Christian Dembiermont christian.dembiermont@bis.org
Mathias Drehmann mathias.drehmann@bis.org
Siriporn Muksakunratana siriporn.muksakunratana@bis.org

How much does the private sector really borrow? A new database for total credit to the private non-financial sector[1]

Despite their importance, data capturing total credit to the private non-financial sector are scarce. This article introduces a new BIS database that provides this information for 40 economies with, on average, more than 45 years of quarterly data, reaching back to the 1940s and 1950s in some cases. It explains the key concepts underlying the compilation of the new series, including a description of the high-level statistical criteria applied, the characteristics of the underlying series used and the statistical techniques employed. For illustration purposes, some facets of the historical evolution of total credit are explored, revealing interesting similarities and differences across countries.

JEL classification: C82, E51.

Credit is vital for economic activity. Households borrow to smooth consumption and purchase homes. Firms often require credit to finance investments. Unsurprisingly, private sector borrowing has important implications for policy. It influences the monetary transmission mechanism and is a major determinant of financial stability – history shows that systemic banking crises tend to be preceded by unusually large build-ups of credit in the private sector.

Despite this importance, series for *total credit* to the non-financial private sector have not been readily available. Even in countries that compile financial accounts, the series for total credit tend to be quite short. As a result, practitioners and researchers have often resorted to well established statistics on bank credit that fail to include credit from non-banks or foreign lenders.

To remedy this, BIS statisticians have compiled long-run series of total credit for 40 advanced and emerging market economies. In doing so, they consulted national

[1] The construction of the long-run credit series would have been impossible without the extensive help of Otakar Cejnar, Irni Ibrahim, Paschalina Karampasi, Denis Marionnet, Rodrigo Oliveira and Robert Szemere. Hubert Bunner provided excellent technical assistance. We are also grateful for the cooperation of national central banks. The break-adjusted series are BIS estimations. Despite every reasonable effort to ensure that the long series on credit are accurate, no guarantees can be made. This article benefited from useful comments by Stefan Avdjiev, Claudio Borio, Steve Cecchetti, Boris Hofmann, Bob McCauley, Christian Upper, Paul Van den Bergh and Phillip Wooldridge, and research assistance by Angelika Donaubauer and Marjorie Santos Beslmeisl. The views expressed are those of the authors and do not necessarily reflect those of the BIS.

central banks to ensure the best possible coverage. A new database on the BIS website makes this information public.[2] For each country and whenever possible, the database contains total credit to the non-financial private sector and its two subcomponents – the household and non-financial corporate sectors – as well as bank credit to the non-financial sector. The database will be updated quarterly.

The new total credit series have important advantages relative to previously available credit series. The new data cover much longer periods and many more countries than nearly all existing total credit series. On average, 45 years of quarterly data are available. For several countries, including Argentina, Germany, Italy and the United States, data start as early as the late 1940s/early 1950s. Importantly, the new series account for *credit from all sources*, not only that extended by domestic banks. International comparability and consistency across time are also quite high, as uniform statistical criteria have been applied as much as possible. That said, some approximations had to be made to overcome gaps in the historical series or changing compilation practices. All these details and exceptions are noted in the metadata published with the series on the BIS website.

For illustration purposes, this article also explores some facets of the historical evolution of total credit. While total credit has generally risen substantially relative to GDP, levels and trends in private sector borrowing have varied across countries to a surprising degree. For instance, in several economies, total credit-to-GDP ratios already significantly exceeded 100% in the 1960s and 1970s. Equally, in a number of countries, the share of domestic bank credit in total credit has actually increased substantially over the last 40 years – that is, banks have become more, not less, important. And finally, sectoral breakdowns show that there has been a general shift towards more household credit. In some countries, households now borrow even more than corporates.

This special feature is structured as follows. It first discusses the compilation of the new total credit series, describing the high-level statistical criteria applied, the characteristics of the underlying series used and the statistical techniques employed. The article also identifies some of the problems faced by compilers and examines how they were addressed. Finally, the historical developments of total credit are analysed.

Characteristics of the new series for total credit

Credit series are defined by several characteristics (Table 1), most importantly the borrower, the lender and the financial instrument(s). The new data focus on borrowing from non-financial corporations, households and non-profit institutions serving households. The aggregate of these sectors is referred to as the "non-financial private sector". Separate series for the corporate and household sectors (including non-profit institutions serving households) are also available.

In terms of lenders, the new total credit series aim to capture *all sources* independent of the country of origin or type of lender. This goes well beyond the provision of credit by domestic depository corporations, such as commercial banks,

[2] www.bis.org/statistics/credtopriv.htm.

Characteristics of credit data[1]

Table 1

	Total credit	Domestic bank credit	Cross-border bank credit
Source	Financial accounts	Monetary surveys	BIS international banking statistics
Borrowers			
Non-financial corporations			
Private non-financial corporations	✓	✓	✓
Public non-financial corporations	✓	✓	✓
Households	✓	✓	✓
Non-profit institutions serving households	✓	✓	✓
Other financial corporations	–	–	✓
Lenders			
Non-financial corporations	✓	–	–
Financial corporations	✓	–	–
Central banks	✓	–	–
Other domestic depository corporations	✓	✓	–
Other financial institutions	✓	–	–
General government	✓	–	–
Households	✓	–	–
Non-profit institutions serving households	✓	–	–
Rest of the world			
Internationally active banks	✓	–	✓
Other sectors	✓	–	–
Instruments			
Debt securities[2]	✓	✓	✓
Loans	✓	✓[3]	✓
Equities and investment fund shares	–	–	–
Insurance, pension and standardised guarantee schemes	–	–	–
Financial derivatives and employee stock options	–	–	–
Trade credit and advances	–	–	–
Other accounts receivable/payable	–	–	–
Currency[4]	National currency	National currency	National currency
Valuation method			
Loans	Nominal value	Nominal value	Nominal value
Debt securities[2]	Market value	Market value[5]	Market value[5]
Intra-sector consolidation	Not consolidated	No intra-sector transactions[6]	No intra-sector transactions[6]

[1] Credit provided by other financial institutions follows the same classification as domestic bank credit, except for the lender coverage. [2] Debt securities include bonds and short-term paper. [3] Not adjusted for securitisation. [4] Exchange rate movements can affect reported levels of credit as loans, particularly cross-border ones, can be denominated in multiple currencies. [5] International statistical manuals recommend valuing debt securities at market values, but this is rarely implemented. [6] Consolidation is not an issue as there are no intra-sector transactions. Only lending relationships between the banking and the private non-financial sector are captured.

Source: Authors' calculations.

savings banks or credit unions, covered by traditional domestic bank credit series, to include eg securitised credits held by the non-bank financial sector or cross-border lending. The coverage of financial instruments includes loans and debt securities such as bonds or securitised loans.

To ensure that the new long-run total credit series exhibit these desired characteristics and that they are as internationally comparable as possible, compilers had to overcome two challenges. First, suitable current as well as discontinued credit series had to be identified. Second, these series needed to be linked in a consistent fashion, adjusting for breaks if the borrower, lender or instrument coverage changed.

The remainder of this feature discusses each of these steps in turn, concentrating for the first one on the three main types of credit series used (country-specific information on exact data sources is available in the metadata).

Step 1: Underlying credit series

As they are fully in line with the desired borrower, lender and instrument coverage (Table 1), the sectoral financial accounts that contain the balance sheets of non-financial corporations, households and non-profit institutions serving households are the natural starting point for constructing the total credit series. The financial accounts form part of the UN System of National Accounts (SNA) and are also sometimes known as the flow of funds. In the United States and Italy, this covers the entire time span for which credit data are available after World War II. But in most cases, these statistics start only in the 1990s or later. Some countries have not yet begun to compile financial accounts.

When no financial accounts are available, total credit to the private non-financial sector is estimated based on two components. First, domestic bank credit stands in for total domestic credit. In two cases, it is also possible to add credit provided by other financial institutions. Second, total cross-border credit is approximated by cross-border bank credit taken from the BIS international banking statistics.

Total credit from financial accounts

For countries that do compile financial accounts, total credit to the private non-financial sector is estimated based on the sum of the stock of loans from all series, domestic and foreign, to non-financial corporations, households and non-profit institutions serving households, plus the debt securities issued by non-financial corporations. These components also allow for the construction of separate series for the non-financial corporate sector and the household sector (including non-profit institutions serving households).

In some countries, a historical set of financial accounts for earlier periods complements the set of financial accounts compiled under current statistical standards.[3] It is then possible to extend the total credit series back in time, making

[3] Current financial accounts are compiled under SNA93 standards (or the corresponding European version, ESA 95) with the exception of Australia, which follows SNA08 standards. Historical financial accounts following SNA68 standards (or ESA 79) and sometimes even SNA53 are available for

adjustments for differences in the borrower, lender or instrument coverage if necessary (see below).[4]

In many countries, financial accounts were originally compiled at an annual frequency. In this case, quarterly data are estimated by applying the widely used Chow-Lin method (Chow and Lin (1971)), which extrapolates a linear regression of the annual series on related quarterly series – in this case, usually domestic bank credit – subject to a constraint that the estimated quarterly series add up to the observed annual one.

As total credit captures lending from all sources, it also captures lending relationships within the same (private non-financial) sector, most importantly within the corporate sector. Consolidating, ie netting out credits between institutional units of the same sector, thus lowers the measured level of total credit. The new total credit series are not consolidated, because for most purposes, such as assessing debt sustainability, it is not relevant whether the source of credit is eg a bank or another corporate.

Consolidation may, however, be appropriate when it comes to lending relationships within the same conglomerate – such as between a parent company and its subsidiaries – as the same decision unit is involved and these credits are often only extended to minimise taxes. Available evidence suggests that these types of loans can be meaningful in some European countries such as Belgium, Ireland or Sweden (Bloomberg et al (2012), Cusse et al (2013)). However, removing loans within the same conglomerate from the new total credit series was impossible as data are not available to delineate them precisely. This approach is also in line with the European Commission's "Scoreboard for the surveillance of macroeconomic imbalances (European Commission (2012)).

Even though the new series are not consolidated, trade credit (as well as other accounts payable and receivable) is excluded from the new total credit series because the quality of the underlying data is globally poor. This can be easily achieved because these credits are identified as separate financial instruments in the financial accounts (Table 1) – if they are recorded at all, as their historical and country coverage is limited.

Domestic credit

If no financial accounts are available, the domestic component of total credit to the non-financial sector is based on domestic bank credit. For Australia and Russia, it is also possible to add credit to the private sector granted by other financial institutions (such as insurance companies or mortgage providers).[5]

The main source for bank credit series is the sectoral balance sheets of depository corporations that form the basis for the compilation of the monetary

Germany, Japan, Korea, Norway, Sweden and the United Kingdom. The historical set of Finnish financial accounts follows a national methodology.

[4] No information on stocks from financial accounts exists in Denmark between 1994 and 1997. But flow data are available from the financial accounts, from which levels are derived.

[5] These data are available for other countries as well, but only for periods when total credit series from the financial accounts are used for the new total credit series.

aggregates and their counterparts.[6] The counterparts cover bank claims on the private non-financial sector (see Table 1). For two countries (Ireland and India), the counterparts are not available for the initial periods when the collection of monetary aggregates first began. In these cases and after adjusting for breaks (see below), bank credit is approximated by the broad monetary aggregate M3.[7]

One problem with bank credit series is that they are affected by securitisation. Under traditional accounting rules, derecognised securitised loans do not sit on banks' balance sheets. Therefore, they are not reported in the monetary statistics, even though banks have often supported their securitised loan portfolios with off-balance sheet commitments, as the crisis has clearly shown.[8] But this is changing. Under the International Financial Reporting Standards (IFRS), traditional securitisations are not considered off-balance sheet anymore. Note, however, that securitisation operations do not affect the total credit series when sourced from the financial accounts as these cover credit from *all* sectors, including special purpose vehicles to which banks sold portfolios of loans.

Cross-border credit

When the new total credit series are not taken from the financial accounts, the cross-border component of total credit is based on the BIS international banking statistics (IBS).[9] These statistics capture credit extended by banks located abroad. But they leave out credit from foreign non-bank lenders and are often not available for the whole sample period covered by bank credit.

The volume of cross-border bank credit to the private non-financial sector is derived from both the locational and the consolidated IBS.[10] The locational by residence statistics comply with statistical standards used in financial accounts. The IBS allocate creditors and debtors geographically according to their residence, and permit loans and debt securities to be identified separately among the total claims. However, the locational statistics currently only allow for a breakdown of banks' claims between banks and non-banks. The share of the private non-financial sector in the latter category is taken from the consolidated IBS.[11] Whilst these statistics

[6] More precisely, the sectoral balance sheets of "other depository corporations" (which exclude the central bank) are used. If these are not available, the balance sheets of the banking sector or national surveys on depository corporations are used as an alternative. Bank credit series are taken from the IMF International Financial Statistics for China for 1985–92, Malaysia for 1964–73 and Thailand for 1957–75.

[7] M3 covers mainly deposit liabilities of banks or depository corporations, and its evolution is highly correlated with developments in the credit aggregates in the years when the two can be compared, especially during the early periods.

[8] In most countries, no data are available to historically track the amounts of derecognised loans. An exception is Belgium, where in 2012 depository corporations' derecognised loans represented 40% of the loans booked on banks' balance sheets.

[9] External debt statistics collected under the international investment position framework could provide coverage of cross-border credit from all sources for some countries. However, these data are not used because doing so would hamper cross-country comparability, as very few countries compile these series with sufficiently detailed instrument and borrowing sector breakdowns for the periods when no financial accounts are available.

[10] For a general introduction to the IBS, see McGuire and Wooldridge (2005) or the introduction to the statistical annex of this *BIS Quarterly Review*. For recent enhancements, see CGFS (2012).

[11] By doing so, cross-border credit to the non-financial sector is overestimated because the non-bank private sector includes non-bank financial corporations (see Table 1). Furthermore, it is implicitly

offer a more granular borrower breakdown than the locational IBS, they are compiled under a different framework that consolidates banks' claims according to the location of their headquarters and looks through transactions with banks' related entities to identify the final borrower.

Step 2: Constructing long series for total credit

Total credit from financial accounts, domestic bank credit and cross-border bank credit are the three main building blocks underlying the construction of the new total credit series. Table 2 shows which components are used when for all the economies covered, and highlights the starting points for all the credit series available in the database (bold entries).

Combining a range of different series gives rise to challenges. In particular, valuation practices may not always be fully consistent. And the borrower, lender or instrument coverage can change, leading to breaks in the series. In this section, we discuss these challenges and explain the technique used to adjust for breaks. A concrete example is given in the box.

Asset valuations and exchange rate effects

Even though international statistical manuals such as the IMF Monetary and Financial Statistics Manual (IMF (2000)) and the UN System of National Accounts 2008 (European Communities et al (2009)) provide harmonised standards for asset

Combining different series and adjusting for breaks: an example

To compile the long-run credit series for Ireland, four credit series are used:

- Broad monetary aggregate (M3) from Q2 1971 to Q2 1992
- Domestic bank credit from Q3 1992 to Q1 1999
- Domestic bank credit and cross-border bank credit from Q2 1999 to Q4 2001
- Total credit from the financial accounts from Q1 2002

Each transition implies breaks in the lender coverage leading to shifts in the level of total credit. In particular, at the end of Q3 1992, domestic bank credit was 52% higher than M3. At the end of Q2 1999, adding cross-border bank credit increases the level of total credit by 42%. And at the end of Q1 2002, the total credit from the financial accounts exceeded the sum of domestic and cross-border bank credit by 10%.

Break-adjusted credit series were obtained by taking total credit as reported in the financial accounts and scaling up (ie multiplying) the sum of domestic and cross-border bank credit by a factor of 1.10 between Q2 1999 and Q4 2001, bank credit by a factor of 1.56 (= 1.10 * 1.42) between Q3 1992 to Q1 1999 and M3 by a factor of 2.37 (= 1.10 * 1.42 * 1.52) before Q3 1992.①

① Table 3 reports the average differences between break-adjusted (*BA*) and unadjusted (*UA*) total credit relative to the adjusted series. These numbers reflect the adjustment factors (*af*) and break dates. For instance, for 1970–90 in Ireland, the table shows that (*BA* – *UA*) / *BA* was on average 58%, which is equal to $1 - UA / BA = 1 - (af_{1971–92})^{-1} = 1 - 1 / 2.37$.

assumed that the sectoral breakdown is not affected by differences in the reporting populations and definitions in the locational and consolidated statistics, or the consolidation of claims on related entities.

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.

valuations, those standards may not always be fully implemented. In principle, nominal values are used for loans, corresponding to the origination price (historical cost) plus the interest that has accrued but not been paid if there has not been a default. And in line with accounting practices, written-off loans are excluded from the reported outstanding loans. All other financial assets, including debt securities, are in principle valued at market prices (Table 1). In practice, though, debt securities are often reported at nominal value. This may affect international comparability in cases of large volumes of debt securities and large price swings, but is impossible to adjust for.

The new credit series are reported in national currencies. Exchange rate movements can thus affect the reported levels of total credit as cross-border and, to a lesser extent, domestic loans are often denominated in multiple currencies. These effects can be dramatic, particularly during a crisis. For example, due to the massive devaluation and a large share of foreign currency credits, total credit in Indonesia expressed in rupiahs doubled within two quarters of the Asian financial crisis. Data adjusted for exchange rate fluctuations may therefore tell very different stories from those implied by the unadjusted series (Avdjiev et al (2012)). Which data provide the appropriate insights ultimately depends on the question asked. Exchange rate adjustments may be useful when assessing short-term growth, whereas unadjusted credit may be better for gauging financial sustainability. As a rule, the new total credit series are not adjusted for exchange rate movements. This correction is only possible for the international banking statistics where a currency breakdown is available, but would be highly artificial for the long-run series.

Changes in borrower, lender or instrument coverage

Ideally, the constructed long-run credit series would be fully consistent with the general criteria outlined in Table 1 regarding the borrower, lender or instrument coverage. However, this is not the case, leading to breaks which must be taken into account. All breaks are reported in the metadata and, to ensure transparency and

help users to make their own adjustments, both break-adjusted and unadjusted credit series are available on the BIS website. This applies to the total credit series, the two sectoral and the bank credit series.

Even though the sum of domestic and cross-border bank credit provides a very good approximation of total credit, it does not capture all sources of credit. Clearly, the main credit providers are reflected, but total credit series from the financial accounts capture a broader universe that includes eg domestic and cross-border lending by non-banks. This gives rise to breaks, when coverage moves from the sum of both components to total credit from the financial accounts. Equally, a break occurs when the cross-border credit is added to the domestic bank credit. Bank credit series themselves may also exhibit changes in the coverage of lenders, especially for earlier periods. For example, lending by the central bank may sometimes be included.

In principle, there should be no major inconsistencies for the borrower and instrument coverage across the three different credit series used. However, compilation practices have changed over time. On the borrower side, for example, it is not always possible to exclude lending to other financial corporations such as insurance companies or securities dealers. And on the instrument side, trade credit and holdings of shares by depository corporations cannot always be fully removed from some national data.

Adjusting for breaks

When breaks occur, all earlier observations are proportionally scaled up or down.[12] For example, to adjust for a break at time Z owing to the transition from domestic and international banking credit (b_t) to total credit from the financial accounts (f_t), break-adjusted series are derived as follows:

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

In general, both break-adjusted and unadjusted series are imperfect measures. The former assume that sources of credit that are not recorded behave in a similar fashion to observable series, whilst the latter does not account for unobserved components at all, even though they may be quite important. Table 3 shows the average difference between break-adjusted and unadjusted total credit relative to the adjusted series for a range of countries. Differences can be large, particularly in earlier periods, often reflecting the impact of several breaks. The average difference was 27% before 1970, and has decreased to approximately 0% now. Similarly, the number of countries for which break adjustments do not play a role has increased from two to 37 since 2005.

[12] In a few cases, break adjustments can affect the sectoral analysis somewhat. For unadjusted series, the total credit series always equal the sum of the series for the household and non-financial corporate sectors. However, for early periods in six countries, the break adjustment implies that the sum of break-adjusted credit series for the household and corporate sectors no longer adds up to the break-adjusted total credit series exactly. This is because pre- and post-break values for overlapping periods determine adjustment factors in such a way that the adding-up constraint only holds in the overlapping period. Despite this, it is best to use the break-adjusted series for economic analyses.

Average difference between break-adjusted and unadjusted total credit

As a percentage of the break-adjusted series Table 3

	Before 1970	1970–90	1990–2005	After 2005
Austria	14	19	15	1
Canada	65	0	0	0
Germany	37	1.2	0	0
Ireland		58	27	0
Japan	8	9	5	0
Korea[1]	41	–16	2	0
Mexico		33	9	0
Portugal	62	59	22	0
Thailand	22	27	8	0
United States	0	0	0	0
Average across all countries	27	17	4	0
No of countries without breaks	2	5	15	37
No of countries with data	19	32	40	40

[1] The negative value for Korea in 1970–90 is due to a change in the compilation practices of financial accounts from SNA73 to SNA93 standards, where the earlier period captures a much broader universe of instruments.

Sources: National data; authors' calculations.

Comparability

Despite the caveats discussed above, the new total credit series are fairly comparable across countries, particularly in the last 10–20 years when they are mainly based on data from financial accounts (Table 2). As just discussed, uncertainties are somewhat larger in periods before that as total credit is often approximated by domestic and international bank credit. For 27 of the 40 economies covered by the database, the most recent observations are sourced from financial accounts, which are globally compiled in accordance with the same methodological standards (European Communities et al (2008)). There, comparability is solid, even if national deviations might sometimes occur. Given international recommendations (IMF and FSB (2009)), more and more countries will compile financial accounts in the future, which will then be used in the total credit series to further enhance cross-country comparability.

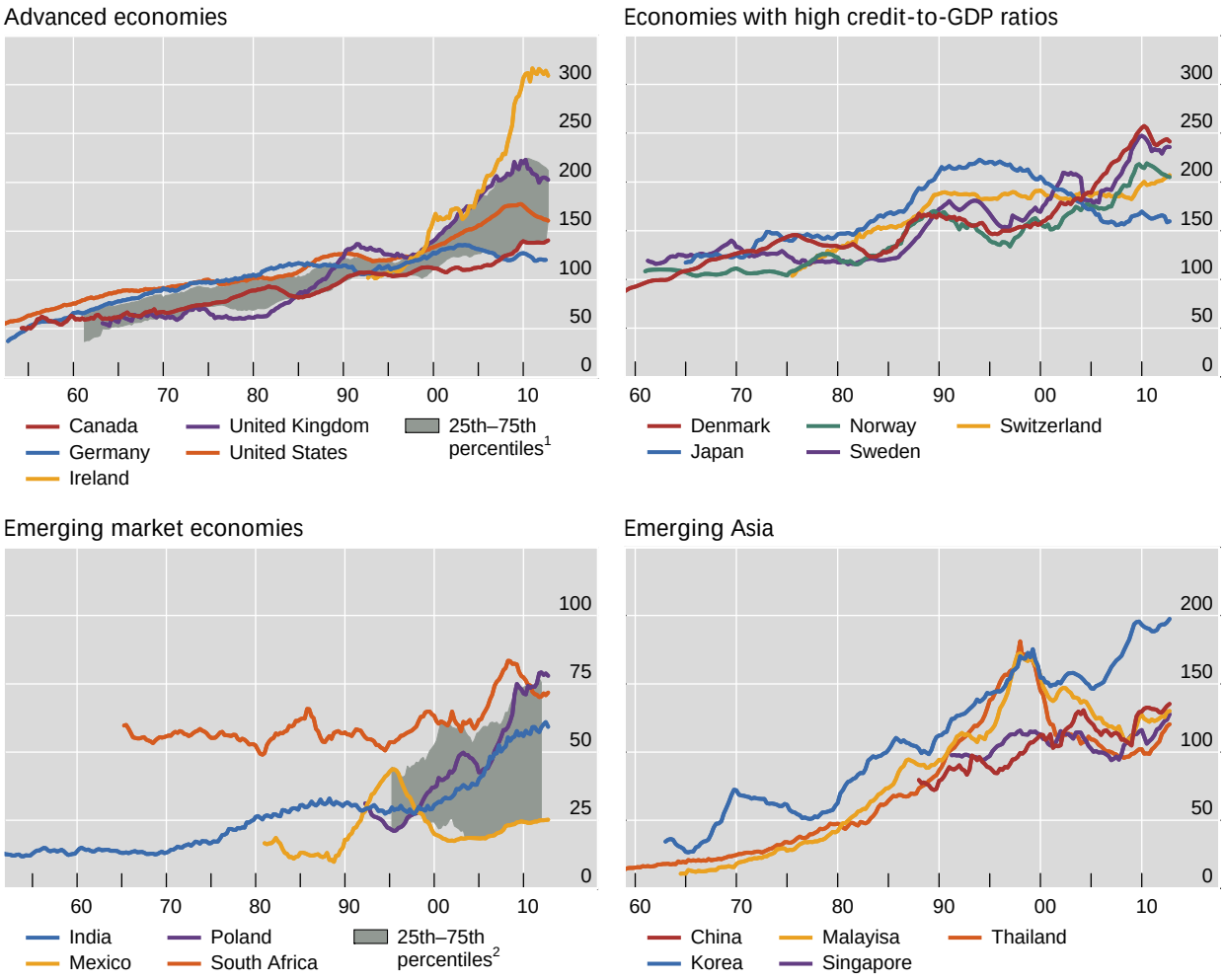
Long-run credit: some historical developments

Over the last 60 years, credit has substantially outgrown GDP in nearly all countries in the sample. That said, surprising differences are evident from Graph 1, which groups countries with similar experiences. The data indicate that the volume of total credit was around 50% of GDP in the 1950s in many advanced economies (top left-hand panel). It then grew at a steady pace for the next 20 to 30 years. By the late 1980s, credit booms emerged in some countries, such as the United States and the

United Kingdom. But cross-country developments started to diverge much more at the end of the 1990s (as highlighted by the shaded area showing the 25th to 75th percentiles of the cross-country distribution). For some countries, like Germany and Canada, total credit growth was modest (their credit-to-GPD ratios are now 120% and 140%, respectively). Other countries experienced rapid credit expansions, with credit-to-GDP ratios reaching levels close to or above 200% around the global financial crisis. Ireland is the extreme case: in 1995, it had a credit-to-GDP ratio of around 100%. Fifteen years later, this figure peaked at 317%, and it has not dropped much since.[13]

Total credit as a percentage of GDP

Graph 1



[1] Of the countries listed plus Australia, Austria, Belgium, Finland, France, Greece, Italy, the Netherlands and Spain. [2] Of the countries listed plus Brazil, the Czech Republic, Hungary, Russia, Saudi Arabia and Turkey.

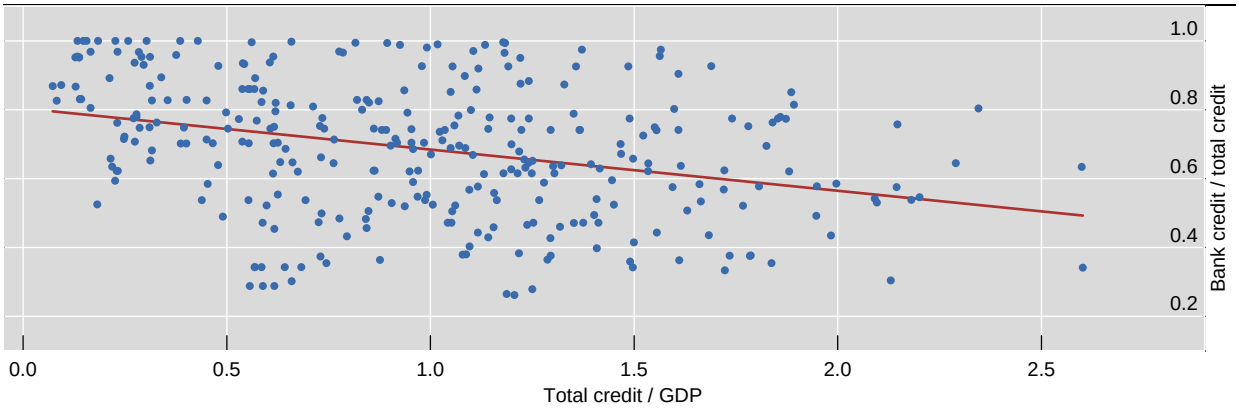
Source: National data.

[13] The Irish credit boom was driven by a massive increase in borrowing from both the household (Cusse and Phelan (2010)) and the corporate sector (Cusse and O'Leary (2013)). The stability of the credit-to-GDP ratio since the crisis reflects continuously high levels of borrowing by mainly multinational corporations. Intra-sector consolidation, which does, however, not net out cross-border intra-sector transactions, currently reduces the total debt of the non-financial private sector by 31% (Cusse and O'Leary (2013)), still implying a total (consolidated) credit-to-GDP ratio of 250%.

Total credit/GDP ratio versus ratio of bank credit to total credit

Five-year averages

Graph 2



The red line indicates the predicted results of a regression of the ratio of bank to total credit on credit-to-GDP ratios. The regression coefficient is statistically significant, but the R^2 is only 0.11.

Source: National data.

As in advanced economies, private sector credit developments in emerging economies (Graph 1, bottom panels) have been characterised by financial deepening and boom-bust episodes. This is exemplified by Thailand, where private sector borrowing rose from 12% of GDP in 1958 to 75% 30 years later. A rapid expansion in credit then followed that ended in the 1997 Asian crisis. Thailand's credit-to-GDP ratio nearly halved over the subsequent 13 years, but started to increase again from 2010 onwards.

Even though these country experiences suggest that private sector borrowing was much lower than GDP before the 1980s, this was not observed everywhere. This is apparent from a group of rather diverse economies including the Nordic countries, Japan and Switzerland (top right-hand panel of Graph 1). In the 1960s and 1970s, credit-to-GDP ratios were already around 100–150% – similar to the current levels in Canada and Germany.

Bank credit versus total credit

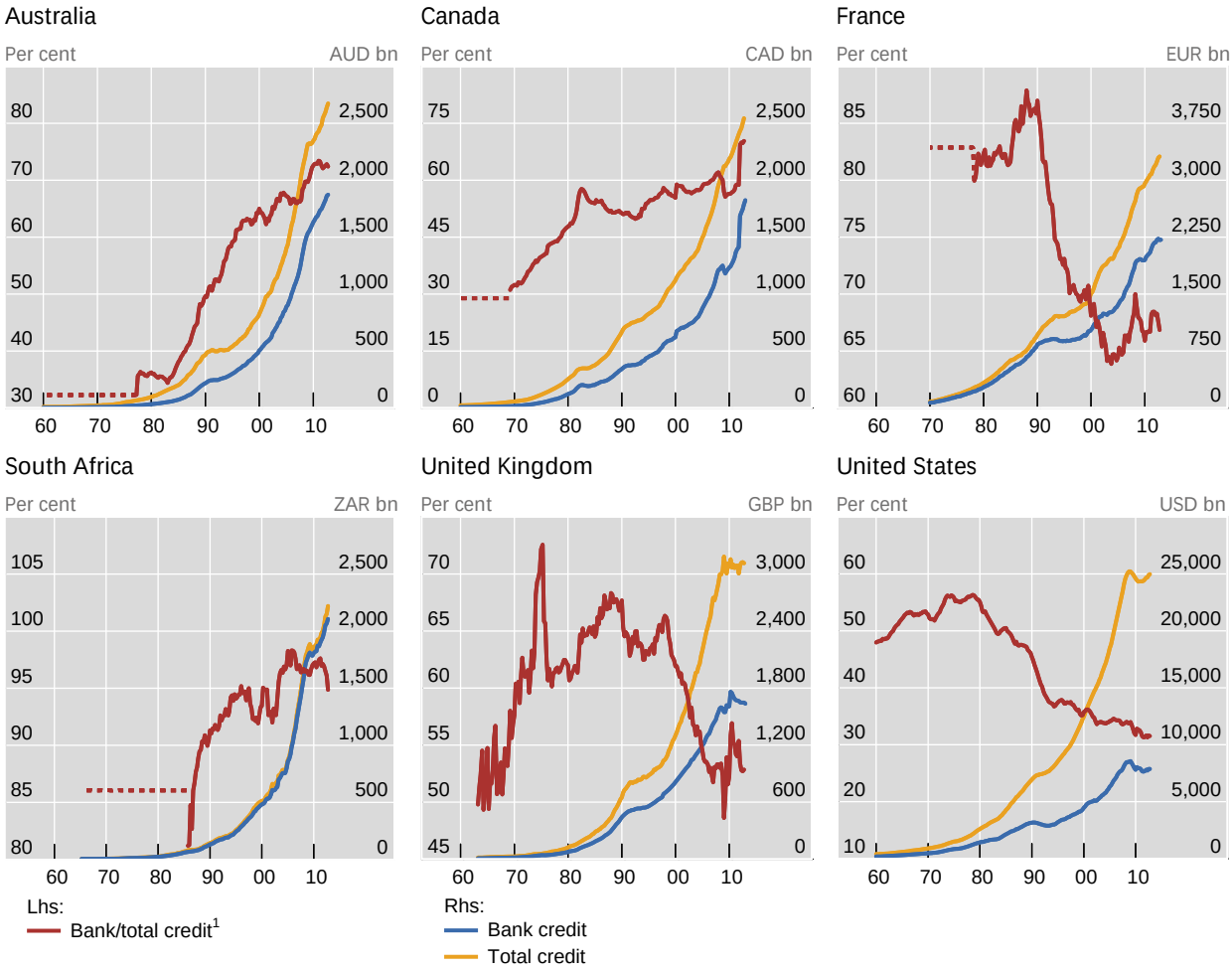
How much of total credit is provided by banks? The average for the whole sample is 70%, but this number varies greatly across countries and over time. Banks may extend only around 30% of total credit, as is currently the case in the United States, or close to 90% in heavily bank-based systems such as Germany or Greece.

While intuition may suggest that domestic banks become a less important source of credit with increased financial development, the relationship has historically been less clear-cut. A simple regression indicates that the share of bank credit in total credit decreases with financial development, as proxied by the total credit-to-GDP ratio.[14] Yet, as Graph 2 highlights, this link is far from strong.

[14] Following Levine and Zervos (1998) and Rajan and Zingales (1998), the literature often approximates financial development by the ratio of bank credit to GDP.

Total and bank credit

Graph 3



[1] A dotted line indicates that total credit series were approximated by domestic bank credit only. Level differences between both series in this case are due to break adjustments.

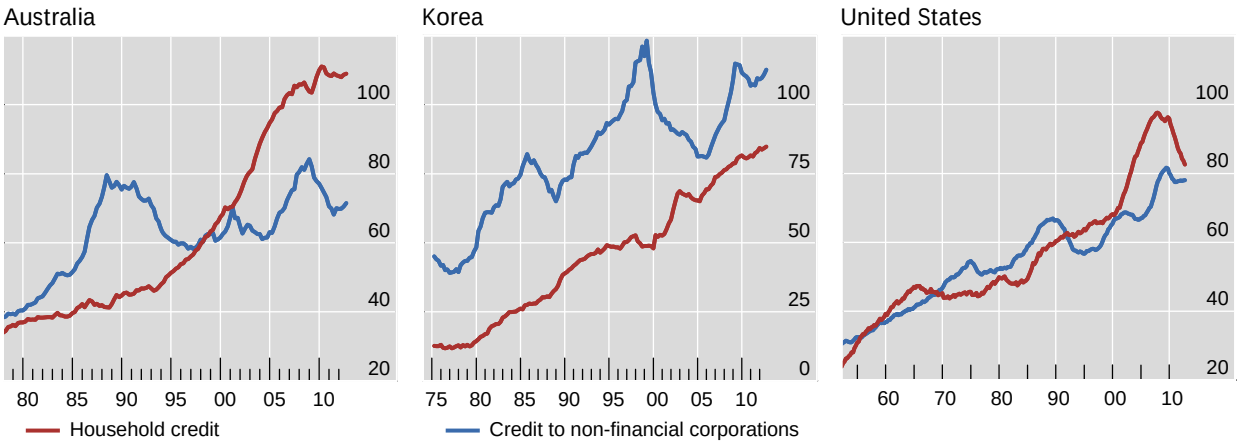
Source: National data.

In fact, in several countries domestic banks have become significantly more important providers of credit over time (Graph 3). This has occurred in both emerging markets and advanced economies. For example, Australia has highly developed banks, deep financial markets and a current total credit-to-GDP ratio of 180%. Yet the ratio of bank credit to total credit has increased steadily, from around 35% in the 1970s to more than 70% in 2012. This development was driven by the dismantling of tight regulation that had led to the emergence of a large shadow banking sector. In addition, the substantial increase in household borrowing was mainly satisfied by the banking sector (Edey and Gray (1996)).

Graph 3 also illustrates how securitisation can potentially distort the measured amount of bank credit, as discussed above. In Canada, bank credit jumped by around 25% in 2011, even though total credit grew by less than 5%. Rather than being driven by fundamental changes in market structure, this reflected the transition from Canadian Generally Accepted Accounting Principles (GAAP) to IFRS, which forced previously off-balance sheet items onto banks' balance sheets. The

Household credit and credit to non-financial corporations

As a percentage of GDP — Graph 4



Source: National data.

recorded volume of bank credit thus increased, even though the actual provision of credit to the economy did not change.

Developments in household and corporate credit

Over the last 40 years, most economies have seen an increase in household credit. This is particularly the case for emerging market economies, where household borrowing generally constituted only 10–20% of total credit at the time data are first collected (typically the 1990s) but has risen to 30–60% more recently. This corresponds to current levels in advanced economies, many of which experienced a similar trend. In several cases, such as Australia or the United States, the level of household credit now exceeds corporate sector borrowing (Graph 4). In the United States, this was already the case in the 1960s, although total credit levels were much lower then.

In addition to these slow-moving trends, household and corporate credit growth can diverge substantially in the short run. Across countries the average correlation between real household and real corporate annual credit growth is just 40%. It is therefore not surprising that there have been several episodes when corporate credit growth slowed but household borrowing expanded rapidly (or vice versa), such as after the dotcom bust in the United States and Australia or the Asian financial crisis in Korea (Graph 4).

Conclusion

This special feature introduced new long-run series for total credit compiled for 40 advanced and emerging market economies. BIS statisticians constructed these series with the help of central banks. The article explains the key concepts underlying the compilation of the new series including a description of the high

level statistical criteria applied, the characteristics of the underlying series used and the statistical techniques employed. It also identifies some of the problems faced by compilers and examines how they were addressed. The BIS will continue to expand the total credit series back in time, increase the country coverage and, where possible, further enhance the comparability of the series across time and countries. In general, the data will be updated on a quarterly basis and released on the BIS website.

For illustration purposes, the article explored some facets of the historical evolution of total credit. The data confirm that in most economies credit has risen substantially relative to GDP, often starting from levels below 50% to reach up to 300% and more now. However, several countries already had high levels of private sector borrowing in the 1960s, with credit-to-GDP ratios between 100% and 150%. Similarly, the data gathered in the long-run series show that bank lending has not necessarily become less important than other sources of funds for the private sector. And sectoral credit developments reveal a structural shift towards more household credit. In some countries, households now borrow even more than corporates.

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