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The construction of long time series on credit to the private and public sector

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Data on credit aggregates have been at the centre of BIS financial stability analysis for years. But long time series on total credit over several decades are hard to find. To go beyond the well-established series on bank credit, the BIS statisticians have compiled long time series on credit. Series on credit to the private non-financial sector have already been published on the BIS website since March 2013. More series on credit to the public sector will be published in the future. This note explains the key concepts behind the compilation of these series.

Background

The BIS has a long standing interest in credit series. From a financial stability perspective, these series help policy makers to detect the boom and bust episodes. One of the major elements of financial cycles is the evolution of credit. The importance of the credit data is illustrated by the “Credit-to-GDP” gap which is used within the Basel III framework as a guideline for setting capital buffers.

Credit booms are not only fuelled by credit extended by banks, but also by other domestic sectors and the rest of the world. Therefore, the BIS monitors the evolution of the *total* credit and its cycles. On the borrowing side, the focus is on the non-financial sectors, i.e. general government, non-financial corporations and households. A breakdown of credit series between these three sectors is highly desirable. Besides total credit, series on bank credit to the non-financial sectors are useful indicators to monitor the risk borne by these financial institutions.

But the available statistics with a large coverage of credit sources is sometimes limited. Very often credit data are only available from domestic monetary institutions, i.e. the depository corporations. These data are compiled according to SNA terminology and cover depository corporations’ funding of the non-financial sectors in the (domestic) economy. Information on funding outside the banking sector is more difficult to collect and less covered by statistics. Data on debt securities held outside banks and on loans extended by the non-bank financial sector are very often not easily available.

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Characteristics of the new series for total credit

Credit series are defined by several characteristics, most importantly the borrower, the lender and the financial instrument(s).

On the borrowing side, the focus is on non-financial corporations, households, non-profit institutions serving households and the general government. The aggregate of the first three sectors is referred to as the “non-financial private sector”. Separate series for the corporate, household (including non-profit institutions serving households) and government sectors are desirable.

In terms of lenders, the new total credit series aim to capture *all sources* independent of the country of origin and type of lender. This goes well beyond the provision of credit by domestic depository corporations, to include the shadow banking lending and cross-border credit.

The coverage of financial instruments includes loans and debt securities such as bonds or short-term bills. Trade credit (as well as other accounts payable and receivable) is excluded from the total credit series because the quality of the underlying data is globally poor and moreover not homogeneous across countries. If recorded at all, the historical and country coverage is very limited.

Benchmark series

To support its long-term analysis, the BIS has targeted the construction of four groups of long series:

- Benchmark 1: Credit from other depository corporations to the non-financial non-government sector
- Benchmark 2: Credit from all sectors to the non-financial non-government sector
- Benchmark 3: Credit from other depository corporations to the non-financial sector
- Benchmark 4: Credit from all sectors to the non-financial sector

The first benchmark series aims at monitoring the financing of the “private” sector by monetary financial institutions. Note that for this exercise the private sector also includes public non-financial corporations in addition to the non-financial non-government sector.

Benchmark 2 covers the total financing of the “private” sector by all resident sectors, financial and non-financial, as well as by non-residents.

Benchmark 3 aims at monitoring the financing of the non-financial sectors, both private and public, by monetary financial institutions.

Benchmark 4 covers the total financing of the non-financial sectors, both private and public by all residents, financial and non-financial, as well as by non-residents. This concept supports the analysis of the BIS credit cycles.

Table 1 illustrates these four series on the matrix of whom-to-whom sectors. From the matrix, it is easy to see that Benchmark 1 is included in Benchmark 2. Similarly Benchmark 3 is included in Benchmark 4.

Identifying credit statistics underlying the long series

The first step in the compilation of long credit series was the analysis of currently available data. Nowadays, much more information is available than before, thanks to technological advances and the fact that national compilers tend to publish more series in an attempt to meet the most recent international statistical standards. Once current statistics with the most suitable coverage had been identified, the BIS compilers had to start looking for historical series with coverage as close as possible to the latest series.

Concretely, the natural starting point for constructing total credit series are the sectoral financial accounts², which provide the desired borrower, lender and instrument coverage (Table 1):

- borrowing sectors: balance sheets of all required domestic sectors (non-financial corporations, households and non-profit institutions serving households and general government) are available;
- lending sectors: all domestic sectors are covered as well as cross-border credit. The sub-sector of depository corporations is available for the compilation of bank credit series;
- instrument coverage: loans and debt securities issued can easily be identified in the financial accounts.

It is important to note that the credit series are not consolidated, i.e. not netted out for credits between institutional units of the same sector. This option was selected because for most purposes, such as assessing debt sustainability, it is not relevant whether the source of credit is a bank or another institutional unit. What matters is the total amount of the credit extended.

When no financial accounts are available, two building blocks are utilised to compile credit series: the monetary statistics on the domestic side and the BIS international banking statistics on the cross-border side. The monetary statistics, and more precisely the balance sheets of depository corporations, is the main contributor to the long credit series when no financial accounts are available. The bank assets included in the monetary statistics cover claims on the non-financial sector (see Table 1). For countries which do not compile balance sheet data, the monetary survey is always available to provide the monetary aggregate counterparts, which cover the requested claims. For earlier periods, when only monetary aggregates were collected without their counterparts, domestic bank

² The financial accounts form part of the UN System of National Accounts (SNA).

credit is approximated by using the broad monetary aggregate M3. In some countries, it is also possible to add to the domestic bank credit the credit provided by some non-bank financial institutions.

The BIS international banking statistics (IBS) provide cross-border credit data and can be added to the monetary statistics for countries which do not compile financial accounts or for periods when no financial accounts are available. The IBS capture cross-border credit, particularly credit extended by banks located abroad. However, the IBS do not cover credit from non-resident non-bank lenders.³ The volume of cross-border bank credit to the non-financial sector is derived from the both IBS data sets: the locational and the consolidated IBS.⁴

Linking credit series

After being identified, the selected credit series will have to be linked. This is not an easy task as these series come from three different statistical frameworks: financial accounts, monetary statistics or IBS. Methodologies, valuation practices are different, borrower, lender or instrument coverage can change from one series to another. All these differences lead to breaks in the long series, for instance, when coverage moves from the sum of domestic and cross-border bank credit to the total credit from financial accounts.

The BIS has adjusted the long series for these breaks in the following way: all observations prior to a break are proportionally scaled up or down. For example, to adjust for a break at time Z owing to the transition from the sum of domestic bank credit (source monetary statistics) and cross-border bank credit (source BIS IBS) (b_t) to total credit (source financial accounts) (f_t), break-adjusted series are derived as follows:

$$Total\ credit(break\ adjusted)_t = \begin{cases} f_t & \text{if } t \geq Z \\ b_t * \frac{f_Z}{b_Z} & \text{if } t < Z \end{cases}$$

It is clear that the break-adjusted series does not perfectly reflect the evolution of the unmeasured total credit prior to the break. Actually it assumes that unobserved sources of credit, typically domestic and cross-border lending by non-banks, behave in a similar way to recorded series.

To ensure transparency, the BIS publishes both the unadjusted and the break-adjusted series. The unadjusted series simply concatenated the series with different

³ International investment position statistics cover cross-border credit from all non-resident sectors and are available in some countries. However, very few countries compile these series with sufficiently detailed instrument and borrowing sector breakdowns for the periods when no financial accounts are available. Consequently, using these statistics only in some countries would hamper cross-country comparability.

⁴ For a detailed explanation on the way the cross-border credit component of the long credit series is estimated, see Dembiermont, Drehmann and Muksakunratana. (2013).

coverage and the breaks are clearly visible. With these series users can implement types of adjustment which differ from the one published on the BIS website. Users should keep in mind that these unadjusted series do not account for unobserved components at all, even though they may be quite important.

Publication on the BIS website

Since March 2013, the BIS publishes quarterly long series on credit for 40 economies, both advanced and emerging. The published series cover the first two of the four benchmark series the BIS has targeted, i.e. the total credit and the bank credit to the private sector. Moreover for most countries, separate series are provided for the total credit to non-financial corporations and to households. These separate series are usually shorter than the series pertaining to the private non-financial sectors, due to the lack of available data. Table 2 shows the components used for all the respective economies, and highlights the starting dates for all the credit series available in the database (bold entries).

To construct the long series, the BIS has largely used the current and historical series stored in the BIS Data Bank, the private database it shares with central banks. Historical data starting in the sixties and even the fifties are available for numerous countries. Also, the BIS has consulted its member central banks and has received methodological assistance on the series used.

Next steps

The long credit series have generated a lot of interest in the research community since their publication, and here is a strong demand for additional data.

In response to the demand for extended country coverage, the BIS is considering including six additional countries, namely: Chile, Colombia, Israel, New Zealand, Peru and the Philippines.

Some users have suggested normalising the credit series by expressing them in percentage of GDP or in US dollars. This could ease the cross-country comparison and analysis.

Currently the credit data set is limited to the private sector. Meeting user demand for the extension of coverage to include the public sector is a big challenge. Where and when financial accounts are available, the total credit to this sector is readily available. For periods or for countries where no financial accounts are available, the compilation will be more difficult than for credit to the private sector. The monetary statistics present the credit to the General Government as net assets. The corresponding gross assets and gross liabilities are not available in all countries. Moreover in the older version of the monetary statistics, only the net claims on the central government are published and the claims on the rest of the general government are hidden within the claims on the other sectors. This will

make the compilation of the claims on the General Government very challenging for the early periods. Public finance data will be an avenue to explore to solve this issue.

All these coverage extensions are certainly considered by the BIS but will not be implemented in a very short term.

Creditors / Lenders Borrowers									
	Central bank	Other depository corporations (ODCs)	Other financial corporations (OFCs)	Central government	Local and state government	Public nonfinancial corporations (PNFCs)	Other nonfinancial corporations (ONFCs)	Households and non-profit institutions serving households (NPISH)	Rest of the world
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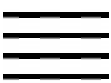
Benchmark 1: Credit from other depository corporations to the non-financial non-govt sector



Benchmark 2: Credit from all sectors to the non-financial non-govt sector



Benchmark 3: Credit from other depository corporations to the non-financial sector



Benchmark 4: Credit from all sectors to the non-financial sector

Starting dates for the new credit series (in bold) and sources

Table 2

Benchmark series Sources	Domestic bank credit	Total credit					Credit to non- financial corporations and credit to households
		Domestic bank credit	Bank credit (domestic + cross-border)	Bank credit (domestic + cross-border) + dom credit from other financial institutions	Total credit (annual financial accounts)	Total credit (quarterly financial accounts)	
Argentina	From 1940	1940–89	From 1990 ¹				
Australia	From 1953	1953–77		1977–88 ²		From 1988	From 1977
Austria	From 1949	1949–95			1995–2000	From 2000	From 1995
Belgium	From 1970	1970–80				From 1980	From 1980
Brazil	From 1993	1993–94	From 1995 ¹				
Canada	From 1954	1954–68				From 1969	From 1969
China	From 1985		From 1985 ³				From 2006
Czech Republic	From 1993	1993–95			1995–2003	From 2004	From 1995
Denmark	From 1951	1951–94				From 1994	From 1994
Euro area	From 1997					From 1999	From 1999
Finland	From 1974				1970–97	From 1997	From 1970
France	From 1969	1969–77				From 1977	From 1977
Germany	From 1948	1948–70			1970–90	From 1991	From 1970
Greece	From 1960	1960–85	1985–94		1994–97	From 1998	From 1994
Hong Kong SAR	From 1978	1978–99	From 1999				From 1990
Hungary	From 1989					From 1989	From 1989
India	From 1951	1951–85 ⁴	From 1985				From 2007
Indonesia	From 1976	1976–85	From 1985				From 2001
Ireland	From 1971	1971–99 ⁵	1999–2001			From 2002	From 2002
Italy	From 1974				1950–94	From 1995	From 1950
Japan	From 1963					From 1964	From 1964
Korea	From 1960				1962–74	From 1975	From 1962
Luxembourg	From 2003					From 2003	From 2005
Malaysia	From 1964	1964–85 ⁶	From 1985				
Mexico	From 1980	1980–93	1993–94 ¹			From 1994	From 1994
Netherlands	From 1961	1961–90			1990–2004	From 2005	From 1990
Norway	From 1953	1953–74				From 1975	From 1975
Poland	From 1992	1992–95			1995–2003	From 2003	From 1995
Portugal	From 1947	1947–85	1985–95		1995–97	From 1997	From 1979
Russia	From 1995		1995–2005	From 2005			
Saudi Arabia	From 1993		From 1993				
Singapore	From 1991		From 1991				From 1991

¹ International banking statistics data are available before these dates but were not used due to excessive exchange rate effects in the wake of currency crises. ² Comprises only credit extended by domestic banks and non-bank financial institutions. ³ IMF data for Q4 1985–Q4 1992. ⁴ For Q2 1951–Q1 1970, total credit is estimated by monetary aggregate M3. ⁵ For Q2 1971–Q2 1992, total credit is estimated by monetary aggregate M3. ⁶ IMF data for Q2 1964–Q3 1973.

Sources: National data; authors' calculations.

Starting dates for the new credit series (in bold) and sources (cont)

Table 2

Benchmark series Sources	Domestic bank credit	Total credit					Credit to non- financial corporations and credit to households
		Domestic bank credit	Bank credit (domestic + cross-border)	Bank credit (domestic + cross-border) + dom credit from other financial institutions	Total credit (annual financial accounts)	Total credit (quarterly financial accounts)	
Spain	From 1970	1970 –80			1980-1989	From 1989	From 1980
Sweden	From 1961	1961 –80			1980-1995	From 1996	From 1981
Switzerland	From 1975	1975 –99			From 1999		From 1999
Thailand	From 1957	1957 –85 ⁷	From 1985				From 1991
Turkey	From 1986		From 1986				From 1986
United Kingdom	From 1963					From 1962	From 1976
United States	From 1952					From 1952	From 1952

⁷ IMF data for Q1 1957–Q3 1975.

Sources: National data; authors' calculations.