank / Domestic Institutions

Monthly Breakdown of Total Liquidity By Major Source in US Dollar or Local Currency Terms

… look for rising liquidity with strong momentum. Avoid opposite.
… good balance ideal. Watch for sudden reversals in cross-border flows by Central Banks
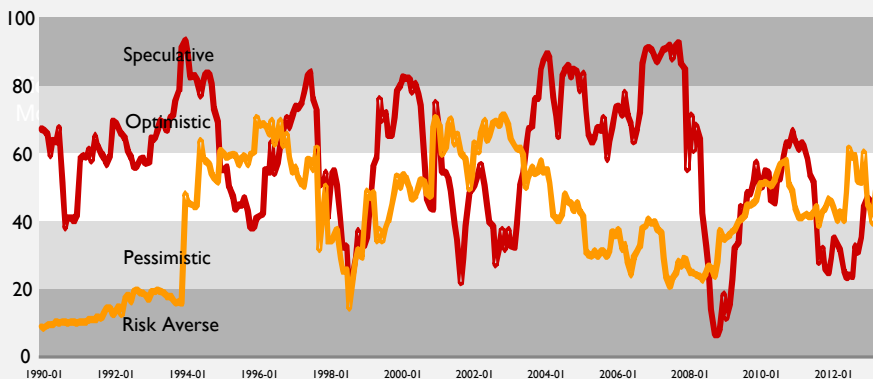
Sentiment/Exposure
Bonds and Stocks — Stocks / Bonds

Investor Exposure to Financial Assets at month-end Normalised deviations of portfolio share away from trend
(Normalised Index 0-100, average 50)

… high readings show above average exposure and high exposure risk

Application

Q: How can we use the liquidity data?

"A primary channel through which [Quantitative Easing] takes place is by narrowing the risk premiums on the assets being purchased. By purchasing a particular asset, the Fed reduces the amount of the security that the private sector holds, displacing some investors and reducing the holdings of others. In order for investors to be willing to make those adjustments, the expected return on the security has to fall. Put differently, the purchasers bid up the price of the asset and hence lower its yield. These effects would be expected to spill over into other assets that are similar in nature, to the extent that investors are willing to substitute between the assets. These patterns describe what researchers often refer to the portfolio balance channel."

**US Federal Reserve
December 2009**

We use the data to understand financial and economic developments. The basic rules of-thumb are that: (1) asset market booms occur within 12 months of a liquidity cycle peak, and (2) banking crises take place around 12 months following a trough in liquidity. Drilling down deeper, we find that our research shows that liquidity affects markets and economies through specific *risk channels*:

Foreign Exchange Rates – the 'price of money' responds to the difference between the ***private sector liquidity index*** and the ***Central Bank liquidity index***, with a lag of around 3-6 months. Cross-border liquidity follows this difference. More private sector liquidity reflects an expanding real economy and rising return on capital, and this raises the demand for the currency. More Central Bank liquidity directly supplies extra currency. Hence, the gap is a measure of 'excess demand'.

Fixed Income Spreads – the quality spread and the time spread (yield curve) respond to ***Total Liquidity*** (Central Bank plus private sector plus cross-border). Convexity of the curve also directly relates to the level of liquidity. The transmission directly influences risk premia. According to consumption-based asset

Application

pricing theory the return of 'good times' causes the risk premia on bonds to rise (they become relatively less attractive) and the risk premia on other assets to fall. Investors thus are pushed out along the risk curve. This effect can also be argued in terms of a smaller illiquidity effect that forces general risk premia lower, or a duration effect, since liquidity is the zero-duration asset. A steeper and more bulging yield curve follows rising liquidity by 3-6 months. We therefore favour *Liquidity Momentum* as a guide to future bond market returns.

Equity Market P/Es (Valuations) – equity valuations move closely with bond markets and the yield curve. Hence, like bonds they move closely with *Liquidity Momentum* with a lag of 3-6 months. The yield curve also determines the split between value and growth stocks, and between defensive and cyclical stocks. A steep curve should for example favour *cyclical growth* stocks.

Equity Market Earnings – the level of *Total Liquidity* determines the pace of business activity around 12-15 months later. Given that it takes, on average 3-6 months for companies to report profits to shareholders, this means that liquidity leads the reported earnings cycle by around 15-18 months. Taken together with the lead-time for P/Es, equities overall tend to follow liquidity with a 6-12 month lag.

Investor Exposure – we collect data on actual investor portfolio exposure to equities, bonds and liquid assets. We take normalised z-scores of this data to derive *Sentiment Indexes*. These are useful short-term momentum indicators and longer-term contrarian indicators.

Application

There are four ways we recommend using this data:

Ranking Scores: applied in a simple ranking system, where more 'liquidity' measured in one of the previous channels favours a specific asset class at some appropriate future date

Granger Causality: a statistical method that examines whether 'liquidity' definitively causes changes in a target variable

Econometric Modelling: data is used directly in a quantitative model to predict target variables

Risk Analysis: we re-configure our liquidity data series, essentially inverting them, and implement these as liquidity and exposure risk warning indicators. High liquidity risk scores warn against moving into a specific asset class.

The predictive power of the Global Liquidity Cycle is established from: (1) turning points in financial markets and in the real economy, e.g. movements in the yield curve, changes in volatility, PMIs; (2) strength of each move, e.g. large moves in the liquidity index lead to large moves in macroeconomic variables, and (3) the average cycle length, e.g. the liquidity cycle averages 60 months, or 5-years, with larger moves every 10-years, or similar to the decennial business cycle and the 4-5 year political and Presidential cycles.

CBC Add-in

Q: How can we access the Liquidity data?

A: Our liquidity data can be accessed via our proprietary Excel add-in. This enables you to download all the series described earlier in this document for all the countries and regions in our coverage. The data largely begin from 1980 and are monthly observations. The add-in allows you to download data, save reports so that you can access your chosen dataset easily, and manipulate and plot data.

CBC Add-in

CBC Add-in

Example of Database Menu   *Global*

Index		Country		Country		Country	
Financial Conditions Index	☐	Argentina	☐	India	☐	Poland	☐
Policy Liquidity Index	☐	Australia	☐	Indonesia	☐	Portugal	☐
Private Sector Liquidity Index	☐	Austria	☐	Ireland	☐	Qatar	☐
Cross-border Flows Index	☐	Bangladesh	☐	Israel	☐	Romania	☐
Quantity Liquidity Index	☐	Belgium	☐	Italy	☐	Russia	☐
Domestic Liquidity Index	☐	Botswana	☐	Japan	☐	Saudi Arabia	☐
Total Liquidity Index	☐	Brazil	☐	Jordan	☐	Serbia	☐
Monetized Savings Index	☐	Bulgaria	☐	Kazakhstan	☐	Singapore	☐
Policy Liquidity $	☐	Canada	☐	Kenya	☐	Slovenia	☐
Policy Liquidity Local Currency	☐	Chile	☐	Korea	☐	South Africa	☐
Policy Liquidity Flows $	☐	China	☐	Kuwait	☐	Spain	☐
Private Sector Liquidity $	☐	Colombia	☐	Lithuania	☐	Sri Lanka	☐
Private Sector Liquidity Local Currency	☐	Croatia	☐	Malaysia	☐	Sweden	☐
Private Sector Liquidity Flows $	☐	Czech	☐	Mauritius	☐	Switzerland	☐
Cross-border Flows $	☐	Denmark	☐	Mexico	☐	Taiwan	☐
Total Liquidity Flows $	☐	Egypt	☐	Mongolia	☐	Thailand	☐
Momentum	☐	Estonia	☐	Morocco	☐	Turkey	☐
Equity Exposure Index	☐	Finland	☐	Netherlands	☐	UAE	☐
Bond Exposure Index	☐	France	☐	New Zealand	☐	Ukraine	☐
Currency Exposure Index	☐	Germany	☐	Nigeria	☐	UK	☐
Liquidity Risk Index	☐	Ghana	☐	Norway	☐	US	☐
Exposure Risk Index	☐	Greece	☐	Pakistan	☐	Venezuela	☐
Forex Risk Index	☐	Hong Kong	☐	Peru	☐	Vietnam	☐
Composite Risk Index	☐	Hungary	☐	Philippines	☐	Zimbabwe	☐

CrossBorderCapital
Implementing Insight

About CrossBorder Capital

➢ CrossBorder Capital is a leading global financial information provider.

➢ We provide independent research to aid asset allocation and decision making.

➢ Our client base includes the key institutional participants in financial markets.

More Information

For more information on the products and services from CrossBorder Capital, please contact us:

CrossBorder Capital
Marble Arch Tower
55 Bryanston Street
London W1H 7AA
Tel: 00 44 207 868 4104
Fax: 00 44 207 868 4118
E-mail: crossbordercapital@liquidity.com