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## Uses of mirror data: examples from the BIS international banking statistics and other external statistics<sup>1</sup>

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<sup>1</sup> This paper was prepared for the meeting. The views expressed are those of the authors and do not necessarily reflect the views of the BIS, the IFC or the central banks and other institutions represented at the meeting.

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## Abstract

This study examines the data elements that are common to the BIS international financial statistics and other external statistics such as the Balance of Payments, International Investment Position and Coordinated Portfolio Investment Survey. We enlist several conceptual relationships between various data sources and demonstrate the validity of relationships with country data at an aggregate level. In addition, the differences between mirror data items provide deeper insight into relevant data sets.

The paper's approach elucidates the methodological framework and data gaps, helping users to properly use the information. It also addresses quality issues and the statistical links between different domains.

**Keywords:** balance of payments, data collection and data estimation methodology, international banking, international financial data.

**JEL classification:** C82, C800, F42, F300.

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## Contents

|   |    |
|---|----|
| Uses of mirror data: examples from the BIS international banking statistics and other external statistics .....                           | 1  |
| A. Introduction .....   | 3  |
| B. Description of data sources .....  | 4  |
| C. Methodological framework and results for loans and deposits: Linkages between LBS and other statistical domains .....                  | 5  |
| Loans and deposits (LD) .....   | 5  |
| LD1: Comparison of bilateral interbank claims and interbank liabilities from the BIS LBS/R .....  | 5  |
| LD2: Comparison domestic claims, local claims in all currencies and local liabilities of domestic banks between the LBS/N and CBS/IC..... | 11 |
| LD3: Comparison of loans and deposits between the BIS LBS/R and the IMF IIP .....   | 13 |
| D. Methodological framework and results for debt securities: Linkages between the LBS and other statistical domains .....                 | 15 |
| DS1: Comparison of cross-border debt securities claims between the BIS LBS/R and the IMF IIP .....  | 15 |
| DS2: Comparison of cross-border debt securities liabilities between the BIS LBS/R and the IMF CPIS.....                                   | 16 |
| DS3: Comparison of international debt securities liabilities between the LBS/R and IDS.....   | 19 |
| E. Conclusion .....   | 22 |
| F. References: .....  | 23 |
| G. Annex: Statistical tables.....   | 24 |

## A. Introduction

Mirror data refer to different sources that capture similar concepts. They involve the comparison of different statistical data that can be analysed mainly in two perspectives – within one country between different statistical domains with similar concepts; or between reporting countries aiming to compare the same statistical data under a dual perspective.<sup>4</sup> For example, creditor banks' assets should equal to debtor banks' liabilities when valued using the same method.

The concept of mirror data is an important statistical tool that also allows common data items to be validated across statistical domains, which can help to fill gaps in related data sets. In addition, it promotes consistency and accuracy, helping to raise statistical quality standards. Consistent and high-quality data are crucial for economists, analysts and policymakers who need to explore statistical information.

This paper focuses on external statistics, comparing creditor as well as debtor data sources. In particular, it explores linkages within and between two data sources of the BIS international banking statistics, as well as linkages with the BIS international debt securities statistics, the IMF International Investment Position (IIP) and the IMF Coordinated Portfolio Investment Survey (CPIS).

The paper seeks to identify statistical consistency tests between the BIS's international banking statistics and other external statistics domains. At a first stage, it aims to compare published data between these different domains. Second, it identifies the methodological aspects that may explain some differences. Finally, it offers guidance on the types of discrepancy that should be avoided. The country experiences include the Portuguese case, and also benefit from contributions provided by other reporting countries.

We propose to develop this joint work in several stages. After identifying the consistency tests (in this paper), we will present them at the BIS workshop for compilers in November 2018 and ask for additional suggestions. In order to address different compilation practices among countries, we intend to collect the relevant metadata from all the compilers and list the main methodological differences. Subsequently, consistency tests for individual reporting countries and bilateral comparisons at a granular level could be constructed.

This document consists of five sections. After the introductory Section A, data sources are described in Section B. The methodological framework for linkages between pairs of mirror data sources and results with explanations are provided in Section C for loans and deposits, and in Section D for debt securities. Section E concludes with proposed future work. The annex provides statistics tables by country for each of the mirror concepts; and also the list of names of ISO country codes used in the texts and tables.

<sup>4</sup> Swapan-Kumar Pradhan (BIS) and Jana Sigutova, who was visiting from the Bank of Canada, were the first to jointly explore the mirror relationships between the BIS international banking statistics and other data sets. The topic was presented for discussion in the Biennial Meeting of the Central Bank Experts, 8–9 February 2017, Basel.

## B. Description of data sources

This study covers two different dimensions: an internal one comparing the BIS international banking and financial statistics (IBFS) data sources and an external dimension comparing the international banking statistics (IBS) with other external data sources. In regard to the first dimension, we recognise linkages between the locational banking statistics (LBS), the consolidated banking statistics (CBS) and the international debt securities (IDS).

The LBS and CBS are the two BIS data sets on international banking activities. The LBS measure claims and liabilities including the inter-office positions of banking offices resident in reporting countries. They record the instruments (loans and deposits, debt securities, and other assets and liabilities), currencies, bank nationalities, counterparty sectors (eg intragroup, central banks, unrelated banks and non-banks) and the composition of resident banks' balance sheet by their counterparties' geographical location. Complementing this perspective, the CBS measure the worldwide consolidated claims of banks headquartered in reporting countries, including claims of their foreign affiliates but excluding inter-office positions.

The LBS comprise two data subsets, the LBS by residence (LBS/R) and the LBS by nationality (LBS/N). Broadly speaking, the LBS/R include an instrument breakdown for banks' on-balance sheet claims/liabilities, while the LBS/N provide the same information on the basis of reporting banks' nationality. The CBS are also presented in two different formats – on an immediate counterparty basis (CBS/IC), which aggregates claims based on the contractual obligation of banks' immediate counterparty countries, and on an ultimate risk basis (CBS/UR). The latter are aggregated on the basis of ultimate obligor, after taking into account risk transfers. Common elements (breakdowns) exist within and between the two LBS data sets, and the LBS/N are also comparable with the CBS/IC since both abide by the principle of immediate counterparty on a residence basis and aggregated by the nationality of banks.<sup>5</sup>

The IDS are a security-by-security data set built by the BIS using information from commercial data providers. They describe securities issued outside the local market of the country where the borrower resides and/or securities issued under international law. They capture eurobonds and foreign bonds but exclude negotiable loans. The securities are aggregated, among other criteria, by issuer's sector, currency, nationality and issuer's residence. The residence of the issuer is the country where the issuer is incorporated, whereas the nationality of the issuer is the country where the issuer's parent is headquartered. In principle, the cross-border debt securities liabilities of banks in the LBS/R should be comparable with the IDS issued by the banks' sector in the same location (residence). However, information may be incomplete if the ownership of securities changes through secondary market transactions.

According to the 'Reporting guidelines and practices for BIS international banking statistics', the LBS statistics are consistent with the Balance of Payments (BoP)

<sup>5</sup> The latest version of the 'Reporting guidelines and practices for BIS international banking statistics', as well as reporting templates and other documents explaining how to report the BIS international banking statistics, are available on the BIS website.

and International Investment Position (IIP) methodology, as they correspond to claims/liabilities of one country vis-à-vis those of non-resident countries. In addition, the LBS are best suited for macro analysis of economic and financial stability issues. The linkages with these and other statistical domains cannot be disregarded and should be part of the IBS statistical analysis.

To address the second dimension, external statistics are used. Under the IMF, Balance of Payments and International Investment Position Manual (sixth edition) (BPM6), the IIP is a statement that shows, at a given point in time, the value of financial assets (liabilities) of residents in one economy that are claims (debts) on non-residents or are gold bullion held as reserve assets. Our analysis focuses on the linkages between LBS/R and the IIP loans, deposits and debt securities of deposit-taking corporations excluding central banks, among all functional categories.

We also compared the debt securities liabilities of banks from the LBS/R with the bank-issued debt securities liabilities that are reported as assets in the IMF CPIS, which is a voluntary data collection exercise conducted by the IMF.

## C. Methodological framework and results for loans and deposits: Linkages between LBS and other statistical domains

One of the most important ways to validate data consistency is to analyse interlinkages with other data sources, and help to improve data quality as well as coverage. In addition, such linkages send an important message to data analysts and decision-makers: namely, that statistical information should be used to complement economic analysis from different perspectives. This section presents three broad categories, with subcategories within each, for loans and deposits.

### Loans and deposits (LD)

#### LD1: Comparison of bilateral interbank claims and interbank liabilities from the BIS LBS/R

This mirror exercise corresponds to the comparison between interbank claims and interbank liabilities for loans and deposits, both sourced from the LBS/R (hereafter referred as interbank claims and interbank liabilities). The LBS/R provide instrument breakdown of claims/liabilities of resident banks in a reporting country, with a full country breakdown of counterparties including currencies and counterparty sectors.

The main motivation in this case is that the claims of reporting banks in country " $i$ " on counterparty banks in country " $j$ " should be a good proxy of the liabilities of reporting banks in country " $j$ " to banks in country " $i$ ".<sup>6</sup> Similarly, the liabilities of

<sup>6</sup> According to the valuation principles defined in the 'Reporting guidelines and practices for BIS international banking statistics', loans (both claims and liabilities) should be valued in accordance with the reporting country's accounting standards and, in principle, at nominal (or contractual) values. It is recognised, however, that national accounting rules may require different valuation methods for particular positions.

reporting banks in country "i" to counterparty banks in country "j" should be a good proxy of the claims of reporting banks in country "j" on banks in country "i".

From the perspective of country "i", the tests can be described as:

$$\text{Interbank claims}_{i;j}^{\text{LBS/R}} \approx \text{Interbank liabilities}_{j;i}^{\text{LBS/R}}$$

and

$$\text{Interbank liabilities}_{i;j}^{\text{LBS/R}} \approx \text{Interbank claims}_{j;i}^{\text{LBS/R}}$$

The above comparison is only possible among LBS reporting countries. We use reported bilateral positions and aggregate to overall positions. The net interbank claims of all countries are defined by:

$$\text{Net interbank claims} = \sum_{i=1}^x \left[ \sum_{\substack{j=1 \\ i \neq j}}^x (\text{Claims}_i^j - \text{Liabilities}_j^i) \right]$$

and

$$\text{Net interbank liabilities} = \sum_{i=1}^x \left[ \sum_{\substack{j=1 \\ i \neq j}}^x (\text{Liabilities}_i^j - \text{Claims}_j^i) \right]$$

Where the inner sum represents net interbank claims/liabilities for reporting country "i" and x is the number of reporting countries in respective quarter. The value of x could be different depending on count of LBP reporting countries, with inclusion of new ones over the years.<sup>7</sup> Tables 1 and 2 (Annex) illustrate how net interbank claims and liabilities were derived in our exercise from underlying bilateral claims and liabilities for banks in reporting countries.

One crucial aspect which is ignored in most research using interbank claims and liabilities, even at the aggregate level, is that the LBS counterparty bank sector includes central banks (or official monetary authorities) which are not included in the reporting banks.<sup>8</sup> Therefore, a fair comparison between interbank claims and liabilities is valid only if the counterparty bank sector excludes central banks. Until Q3 2013, such an exclusion was possible only at the aggregate cross-border positions level, but hardly any analysis using aggregate level data on interbank claims/liabilities considered this aspect when comparing mirror positions.<sup>9</sup> The importance of positions vis-à-vis central banks in reconciliation of interbank claims/liabilities is demonstrated with actual reported data in Table 3.

<sup>7</sup> x =38 in 2004, 39 in 2005/2006, 40 in 2007, 41 in 2008, 42 in 2009, 43 in 2010 to 2014, 45 in 2015 and 47 in 2016/17.

<sup>8</sup> Data structure definition of LBS is available at [www.bis.org/statistics/dsd\\_lbs.pdf#page=2](http://www.bis.org/statistics/dsd_lbs.pdf#page=2).

<sup>9</sup> Committee on the Global and Financial System (CGFS) Stage 1 and 2: "Improving the BIS international banking statistics", CGFS Papers, no 47, BIS, November 2012.

Positions vis-à-vis counterparty bank sector and, of which, central bank

Actual reported positions, as of Q4 2017, in USD millions

Table 3

| Position                                       | Reporting country (RC) | Interbank sector including CBs | Interbank sector excluding CBs |
|--|------------------------|--------------------------------|--------------------------------|
| Claims   | RC1 on RC2             | 28,393.0                       | 8,155.0                        |
| Liabilities                                    | RC2 to RC1             | 8,720.7                        | 8,600.8                        |
| <b>Net interbank claims of RC1 on RC2</b>      |                        | <b>19,672.3</b>                | <b>-455.8</b>                  |
| Position                                       | Reporting country (RC) | Interbank sector including CBs | Interbank sector excluding CBs |
| Liabilities                                    | RC1 to RC2             | 31,499.0                       | 9,334.0                        |
| Claims   | RC2 on RC1             | 11,736.1                       | 8,020.6                        |
| <b>Net interbank liabilities of RC1 to RC2</b> |                        | <b>19,762.9</b>                | <b>1,313.4</b>                 |

In our analysis, we exclude bilateral positions vis-à-vis central banks, which are reported with enhanced data from Q4 2013<sup>10</sup> subject to availability (a few countries started providing enhanced data in subsequent quarters). Using reported bilateral data and the methodology described above, Table C1.1 and Table C1.2 (Annex) respectively reveal results by country for positions in total of all currencies.<sup>11</sup> Both Tables show the comparison of net bilateral interbank claims and net bilateral liabilities for the same set of 44 individual reporting countries between two periods: Q4 2011 (before CGFS enhancements) and Q4 2017.<sup>12</sup>

Between 2011 and 2017, the size of net claims differences, at the level of all reporting countries, fell from USD -322.8 billion to USD -162.5 billion, which corresponds to a decline from -2.2% to -1.5% of the stock of net interbank claims (Graph C1 left-hand panel and Table C1.1).

At an aggregate level, this is represented with the opposite sign for net interbank liabilities (Graph C1 right-hand panel and Table C1.2 (Annex)). Of the 25 countries shown individually in the table, net interbank claims improved for 16 countries between 2011 and 2017, and also for nine of other 19 countries not shown individually. This trend is also observed for net interbank liabilities across countries with some exceptions.

<sup>10</sup> According to the march 2013 'Reporting guidelines and practices for BIS international banking statistics' which incorporates Stage 2 enhancements, sub-sectors within the banking sector should be reported in both sets of locational statistics.

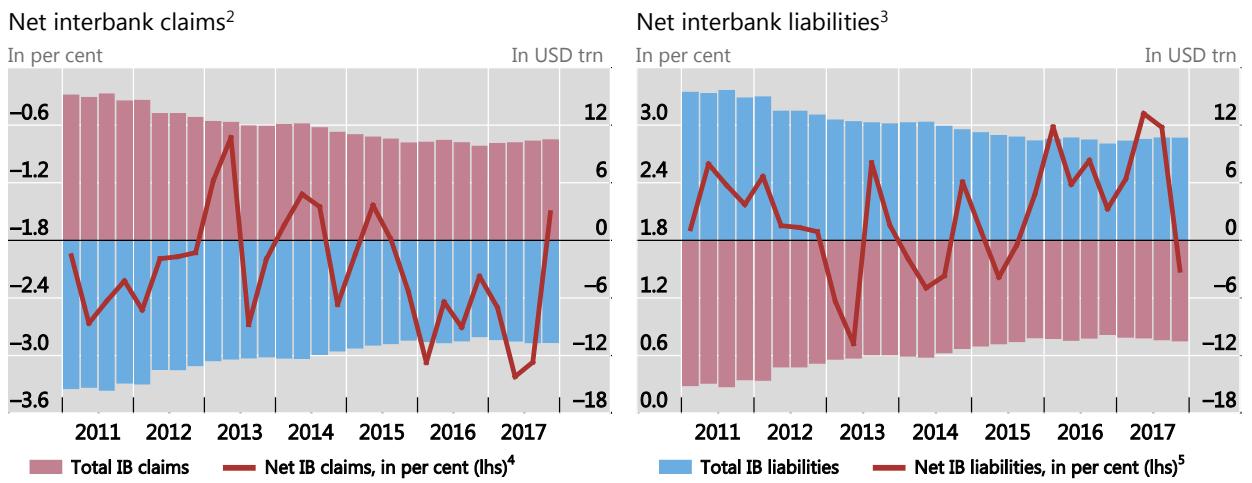
<sup>11</sup> We also examined total differences by currency – total, euro and dollar – but results in tables are for all currencies.

<sup>12</sup> Three countries (China, Russia and the Philippines) joined after Q4 2011 and are excluded for the comparison from these two tables.

## Cross-border net interbank claims and liabilities in reporting countries<sup>1</sup>

Excluding positions vis-à-vis central banks

Graph C1



<sup>1</sup> Interbank positions of banks in 44 reporting countries; CN, PH and RU started reporting after 2011 and are excluded. <sup>2</sup> Sum of all bilateral claims of banks in one reporting country vis-à-vis banks in the other 43 reporting countries minus sum of all bilateral liabilities by banks in the other 43 reporting countries to banks in a reporting country. <sup>3</sup> Sum of all bilateral liabilities of banks in one reporting country to banks in the other 43 reporting countries minus sum of all bilateral claims by banks in the other 43 reporting countries on banks in a reporting country. <sup>4</sup> Net claims (=total Interbank claims minus total Interbank liabilities) as a percentage of total Interbank claims. <sup>5</sup> Net liabilities (=total Interbank liabilities minus total Interbank claims) as a percentage of total Interbank liabilities.

Source: BIS locational banking statistics by residence (QR June 2018, Released database).

It is noteworthy that the accuracy of the results also depends on the availability of data reported on positions vis-à-vis central banks (CB), a subcategory of the total banks sector. Graph C2 represents the share of the central bank sector in total claims/liabilities, interbank claims (loans) and interbank liabilities (deposits) vis-à-vis the counterparty bank sector. It shows that global cross-border interbank claims and interbank liabilities are highly concentrated within BIS reporting countries (about 95% for claims and 92% for liabilities).

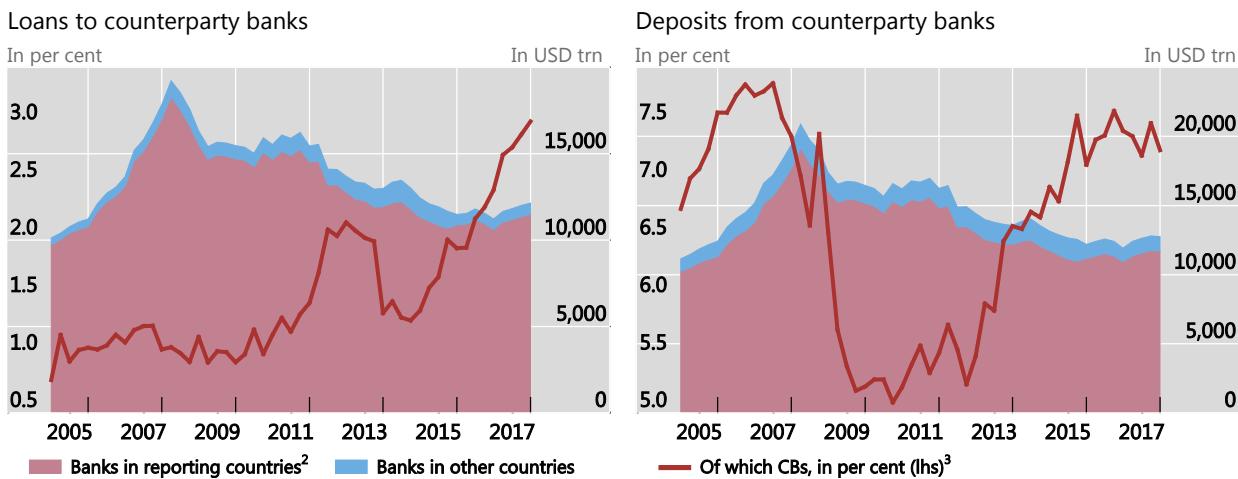
On the other hand, the share of the CB subsector has been increasing over time with respect to loans and after 2009 for deposits. In 2017 the percentage of central bank (CB) loans and deposits was 3% and 7.5%, respectively, in the total amount of the "banks" sector.

We further analysed the loans to CBs and deposits from CBs by counterparty country location from Q4 2013 (Graph C3). The bilateral cross-border loans of reporting banks to CBs (left) are shown by location and for deposits of CBs (right) placed with reporting banks. Between 2014 and 2017, cross-border loans to CBs have increased from USD 177 billion to USD 368 billion, whereas for cross-border deposits from CBs increased from USD 898 billion to USD 929 billion. It can also be seen that in the case of loans, counterparty CBs located in reporting countries correspond to 80% of the total amount (compared with 14% in non-reporting countries and the remaining 6% undisclosed by location for confidentiality reasons). In the case of deposits, counterparty CBs in reporting countries correspond to only 37% (and 35% from CBs in non-BIS reporting countries and a remaining 28% undisclosed by location for confidentiality reasons).

## Global cross-border interbank loans and deposits vis-à-vis bank sector<sup>1</sup>

Counterparty banks in all countries

Graph C2



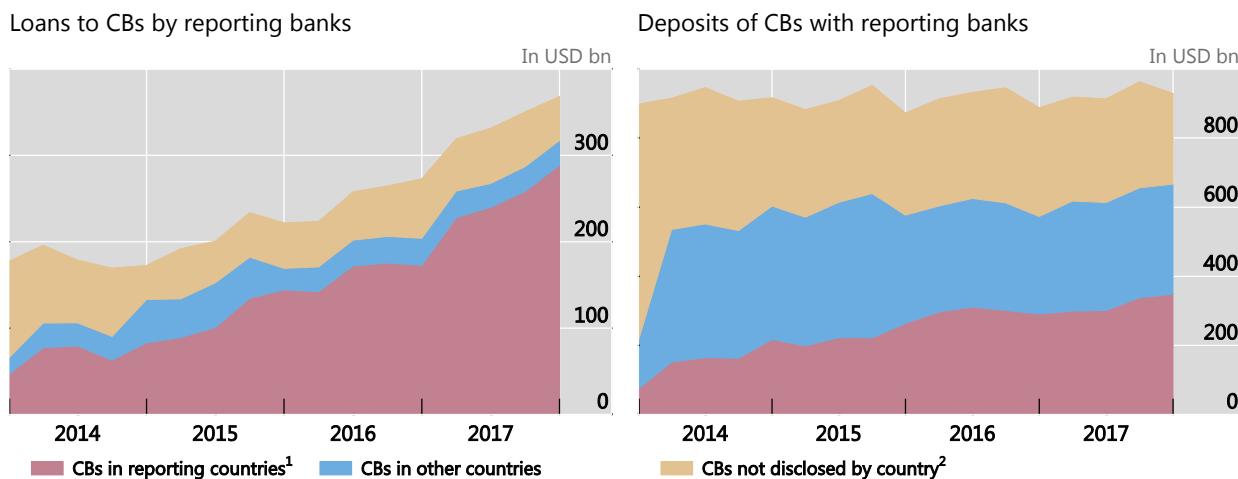
<sup>1</sup> In the locational banking counterparty sector, "banks" includes central banks. <sup>2</sup> Among all counterparty countries in the world, the set of counterparties as reporting countries and as other countries adjusted in each quarter, depending on countries that contributed to the LBS in the respective quarter, ie 38 in 2014 and 47 in Q4 2017. <sup>3</sup> Share in total claims/liabilities vis-à-vis bank sector.

Source: BIS locational banking statistics by residence (QR June 2018, Released database).

## Cross-border loans and deposits vis-à-vis central banks

By location of counterparty CBs

Graph C3



<sup>1</sup> Among all counterparty countries in the world, the set of counterparties as reporting countries and as other countries adjusted in each quarter, depending whether countries contributed to the LBS in the respective quarter, ie 44 in 2014 and 47 in Q4 2017. <sup>2</sup> Cross-border positions not allocated by country either to counterparty reporting countries or to other countries, mainly on account of confidentiality restrictions.

Source: BIS locational banking statistics by residence (QR June 2018, Released database).

When we consider the Portuguese case, net claims differences fell from USD –1.8 billion (end-2011) to USD –0.9 billion (end-2016). We investigated the interbank claims/liabilities of banks in Portugal vis-à-vis banks in other reporting countries between 2004 and 2017. We find that the loan claims and deposit liabilities of Portuguese banks are mostly vis-à-vis the bank sector in other reporting countries. Although the positions vis-à-vis the CB subsector in the case of banks in Portugal were immaterial, the exclusion of these positions, starting in 2014 when data became available, further diminished the already negligible differences between compared claims and liabilities. This also means that the quality of interbank data reported by Portugal (vis-à-vis other reporting countries) and by other reporting countries (vis-à-vis Portugal) has improved over time.

Differences identified in Table C1.1 and C1.2 indicate that the interbank assets/liabilities reported by countries may not be consistent with derived liabilities/assets provided by counterparty reporting countries. However, this does not necessarily mean that there are gaps or errors for the reporting country concerned. Some issues can be adduced to explain the differences:<sup>13</sup>

1. **Coverage** – incomplete coverage of the counterparty banks – eg banks in a reporting country may have claims on a specific bank located in another reporting country that exclude the bank from its reporting population.
2. **CB's positions** – not all concerned countries disclose bilateral positions vis-à-vis CB (official monetary authorities). These positions, if not excluded, will widen the gap in the reconciliation of interbank positions.
3. **Definition of bank sector** – a few countries include building societies or post-banks in their reporting banks but they are non-bank counterparty for other reporting countries. Non-bank financial institutions are also included in some reporting populations (eg development banks and export credit agencies).
4. **Instrument breakdown** – in some cases, there are gaps in instrument breakdown as well as issues with the inclusion/exclusion of items within loans and deposits. For example, non-negotiable debt instruments should be reported under loans and deposits, not in debt securities. By contrast, loans that become negotiable should be reported under debt securities (provided that a secondary market exists for the trading of such loans).
5. **Valuation** – varying valuation methods. According to the BIS guidelines, loans and liabilities (eg deposits) should be valued at nominal (or contractual) values rather than at market prices. However, it is recognised that national accounting rules may require different valuation methods for particular positions.
6. **Banking laws** – treatment of instruments could differ due to accounting or other reasons (eg Islamic banking).
7. **Legal/confidentiality restrictions** – country legal restrictions preventing the disclosure of bilateral loans/deposits for confidentiality reasons, even to the BIS.
8. **Different reporting practices** – with regard to fiduciary instruments (credit on a trust basis).

<sup>13</sup> The relative importance of each issue will vary according to the reporting country.

## LD2: Comparison domestic claims, local claims in all currencies and local liabilities of domestic banks between the LBS/N and CBS/IC<sup>14</sup>

We compare domestic claims in all currencies, local claims in all currencies and local liabilities in local currency vis-à-vis residents of the respective reporting countries using data reported in the CBS/IC and LBS/N.

Domestic claims are those vis-à-vis residents of a country, regardless of whether the claims/liabilities are booked by domestic banks' offices inside the country (local claims) or by offices outside the country (cross-border claims). In the LBS/N domestic claims are those vis-à-vis residents of the parent country and are reported by host LBS countries, while in the CBS/IC those vis-à-vis residents of the country that compiles/reports the data.

On the other hand, local claims and local liabilities of domestic banks are those vis-à-vis residents of country where banking offices are located, be in the reporting country or abroad. In our test, we consider local claims and local liabilities vis-à-vis residents of the reporting country that compile both data sets. In the LBS/N, both local claims and local liabilities are available with a currency breakdown into local (or domestic) and foreign currencies. However, in the CBS/IC local liabilities vis-à-vis residents are available only in local currency and are collected as a memo item. That is why we can compare domestic claims (local plus cross-border) and local claims from LBS/N (both excluding intragroup positions) with the reported figures in CBS/IC but only the local liabilities in local currency (defined as liabilities booked in the domestic currency of, and with a counterparty located in the reporting country in both the LBS/N and CBS/IC).

The intuition is that the above positions<sup>15</sup> of country " $i$ " banks (domestic banks) in the consolidated banking statistics on an immediate counterparty basis vis-à-vis residents of country " $i$ "<sup>16</sup> should be a good proxy for the domestic position, excluding intragroup, of country " $i$ " banks in the locational by nationality statistics.

This test can be described for both claims and liabilities by the following:

$$\begin{aligned}LBS/N \text{ claims}_i^{DomesticAll} &\approx CBS/IC \text{ claims}_i^{DomesticAll} \\LBS/N \text{ claims}_i^{LocalAll} &\approx CBS/IC \text{ claims}_i^{LocalAll} \\LBS/N \text{ liabilities}_i^{LocalLocal} &\approx CBS/IC \text{ liabilities}_i^{LocalLocal}\end{aligned}$$

The results are shown in Tables C2.1, C2.2 and C2.3 (Annex). Domestic claims and liabilities in the LBS are available from Q2 2012 under enhanced requirements, while domestic claims are available in CBS/IC from Q4 2013.

Table C2.1 reveals that the differences in domestic claims between the LBS/N and CBS/IC diminished at an aggregate level in percentage terms from 16.6% in Q4 2014 to 15.9% in Q4 2017. It was possible to reveal figures in all cells for 19 countries but not for all countries due to data confidentiality or data gaps. The amounts between

<sup>14</sup> Domestic claims in all currencies, local claims in local currency and local liabilities in local currency, potentially include financial instruments (eg debt securities) in addition to loans and deposits.

<sup>15</sup> Positions vis-à-vis banks and non-banks located in the same country of residence of the reporting banking office.

<sup>16</sup> Available in the enhanced CBS/IC data from Q4 2013, and from Q2 2012 in the LBS/N data.

the two data sets are either almost the same or differ by less than 10% for 13 of the 19 reporting countries. On the other hand, relatively large differences exist for a number of countries

Table C2.2 compares local claims in all currencies on residents of the reporting countries by domestic banks located in the same country of residence as that of the reporting country. In the total of 16 countries, the difference increased from USD 3,603 billion (12.4%) in Q4 2014 to USD 3,716.3 billion (14.6%) in Q4 2017. However, the individual behaviour is heterogeneous, with a number of countries posting almost the same amount in both data sets.

Table C2.3 compares local liabilities in local/domestic currency between the LBS/N and CBS/IC. The table shows that the amounts between the two data sets are either the same or differ by less than 6% for a number of reporting countries while, for other countries, the gap between the two data sets has increased between 2014 and 2017.

Differences between the LBS/N and CBS/IC may relate to several different issues:

1. **Coverage** – the CBS/IC have a much broader coverage than the LBS/N data. In addition, while the CBS reporting population may exclude smaller banks and include non-financial subsidiaries (excluding insurance), the LBS/N population may include non-bank affiliates such as building societies, credit unions and other financial institutions that take deposits or issue a close substitute for deposits.
2. **Different criteria** – the LBS and CBS/IC use different criteria for the classification of domestic banks. Some countries classify banks with a private foreign ownership as non-domestic banks in the LBS/N but classify them as domestic banks in the CBS for supervisory purposes.
3. **Geographical breakdown** – domestic claims are aggregated by nationality in the LBS/N data (excluding inter-office claims) by the BIS, whereas they are reported by the concerned country in the CBS/IC. Different data sources, particularly inter-office positions, may not be completely consistent or correctly reported. In certain cases, inter-office positions may include those vis-à-vis non-bank affiliates.
4. **Reporting issues** – in the case of local liabilities in the CBS/IC, a number of countries report only loans and deposits, whereas other positions such as debt securities are also included in the LBS/N. Debt securities issued by counterparty country are also difficult to report under the CBS.
5. **Different scope/coverage** – in some countries, such as Austria and Finland, a very large number of small banks are not consolidated by a parent. If these very small banks have a reporting obligation only for the LBS/N, whereas in the CBS only “internationally active banks” are included, the local/domestic claims and liabilities are prone to differ. In such a case, the CBS’s focus on internationally active banks might actually lead to a situation where the LBS/N provide a broader coverage of domestic/local business, whereas the CBS are broader in their coverage of international banking businesses.
6. **Different scope of consolidation** – the “artificial consolidation” applied in this test by excluding intragroup positions is only applied to claims/liabilities from banks, whereas the scope of consolidation in the CBS is usually wider

in scope (often a prudential scope of consolidation is used, also including various kinds of financial intermediaries). As a result, the LBS/N part of the test usually includes claims and liabilities that would be consolidated by the reporting bank in the CBS. Additionally, it is usually very hard for central banks to classify liabilities/debt securities as intragroup, which would not allow them to “artificially consolidate”.

There are varying experiences across countries. In Portugal, the main discrepancies for the recent periods are related to the geographical breakdown on interest owed but not yet paid. Austria explains that the difference is mainly due to the sample of reporting banks, in that only internationally active banks are included in the CBS. Another important difference between the LBS/N and CBS for liabilities for Austria is how debt securities are treated: while they are not included in local liabilities in the CBS, they are included in the LBS/N and assigned to a counterparty based on an estimation of the holder of the securities (based on the Securities Holdings Statistics or SHS data). In the Swiss case, interbank positions in the CBS are netted between the parent company and its subsidiaries/affiliates (netting in both directions) but, in the LBS/N, positions against parent companies or “sister” companies are not included in the counterparty sector “intragroup”.

### LD3: Comparison of loans and deposits between the BIS LBS/R and the IMF IIP

We examine the loans and deposits of deposit-taking institutions excluding CB between the LBS/R and the IMF IIP

We consider that cross-border loans and deposits for both claims and liabilities on the accounts of reporting banks in the LBS/R should be comparable with the country's International Investment Position assets and liabilities for the functional category “other investment” comprising currency, deposits and loans for the deposit-taking corporations, excluding central banks.

This test can be summarised as follows:

$$\begin{aligned} \text{LBS/R assets}_i^{\text{Loans and deposits}} &\approx \text{IIP assets}_i^{\text{Loans and deposits}} \\ \text{LBS/R liabilities}_i^{\text{Loans and deposits}} &\approx \text{IIP liabilities}_i^{\text{Loans and deposits}} \end{aligned}$$

Graph C5 shows the evolution of LBS/R and IMF IIP claims and liabilities between 2006 and 2017. Note that loans and deposits have declined for these countries after the 2007–09 Great Financial Crisis. In addition, LBS/R amounts are higher than the IIP for this period.

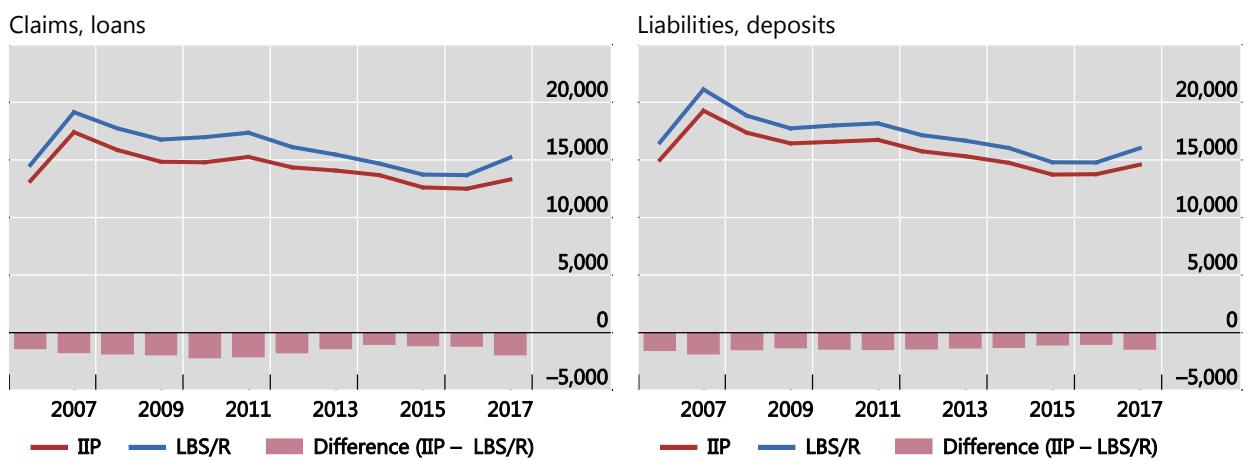
We also compare LBS/R data with the IIP by country for two different periods – Q4 2014 and Q4 2017. Of the 47 reporting countries in the LBS/R, IIP data for loan claims and deposit liabilities of deposit-taking corporations are not available for 12 LBS/R reporting countries.<sup>17</sup> We thus make the comparisons for the remaining 35 LBS/R reporting countries.

<sup>17</sup> The IIP data on loans and deposits are not available for 12 LBS/R reporting countries (BS, BH, CN, CW, GG, IM, JE, KY, MO, MY, SG and TW).

## Cross-border loans and deposits between the BIS LBS/R and the IMF IIP<sup>1</sup>

In billions of US dollars

Graph C5



<sup>1</sup> Claims and liabilities in the IIP comprise "Other investment" on account of currency and deposits, and loans of deposit corporations excluding central banks. This graph shows comparison for total loans and deposits for the 24 countries for which IIP data have been available since Q4 2006. The countries are AT, AU, BE, BR, CA, CH, CL, DE, DK, ES, FI, FR, GB, GR, IN, IT, JP, KR, LU, NL, PA, SE, TR and US. The latest available IIP data for GB related to Q4 2015 and were copied to Q4 2016 and Q4 2017. A number of other countries that started reporting IIP data after Q4 2006 are excluded from this graph (details in Table C3.1 and Table C3.2).

Source: BIS locational banking statistics by residence (QR June 2018, Released database) and IMF International Investment Positions (IIP, 2018 M06 release)

Table C3.1 and C3.2 (Annex) confirm that, except in some instances, data on loans and deposits between LBS/R and the IIP reporting systems are complementary to each other as the differences are limited for most countries. While both sets exist for different purposes (eg granularity in the LBS/R, frequency), there are a number of benefits in such complementary data sources. For instance, the short-term and long-term split, not available in the LBS/R, can be found in the IMF IIP database.

In the case of loans claims, the difference in the total of all countries increased from -6.9% in Q4 2014 to -9.1% Q4 2017. The difference between the two mirror sources fell for most other countries. In the case of deposit liabilities, the difference in the total of all countries fell from -7.7% in Q4 2014 to -6.7% in Q4 2017, and, except in a few cases, the differences between the two mirror sources also narrowed in the latest period of Q4 2017.

In the Portuguese case, the differences between the IIP and LBS/R for claims amount to USD -0.2 billion in Q4 2014 and USD -1.5 billion in Q4 2017 (Table C 3.3, Annex). These differences are mainly related to the geographical breakdown on interest owed not yet paid. The larger values for the Swiss IIP are related to the calculation from the monthly balance sheet survey, which includes more than 240 banks (larger than number of reporting banks in the LBS/R data). However, the difference between the IIP and LBS/R for Switzerland fell in Q4 2017 compared with Q4 2014. Canada's main differences on the assets side are related to the inclusion of inter-office positions – equity and retained earnings in the LBS/R loans and deposits. On the liabilities side, the discrepancy is caused by the exclusion of repo transactions in the IMF IIP and the inclusion of covered bonds in the LBS/R.

## D. Methodological framework and results for debt securities: Linkages between the LBS and other statistical domains

In this section, we discuss three broad categories of mirror relationship with subcategories for the debt securities claims/liabilities. Debt securities claims and liabilities (DS)

### DS1: Comparison of cross-border debt securities claims between the BIS LBS/R and the IMF IIP

We examine the cross-border debt securities claims between the BIS LBS and the IIP of deposit-taking corporations excluding the CB of that country.

The cross-border debt securities claims of deposit-taking corporations, except for those of CB, should, in principle, be comparable between the BIS LBS/R and the IMF IIP. The presumption in this case is that the cross-border debt securities assets of reporting banks in the LBS/R should be similar to the portfolio investment net acquisition of financial assets amounts of deposit-taking corporations (excluding those of central banks).

This test can be described by the following formula:

$$LBS/R \text{ assets}_i^{Cross-border debt securities} \approx IIP \text{ assets}_i^{Debt securities}$$

The IMF IIP data on portfolio investment debt securities claims are available for 34 of 47 countries with latest available data for Q4 2017 (2018 M06 release).<sup>18</sup> In the LBS/R, two countries (Bahrain and Curaçao) do not report cross-border debt securities claims and, of the remaining 45 countries, the data for two countries are not disclosed.

Graph D1 shows the relationship between the LBS/R and IIP for these two periods. It is noteworthy that almost all reporting countries are aligned between the two data sets. However, there are some exceptions for countries with larger LBS/R and IIP amounts.

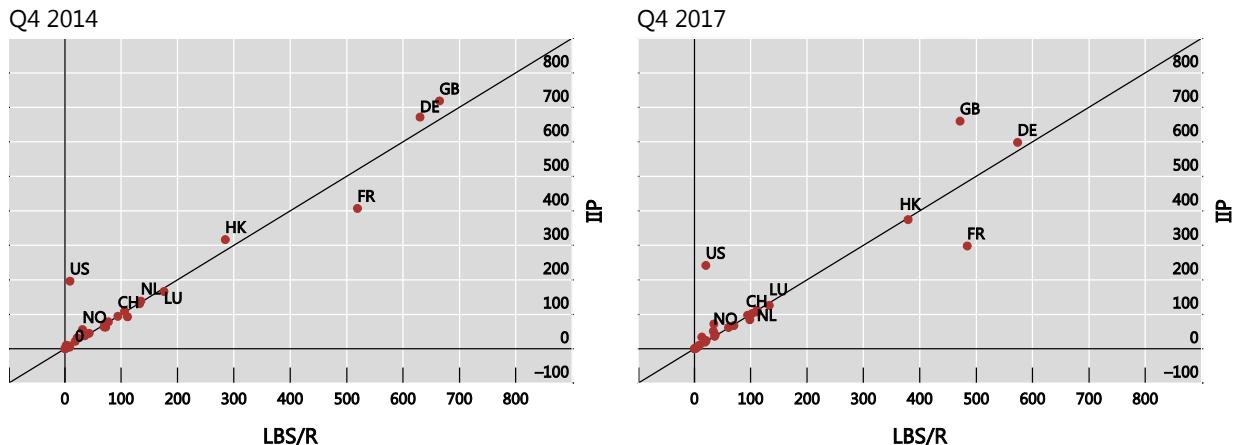
In particular, data are exactly or almost the same or they differ by less than 5% for 14 countries. On the other hand, large differences exist for three countries (GB, JP and US). A time series comparison shows high volatility in the data for the most recent quarters in a number of countries (eg Australia and France), which may be due to the provisional nature of the data. Further investigation is needed, with the help of reporting countries, to understand the underlying reasons and resolve any issues relating to concepts, coverage or reporting. A few large exceptions resulted in a broader gap in the total of 34 countries. Nevertheless, a comparatively good consistency between the two mirror sources for a large number of countries offers the added benefit that cross-border debt securities claims from the IIP are available with a maturity breakdown into short- and long-term.

<sup>18</sup> IIP data on cross-border debt securities claims are not available for 13 LBS reporting countries (BH, BS, CA, CN, CW, GG, IM, JE, KY, MO, MY, SG and TW).

## Cross-border debt securities claims between the BIS LBS/R and the IMF IIP<sup>1</sup>

In billions of US dollars

Graph D1



<sup>1</sup> The IMF IIP data for debt securities claims are available for 34 of the 47 LBS/R reporting countries. The graph shows data for 31 of the 34 countries, excluding JP, PH and RU (data of JP are not public whereas those for PH and RU are not available in Q4 2014). Further details provided in the footnote of Table D1.

Source: BIS locational banking statistics by residence (QR June 2018, Released database) and IMF international investment positions (IIP, 2018 M06 release).

There are country-specific reasons for differences in the cross-border debt securities claims of deposit-taking corporations (except those of CB between the two sources. The main reasons for the differences between the two data sources are listed below:

1. **Coverage** – while debt securities issued by internationally active banks are included in the LBS, the IIP covers those by all deposit-taking institutions excluding central banks.
2. **Sources** – in most countries, the LBS data are compiled by central banks (official monetary authorities) while the IIP is compiled mostly by statistical agencies but CB in some other cases.
3. **Definition** – the definition and treatment of external/cross-border positions might differ between the LBS and the IIP.
4. **Treatment of instruments** – there is the possibility of incorrect classification of instruments by the reporting entities. In particular, debt securities that are held on a custodial basis for customers or acquired without cash collateral should not represent on-balance sheet claims (or holdings of debt securities).

## DS2: Comparison of cross-border debt securities liabilities between the BIS LBS/R and the IMF CPIS

We examine the debt securities liabilities of banks by counterparty country between the LBS/R and the CPIS. This section also benefits from information available from the IMF as well as from a few central banks. The concepts of counterparty country and counterparty sector are identical between the LBS/R and the CPIS: both follow the same BoP/IIP treatments or principles. The treatment of instrument classification is

almost the same. In both data sets, loans that have become negotiable instruments are reclassified from loans to debt securities.

With regard to our purpose on debt securities liabilities by counterparty country, the main problem is that the issuer of a security (debtor) may not know the residency of the holder. This uncertainty for tradable instruments arises from the fact that foreign custodians or other intermediaries may hold the securities. The CPIS thus provides more reliable detailed cross-border positions because the holder (creditor) will usually know its holdings. We explain below the conceptual framework that could be exploited to use the CPIS source to ascertain counterparty country names and the amounts of bank-issued debt securities liabilities. A further possibility is that the remaining amount could be either proportionally allocated to these known counterparty countries or assigned to unallocated (cross-border or unknown location) in the LBS/R.

The CPIS was first conducted for end-December 1997, but data are comparable annually from 2001 to 2012. From 2013 onwards, the CPIS was published semi-annually (end-June and end-December). According to the CPIS guidelines, a reporting economy provides data on its holdings of portfolio investment securities (separate data are reported for equity and investment fund shares, long-term and short-term debt instruments). Derived portfolio investment liabilities (all economies) by the economy of non-resident holders are also available in this survey.

The coverage of reporting countries in the CPIS has increased over time. Comparing the two sources, we find that 44 of 47 LBS/R reporting countries provide CPIS data to the IMF. The limitation for derived debt securities liabilities is that liabilities would be known only to CPIS reporting countries that voluntarily report holdings of such securities by issuing sector as an "encouraged" contribution. The usefulness of the CPIS is that, using the holding data by issuing sector, it is possible to obtain the derived debt securities liabilities of 120 countries vis-à-vis holders in a maximum of 26 CPIS reporting economies. For example, one can identify the names of a maximum 26 counterparty countries that hold debt securities liabilities of banks located in Australia.

The voluntary reporting in CPIS for holdings of debt securities by issuer sector leads to our intuition that the total cross-border debt securities liabilities of reporting banks in the LBS/R in all currencies should be higher than those derived from the CPIS reporting countries' holdings of debt securities that were issued by deposit-taking corporations (excluding central banks).

This test can be described by the following formula:

$$LBS/R \text{ liabilities}_{i,j}^{Cross-border debt securities} > CPIS \text{ liabilities}_{i;j}^{Derived debt securities}$$

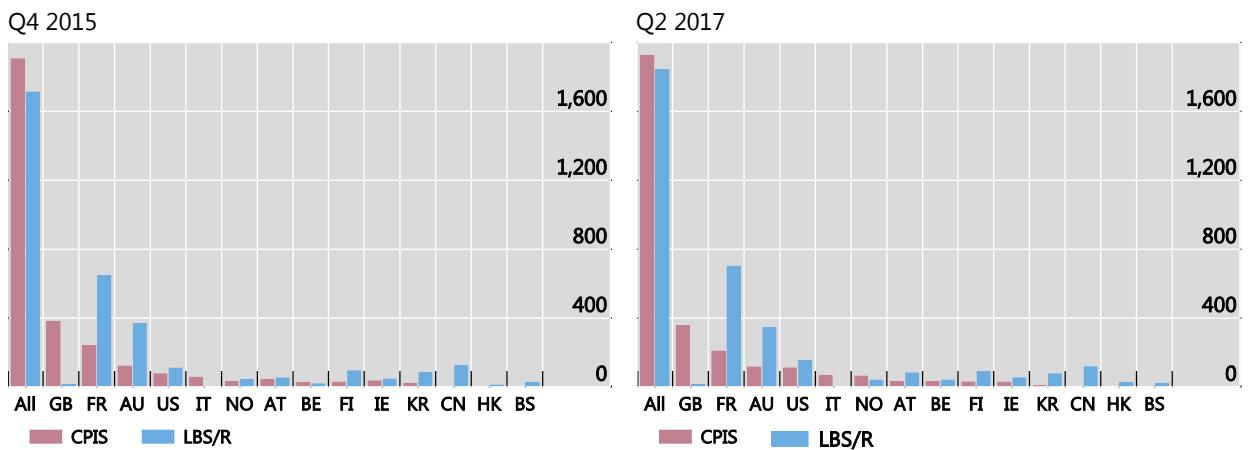
We compare data as of end-December 2015 and end-June 2017<sup>19</sup> (Graph D2) and we demonstrate the results by country in Table D2 (Annex).

<sup>19</sup> The reason for the choice of the first period was that both China and Russia started reporting LBS data from Q4 2015.

## Cross-border debt securities liabilities of banks by issuing country<sup>1</sup>

Amount outstanding; in billions of US dollars

Graph D2



<sup>1</sup> Countries having more 20 billion USD debt securities outstanding by individual counterparty countries either in CPIS or in LBS/R are shown in the graph.

Sources: BIS locational banking statistics by residence (QR June 2018, Released database) and IMF CPIS survey (15 March 2018 release).

Although the gap in partially reported counterparty country breakdown between the CPIS and LBS/R has fallen by over 50% (from USD 193 billion in Q4 2015 to USD 83 billion in Q2 2017) within one and half years, it is surprising to note that the counterparty breakdowns within the LBS/R are underreported by almost 50% of the total cross-border amount (Table D2, columns 3 and 4 versus columns 7 and 8).

In addition, we investigated the gap between the LBS/R and CPIS for the same set of 47 BIS reporting countries. The derived debt securities liabilities of banks from the CPIS should be lower in amount as compared with the reported data in the LBS/R, because the number of reporting countries providing issuing sector breakdown is limited in the CPIS. There are other reasons that could potentially cause differences, even if all CPIS countries reported the breakdown, as encouraged. Differences between the two sources can be partially explained by valuation. In the case of the CPIS, holdings (from which we derived liabilities of banks in counterparty countries) are reported at market values, whereas the guidelines for the LBS/R reporting recommend the use of nominal (or contractual) values rather than market values. It is also recognised that national accounting rules may require different valuation methods for particular positions. However, additional factors probably need to be invoked to explain the large differences.

In our exercise, we find a number of interesting facts: First, the CPIS data suggest that banks in Bahrain, Curaçao, Greece and Singapore issued debt securities liabilities but these countries did not report such liabilities in the BIS LBS/R. Second, countries with large cross-border debt securities liabilities, such as the Cayman Islands, Germany and the United Kingdom, do not report any counterparty country breakdown in the LBS/R (reported as total cross-border) but country breakdowns are available in the mirror CPIS data (holdings of debt securities). Third, about USD 1.6 trillion are reported in LBS/R against unallocated by location (neither residents nor non-residents/cross-border). The countries with significantly large amounts vis-à-vis unallocated by country are, above all, Denmark, Japan, Luxembourg, the Netherlands, Sweden and Switzerland.

The CPIS data on holdings of debt securities (claims) reported by CPIS participating economies vis-à-vis all other economies in the rest of the world (including unallocated) are informative and useful. These claims data by individual counterparty country and by counterparty issuing sector could serve the following needs:

1. They allow the debt securities liabilities of banks in individual countries to be derived vis-à-vis the reporting economies;
2. Reported debt securities liabilities in the LBS/R could be compared with derived debt securities liabilities from the CPIS; and
3. The country breakdown of debt securities liabilities from the CPIS can be used when such a breakdown is not available in the LBS/R, keeping the remaining amount (if any) in the unallocated category. One of the outcomes of this exercise is that the derived country breakdown of debt securities liabilities from the CPIS can be used to enhance data in other data sets (eg the LBS/R).

We also note below some limitations and sources of differences between the two sources:

1. **Frequency** – the CPIS is semi-annual (after 2013) whereas the LBS/R are quarterly.
2. **Vintages** – the CPIS data are available much later than the LBS/R data. Preliminary LBS/R data are available in about 120 days from the reference period but the CPIS data are available only about 250 days from the reference date.
3. **Reporting population** – only 26 countries report holdings of debt securities by issuing sector, whereas debt securities can be held by investors (creditors) in many more countries.
4. **Different sources** – in some cases, the main data sources for the LBS/R are the banks, while for the CPIS custodians and investment managers are the main data providers.
5. **Valuation** – holdings data in the CPIS are valued at market price whereas liabilities in the LBS/R are reported at book value. However, there are exceptions in the LBS/R that some countries report debt securities liabilities on market price (eg China, South Africa).

Finally, it is possible to use the country breakdown of debt securities liabilities from the CPIS and reconcile it with individual positions reported in the LBS/R. In future we plan to undertake such an exercise and demonstrate ways to use CPIS data for the counterparty country allocation of debt securities liabilities. In addition, as suggested by Austrian colleagues, the Centralised Securities Data Base (CSDB) would be also a good benchmark for comparisons within the euro area.

### DS3: Comparison of international debt securities liabilities between the LBS/R and IDS

This section deals with the concepts and the comparison of outstanding debt securities between the LBS/R and IDS. Reporting banks in the LBS/R provide

information on their debt securities liabilities vis-à-vis resident and non-resident (cross-border) counterparties of concerned reporting countries. When banks do not know the residency of the debt holder, they report amounts against an unknown country. In the case of the IDS, total international debt securities outstanding from the banks are obtained using a security-by-security database,

Using reported data in the LBS/R, we assume that banks' international debt securities outstanding are the sum of debt securities liabilities to non-residents (cross-border) in all currencies, and those to residents and unallocated countries in foreign currencies. We exclude all debt securities in domestic currency that are reported vis-à-vis residents as well as vis-à-vis unallocated countries. We explain below some potential conceptual differences between these two mirror sources and also give our views on the motivation for such comparisons, even with known weak links.

The concept in this case is that the aggregated outstanding debt securities liabilities of banks (LBS/R) should be comparable with the debt securities liabilities of banks from the IDS database. In other words, the international debt securities liabilities (LBS/R) of banks located in reporting country " $i$ " should be similar to the outstanding amount of debt securities issued by public and private banks in the country " $i$ " from the IDS databases.

This test can be described by:

$$LBS/R \text{ liabilities}_i^{international \ debt \ securities} \approx International \ liabilities_i^{debt \ securities}$$

We show the results by groups of countries having outstanding debt securities of more than USD 20 billion as of Q4 2017 in either the LBS/R or the IDS (Graph D3). Since 2007, the debt security differences between the IDS and LBS/R have been falling due mainly to the contribution of developed countries. By end-2017, the differences had fallen to 29.4% from 46.4% in 2007.

Table D3 (Annex) shows the results for Q4 2015 and Q4 2017. The reason for the choice of the first period was that China and Russia started reporting LBS data from Q4 2015. Total percentage differences fell from -7.7% (2015) to -6.7% (2017).

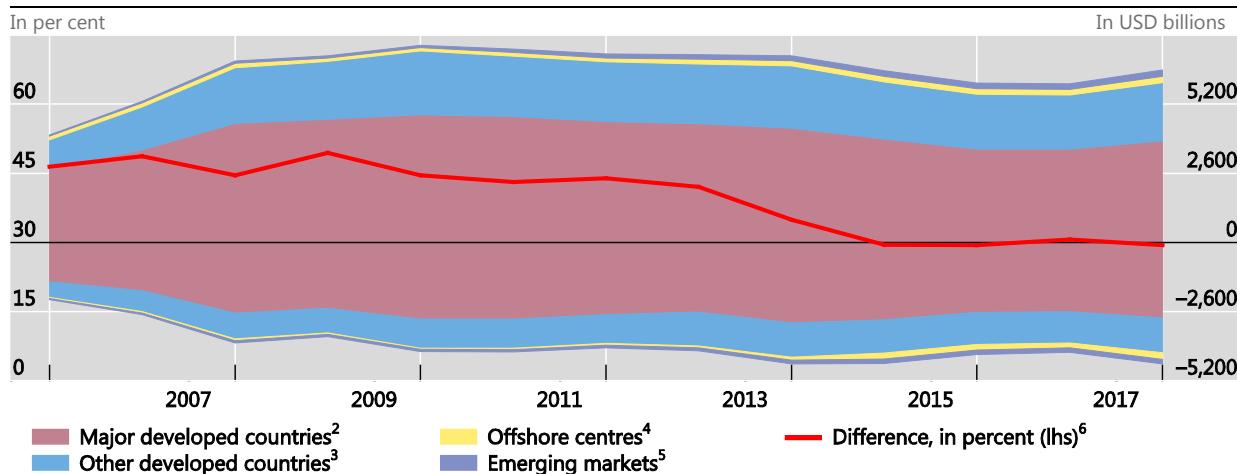
Nevertheless, Table D3 shows large differences for some countries. We examined why amounts in the IDS are always higher for securities denominated in the euro, primarily by banks in the euro area, followed by those denominated in US dollars. IDS statistics are compiled primarily from information on individual securities provided by commercial data sources. Regarding local currency-denominated debt securities (eg euro-denominated in the case of Portugal), the IDS consider a security as international if the governing law is not local and the security is listed on an exchange outside the borders of the country or if the security was issued as a euro bond. Among countries with a lower amount in the LBS/R are some that admittedly underreport debt securities liabilities compared with those in the IDS. There are different reasons for countries having a higher amount in the LBS/R than in the IDS. One reason is that the IDS do not include negotiable loans that are reported as debt securities liabilities in the LBS/R.

In the IDS database, some domestic bonds in local currency are reported as being listed on more than one exchange (for example, in the domestic market and in Luxembourg or London), and other domestic bonds may be subject to a foreign

## International debt securities liabilities of banks in LBS/R reporting countries<sup>1</sup>

By issuer region

Graph D3



<sup>1</sup> Countries that either joined after Q4 2005 or do not have issuance recorded in the IDS or have not reported IDS are excluded. <sup>2</sup> Refers to largest issuers and comprises banks in DE, FR, GB, NL and US. <sup>3</sup> Comprises AU, AT, BE, CA, CH, DK, ES, FI, IE, IT, JP, LU, NO, PT, and SE. <sup>4</sup> Comprises BS, BM, KY, HK, MO and PA. <sup>5</sup> Comprises BR, CL, TW, IN, MX, KR and TR. <sup>6</sup> Percentage differences in amounts between IDS and LBS/R with respect to total IDS of the countries mentioned in footnotes.

Source: BIS locational banking statistics by residence (QR June 2018, Released database) and BIS international debt securities statistics (QR June 2018 release)

governing law (issued abroad). In both cases, they are treated as IDS, whereas the LBS/R excludes domestic local currency securities issued locally.

We are aware of conceptual differences between the two mirror sources. First of all, debt securities in the LBS/R should reflect liabilities to investors/buyers as of the reporting date whereas the BIS IDS reflect outstanding by place of issuance. In the LBS/R, a number of reporting countries assign the issuance country as the country of the debt securities holders in the LBS/R (He and Filková (2018) also note this from the country survey). The main reason is that debt securities are traded in the secondary market, and hence the country of the actual holders is usually unknown to the issuing banks. The difficulty of ascertaining the actual holders is also the reason why a number of countries report debt securities liabilities vis-à-vis unallocated by country. Second, in our comparison we followed the standard definition for the LBS/R, which defines the international positions as those that are vis-à-vis non-residents in any currency and vis-à-vis residents in foreign currencies.

On the other hand, the definition of "international" in the BIS IDS is based primarily on the market of issuance (outside the home market) and governing law (international). We have attempted to compare these two sources for two main reasons. First, issuing banks tend to report debt securities in the LBS/R based primarily on the place of issuance (ie cross-border or a foreign country/market where securities were issued) or those issued in the home country but aimed at foreign investors (eg those denominated in a foreign currency irrespective of place). Second, an increasing number of studies combine international/cross-border deposits positions from the LBS/R with debt securities liabilities from the BIS IDS. We thus opted to test if such combinations of sources are meaningful in view of the fact that deposit or debt securities liabilities in the LBS/R are those vis-à-vis actual creditors of banks whereas the IDS reflect only outstanding issuance.

We summarise below the main reasons for differences between the two data sets:

1. **Concepts** – the concepts differ between the two sources. The IDS measure primary market issuance, whereas the LBS/R liabilities are intended to measure holdings (resident vs non-resident holdings).
2. **Definition** – the definition of “international” differs between the LBS/R and the IDS. In the first case, cross-border securities plus local securities in foreign currencies are treated as international, whereas in the IDS debt securities are classified as international if at least one of the following characteristics differs from the country where the borrower resides: registration domain (ISIN), listing place or governing law.
3. **Sources** – LBS/R data are reported by central banks, whereas IDS data are compiled from commercial sources.

## E. Conclusion

We demonstrate at an aggregate level that data are available from multiple sources, although with differences in coverage and conceptual aspects. Their usefulness will depend on their granularity and on how widely available the data can be made, with a view to providing tools to validate data quality/reconciliation among reporting countries and fill in data gaps including estimation. Furthermore, mirror sources with good data quality would help provide better estimates of positions for and by non-reporting countries. As an example, the securities holding statistics from the CPIS allow users to obtain derived liabilities for about 120 countries. Similarly, the LBS/R allow BoP compilers in many countries to estimate the claims and liabilities of their residents vis-à-vis banks in BIS reporting countries.

Post-crisis, the enhancements approved by the Committee on the Global Financial System have spurred most of the reporting countries to improve data quality and coverage. These countries have closed reporting gaps and provided new breakdowns, and are reporting bilateral data with or without restrictions. The enhanced data have also allowed a better comparison of interbank positions for the first time. We hope that reporting countries will provide not only the recommended breakdowns at a granular level but will also consider providing encouraged breakdowns with lower confidentiality restrictions to relevant international institutions such as the BIS and the IMF.

Finally, it is important to clarify that this work is a first step towards identifying possible data gaps including limitations and confidentiality issues. These we do not intend to highlight, but rather we aim to point out possible ways of looking at the data with a much more consistent approach, making appropriate use of complementary information to fill in incomplete data. Another conclusion is that countries should work closely together in order to help to identify missing data/reporting errors or bilateral asymmetries. Nevertheless, international institutions should also make comparable analyses to help reporting countries identify these situations. In this endeavour, the BIS could play a major role by encouraging and involving reporting countries to reconcile data between mirror sources. This will be no easy task, but if the similarities and differences between different data domains are explored and explained, all data users would be helped towards a better understanding of the correct use and interpretation of statistical data.

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## G. Annex: Statistical tables

| Table      | Description  |
|------------|--|
| Table 1    | Illustration of bilateral interbank claims and liabilities   |
| Table 2    | Illustration for derived total and net interbank claims and liabilities  |
| Table C1.1 | Net bilateral interbank claims by reporting country  |
| Table C1.2 | Net bilateral interbank liabilities by reporting country   |
| Table C2.1 | BIS LBS/N vs BIS CBS/IC: Domestic claims of domestic banks vis-à-vis reporting countries                                       |
| Table C2.2 | BIS LBS/N vs BIS CBS/IC: Local claims in all currencies of domestic banks vis-à-vis reporting countries                        |
| Table C2.3 | BIS LBS/N vs BIS CBS/IC: Local liabilities in local currency of domestic banks vis-à-vis reporting countries                   |
| Table C3.1 | BIS LBS/R vs IMF IIP: Loans claims of deposit-taking corporations excl. central banks  |
| Table C3.2 | BIS LBS/R vs IMF IIP: Deposit liabilities of deposit-taking corporations excl. central banks                                   |
| Table D3.3 | BIS LBS/R vs IMF IIP: Loans and deposits of banks located in Portugal  |
| Table D1   | BIS LBS/R vs IMF IIP: Cross-border debt securities claims of deposit-taking corporations excl. central banks                   |
| Table D2   | BIS LBS/R vs IMF CPIS: Counterparty country breakdown of cross-border debt securities liabilities of banks excl. central banks |
| Table D3   | BIS LBS/R vs BIS IDS : International debt securities liabilities of banks  |
| Table E    | ISO codes and country/jurisdiction names   |

### Illustration of reported bilateral interbank claims/liabilities and derived net interbank claims/liabilities

For simplicity, we assume that there are only three reporting countries: Austria, Belgium and Portugal. Table 1 identifies bilateral claims (loans) and liabilities (deposits) of reporting banks vis-à-vis banks in the other two counterparty reporting countries. The actual reported bilateral positions are unpublished and mostly either restricted or confidential. Using these underlying data, we derived aggregated interbank positions and net positions (Table 2).

| Illustration of bilateral interbank claims and liabilities <sup>1</sup> |                          | Table 1    |                 |
|---|--------------------------|------------|-----------------|
| In USD  |                          |            |                 |
| Reporting country (i)   | Counterparty country (j) | Claims i,j | Liabilities j,i |
| AT: Austria   | PT: Portugal             | 10         | 15              |
| AT: Austria   | BE: Belgium              | 15         | 12              |
| BE: Belgium   | AT: Austria              | 20         | 16              |
| BE: Belgium   | PT: Portugal             | 25         | 28              |
| PT: Portugal  | AT: Austria              | 15         | 24              |
| PT: Portugal  | BE: Belgium              | 35         | 28              |
| Total   |                          | 120        | 123             |

<sup>1</sup> Numbers are for illustration only.

Table 2 also demonstrates that while net interbank claims/liabilities for individual countries might differ, the total net interbank claims must be equal to total net liabilities, of all countries combined.

#### Illustration for derived total and net interbank claims and liabilities

In USD billions

Table 2

| Reporting country (net interbank claims) | Total claims<br>[1] | Comparable liabilities of other countries<br>[2] | Net claims<br>[3] =[1]+[2] |
|--|---------------------|--|----------------------------|
| AT: Austria                              | 25                  | -40  | -15                        |
| BE: Belgium                              | 45                  | -40  | +5                         |
| PT: Portugal                             | 50                  | -43  | +7                         |
| <b>Total</b>                             | <b>120</b>          | <b>-123</b>                                      | <b>-3</b>                  |

| Reporting country (net interbank liabilities) | Total liabilities<br>[4] | Comparable claims of other countries<br>[5] | Net liabilities<br>[6]=[4]+[5] |
|---|--------------------------|---|--------------------------------|
| AT: Austria                                   | 27                       | -35   | -8                             |
| BE: Belgium                                   | 44                       | -50   | -6                             |
| PT: Portugal                                  | 52                       | -35   | +17                            |
| <b>Total</b>                                  | <b>123</b>               | <b>-120</b>                                 | <b>+3</b>                      |

## Net bilateral interbank claims by country

In USD billions

Table C1.1

| Reporting<br>country<br>(ISO Code) | End-2011                    |                                 |                           |  | End-2017                   |                                 |                           |  |
|------------------------------------|-----------------------------|---------------------------------|---------------------------|--|----------------------------|---------------------------------|---------------------------|--|
|                                    | Interbank<br>claims<br>[1]  | Interbank<br>liabilities<br>[2] | Net claims<br>[3]=[1]+[2] | % Net<br>claims<br>[4]=<br>[3]*100/[1] | Interbank<br>claims<br>[5] | Interbank<br>liabilities<br>[6] | Net claims<br>[7]=[5]+[6] | % Net<br>claims<br>[8]=<br>[7]*100/[5] |
|                                    | All<br>(Total) <sup>1</sup> | 14,529.6                        | -14,852.3                 | -322.8                                 | -2.2                       | 10,474.5                        | -10,637.0                 | -162.5                                 |
| GB                                 | 2,890.7                     | -3,097.1                        | -206.3                    | -7.1                                   | 2,280.6                    | -2,248.6                        | 32.0                      | 1.4                                    |
| US                                 | 2,534.1                     | -2,350.4                        | 183.7                     | 7.2                                    | 1,541.8                    | -1,466.2                        | 75.7                      | 4.9                                    |
| DE                                 | 1,074.7                     | -1,175.3                        | -100.5                    | -9.4                                   | 835.3                      | -853.1                          | -17.7                     | -2.1                                   |
| FR                                 | 1,201.1                     | -1,081.5                        | 119.6                     | 10.0                                   | 818.3                      | -848.9                          | -30.5                     | -3.7                                   |
| JP                                 | 612.1                       | -517.5                          | 94.6                      | 15.4                                   | 565.5                      | -542.2                          | 23.3                      | 4.1                                    |
| KY                                 | 1,070.6                     | -1,114.8                        | -44.3                     | -4.1                                   | 560.8                      | -552.5                          | 8.3                       | 1.5                                    |
| HK                                 | 362.2                       | -345.7                          | 16.5                      | 4.6                                    | 489.3                      | -472.8                          | 16.5                      | 3.4                                    |
| NL                                 | 367.0                       | -367.4                          | -0.4                      | -0.1                                   | 384.9                      | -380.0                          | 4.9                       | 1.3                                    |
| LU                                 | 378.8                       | -487.3                          | -108.5                    | -28.6                                  | 288.8                      | -349.1                          | -60.3                     | -20.9                                  |
| SG                                 | 274.1                       | -364.6                          | -90.5                     | -33.0                                  | 281.9                      | -351.9                          | -70.0                     | -24.8                                  |
| CA                                 | 262.1                       | -174.7                          | 87.4                      | 33.3                                   | 268.8                      | -182.6                          | 86.2                      | 32.1                                   |
| SE                                 | 200.5                       | -187.1                          | 13.4                      | 6.7                                    | 236.4                      | -225.7                          | 10.7                      | 4.5                                    |
| BE                                 | 349.4                       | -318.4                          | 31.0                      | 8.9                                    | 224.7                      | -215.4                          | 9.2                       | 4.1                                    |
| CH                                 | 551.0                       | -662.1                          | -111.1                    | -20.2                                  | 200.7                      | -349.9                          | -149.3                    | -74.4                                  |
| IT                                 | 208.9                       | -211.1                          | -2.2                      | -1.1                                   | 163.1                      | -162.6                          | 0.5                       | 0.3                                    |
| ES                                 | 204.3                       | -200.9                          | 3.5                       | 1.7                                    | 139.6                      | -119.2                          | 20.4                      | 14.6                                   |
| DK                                 | 94.8                        | -101.8                          | -7.0                      | -7.4                                   | 134.5                      | -125.2                          | 9.3                       | 6.9                                    |
| JE                                 | 221.4                       | -225.2                          | -3.7                      | -1.7                                   | 125.4                      | -138.0                          | -12.6                     | -10.0                                  |
| IE                                 | 222.5                       | -234.0                          | -11.5                     | -5.2                                   | 120.5                      | -131.0                          | -10.5                     | -8.7                                   |
| AU                                 | 72.6                        | -120.7                          | -48.1                     | -66.2                                  | 116.4                      | -133.6                          | -17.2                     | -14.8                                  |
| GG                                 | 109.1                       | -110.7                          | -1.6                      | -1.5                                   | 93.9                       | -91.8                           | 2.0                       | 2.2                                    |
| TW                                 | 43.5                        | -56.4                           | -12.9                     | -29.8                                  | 81.5                       | -86.9                           | -5.5                      | -6.7                                   |
| BS                                 | 539.6                       | -507.1                          | 32.5                      | 6.0                                    | 81.0                       | -87.5                           | -6.4                      | -7.9                                   |
| NO                                 | 67.4                        | -82.1                           | -14.7                     | -21.9                                  | 47.6                       | -58.1                           | -10.5                     | -22.1                                  |
| FI                                 | 69.0                        | -68.6                           | 0.4                       | 0.5                                    | 43.3                       | -45.9                           | -2.6                      | -6.0                                   |
| Others(19)                         | 547.9                       | -689.9                          | -142.0                    | -25.9                                  | 349.8                      | -418.0                          | -68.2                     | -19.5                                  |

<sup>1</sup> Total of all 44 BIS reporting countries, excluding CN, PH and RU. These three countries (CN, PH and RU) were excluded from bilateral pairs and we kept the other comparable 44 reporting countries in both periods (Q4 2011 and Q4 2017). Of the 25 countries in shown in the table, net interbank claims improved for 16 countries between 2011 and 2017, and also for nine of the other 19 countries.

Source: BIS locational banking statistics by residence (QR June 2018, Released database).

## Net bilateral interbank liabilities by country

In USD billions

Table C1.2

| Reporting<br>country<br>(ISO Code) | End-2011                        |                            |                                   |   | End-2017                        |                            |                                   |   |
|------------------------------------|---------------------------------|----------------------------|-----------------------------------|---|---------------------------------|----------------------------|-----------------------------------|---|
|                                    | Interbank<br>liabilities<br>[1] | Interbank<br>claims<br>[2] | Net<br>liabilities<br>[3]=[1]+[2] | % Net<br>liabilities<br>[4]=[3]*100/[1] | Interbank<br>liabilities<br>[5] | Interbank<br>claims<br>[6] | Net<br>liabilities<br>[7]=[5]+[6] | % Net<br>liabilities<br>[8]=[7]*100/[5] |
|                                    | All<br>(Total) <sup>1</sup>     | 14,852.3                   | -14,529.6                         | 322.8                                   | 2.2                             | 10,637.0                   | -10,474.5                         | 162.5                                   |
| GB                                 | 3,042.5                         | -3,113.9                   | -71.4                             | -2.3                                    | 1,820.2                         | -1,730.5                   | 89.7                              | 4.9                                     |
| US                                 | 2,694.5                         | -2,484.2                   | 210.3                             | 7.8                                     | 1,796.4                         | --1,658.7                  | 137.6                             | 7.7                                     |
| JP                                 | 781.9                           | -579.9                     | 202.0                             | 25.8                                    | 1,030.9                         | -841.4                     | 189.5                             | 18.4                                    |
| FR                                 | 1,240.5                         | -935.6                     | 304.9                             | 24.6                                    | 793.2                           | -912.6                     | -119.4                            | -15.1                                   |
| DE                                 | 702.0                           | -769.4                     | -67.4                             | -9.6                                    | 672.6                           | -684.2                     | -11.6                             | -1.7                                    |
| KY                                 | 831.6                           | -870.4                     | -38.8                             | -4.7                                    | 512.2                           | -500.7                     | 11.5                              | 2.2                                     |
| HK                                 | 368.3                           | -329.0                     | 39.4                              | 10.7                                    | 410.1                           | -399.2                     | 10.9                              | 2.7                                     |
| NL                                 | 451.7                           | -495.7                     | -44.0                             | -9.7                                    | 377.3                           | -416.4                     | -39.1                             | -10.4                                   |
| SG                                 | 305.6                           | -430.6                     | -125.0                            | -40.9                                   | 369.4                           | -461.5                     | -92.1                             | -24.9                                   |
| CH                                 | 341.2                           | -427.8                     | -86.6                             | -25.4                                   | 327.6                           | -346.2                     | -18.6                             | -5.7                                    |
| IT                                 | 402.4                           | -394.0                     | 8.4                               | 2.1                                     | 264.9                           | -277.6                     | -12.6                             | -4.8                                    |
| LU                                 | 382.6                           | -452.0                     | -69.4                             | -18.1                                   | 239.8                           | -210.0                     | 29.8                              | 12.4                                    |
| ES                                 | 389.5                           | -352.0                     | 37.5                              | 9.6                                     | 205.7                           | -157.7                     | 48.0                              | 23.3                                    |
| CA                                 | 249.3                           | -227.6                     | 21.7                              | 8.7                                     | 193.4                           | -199.6                     | -6.2                              | -3.2                                    |
| BE                                 | 229.6                           | -201.1                     | 28.4                              | 12.4                                    | 170.1                           | -149.0                     | 21.1                              | 12.4                                    |
| SE                                 | 164.4                           | -143.6                     | 20.8                              | 12.6                                    | 158.6                           | -170.7                     | -12.1                             | -7.6                                    |
| NO                                 | 127.8                           | -148.7                     | -20.8                             | -16.3                                   | 131.9                           | -143.9                     | -12.1                             | -9.2                                    |
| AU                                 | 110.5                           | -162.0                     | -51.5                             | -46.6                                   | 128.5                           | -167.5                     | -39.0                             | -30.3                                   |
| FI                                 | 179.0                           | -148.4                     | 30.6                              | 17.1                                    | 112.9                           | -99.8                      | 13.2                              | 11.7                                    |
| BR                                 | 103.9                           | -94.3                      | 9.6                               | 9.3                                     | 102.9                           | -74.0                      | 28.9                              | 28.1                                    |
| IE                                 | 347.0                           | -264.4                     | 82.5                              | 23.8                                    | 102.3                           | -108.8                     | -6.5                              | -6.4                                    |
| TW                                 | 56.5                            | -62.2                      | -5.7                              | -10.0                                   | 90.1                            | -83.9                      | 6.2                               | 6.9                                     |
| DK                                 | 128.9                           | -110.1                     | 18.8                              | 14.6                                    | 86.0                            | -82.5                      | 3.5                               | 4.0                                     |
| TR                                 | 55.9                            | -57.9                      | -2.0                              | -3.5                                    | 72.0                            | -73.8                      | -1.9                              | -2.6                                    |
| BS                                 | 434.4                           | -446.8                     | -12.4                             | -2.8                                    | 65.0                            | -56.3                      | 8.7                               | 13.4                                    |
| Others(19)                         | 730.8                           | -828.1                     | -97.3                             | -13.3                                   | 403.1                           | -468.0                     | -64.9                             | -16.1                                   |

<sup>1</sup> Total of all 44 BIS reporting countries, excluding CN, PH and RU. These three countries (CN, PH and RU) were excluded from bilateral pairs and we kept the other comparable 44 reporting countries in both periods (Q4 2011 and Q4 2017). Of the 25 countries in shown in the table, net interbank liabilities improved for 19 countries between 2011 and 2017, and also for eight of the other 19 countries.

Source: BIS locational banking statistics by residence (QR June 2018, Released database).

BIS LBS/N vs BIS CBS/IC – domestic claims of domestic banks vis-à-vis reporting countries<sup>1</sup>

Excluding intragroup claims, amounts outstanding in USD billions

Table C2.1

| Parent /reporting country | Q4 2014                  |                 | Q4 2017         |                 | Difference (amount)<br>(LBS/N – CBS/IC) |                        | Difference (percentage)       |                               |
|---------------------------|--------------------------|-----------------|-----------------|-----------------|---|------------------------|-------------------------------|-------------------------------|
|                           | LBS/N<br>[1]             | CBS/IC<br>[2]   | LBS/N<br>[3]    | CBS/IC<br>[4]   | Q4 2014<br>[5] =[1]-[2]                 | Q4 2017<br>[6]=[3]-[4] | Q4 2014<br>[7] = [5]*100 /[1] | Q4 2017<br>[8] = [6]*100 /[3] |
|                           | <b>Total<sup>2</sup></b> | <b>46,119.0</b> | <b>38,454.3</b> | <b>51,196.4</b> | <b>43,055.9</b>                         | <b>7,664.8</b>         | <b>8,140.5</b>                | <b>16.6</b>                   |
| AT                        | 532.6                    | 371.1           | 492.2           | 407.6           | 161.5                                   | 84.6                   | 30.3                          | 17.2                          |
| BE                        | 286.6                    | 266.2           | 357.1           | 331.4           | 20.4                                    | 25.7                   | 7.1                           | 7.2                           |
| CA                        | 1,954.0                  | 1,943.3         | 2,085.8         | 2,064.5         | 10.7                                    | 21.3                   | 0.5                           | 1.0                           |
| CH                        | 1,165.3                  | 1,172.4         | 1,382.9         | 1,390.0         | -7.1                                    | -7.1                   | -0.6                          | -0.5                          |
| CL                        | 170.6                    | 173.6           | 191.8           | 191.5           | -3.0                                    | 0.4                    | -1.8                          | 0.2                           |
| DE                        | 5,447.3                  | 5,222.8         | 5,568.5         | 5,435.1         | 224.5                                   | 133.4                  | 4.1                           | 2.4                           |
| DK                        | 676.3                    | 629.2           | 685.7           | 624.5           | 47.1                                    | 61.3                   | 7.0                           | 8.9                           |
| ES                        | 2,357.4                  | 2,164.1         | 2,090.4         | 1,943.4         | 193.3                                   | 147.0                  | 8.2                           | 7.0                           |
| FI                        | 165.1                    | 78.0            | 198.1           | 101.2           | 87.1                                    | 97.0                   | 52.8                          | 48.9                          |
| FR                        | 4,051.1                  | 3,761.8         | 4,602.1         | 4,426.4         | 289.3                                   | 175.7                  | 7.1                           | 3.8                           |
| GB                        | 4,981.1                  | 2,701.2         | 5,130.9         | 2,674.9         | 2,279.8                                 | 2,455.9                | 45.8                          | 47.9                          |
| GR                        | 289.9                    | 298.6           | 247.6           | 257.1           | -8.7                                    | -9.5                   | -3.0                          | -3.8                          |
| IE                        | 230.4                    | 208.0           | 184.5           | 165.9           | 22.4                                    | 18.6                   | 9.7                           | 10.1                          |
| IT                        | 3,304.5                  | 2,893.1         | 3,133.1         | 2,739.9         | 411.4                                   | 393.2                  | 12.4                          | 12.6                          |
| JP                        | 15,498.6                 | 11,913.0        | 19,272.8        | 15,123.6        | 3,585.7                                 | 4,149.2                | 23.1                          | 21.5                          |
| KR                        | 1,553.7                  | 1,533.0         | 1,873.2         | 1,853.5         | 20.6                                    | 19.7                   | 1.3                           | 1.1                           |
| NL                        | 1,623.0                  | 1,436.2         | 1,619.4         | 1,401.3         | 186.8                                   | 218.1                  | 11.5                          | 13.5                          |
| SE                        | 761.0                    | 695.7           | 770.8           | 722.9           | 65.4                                    | 47.9                   | 8.6                           | 6.2                           |
| TW                        | 1,070.5                  | 993.0           | 1,309.4         | 1,201.3         | 77.5                                    | 108.1                  | 7.2                           | 8.3                           |
| HK                        | 57.9                     | ...             | 65.9            | ...             |   |                        |                               |                               |
| LU                        | 52.4                     | ...             | 62.9            | ...             |   |                        |                               |                               |
| NO                        | 326.1                    | ...             | 314.8           | ...             |   |                        |                               |                               |
| AU                        | 2,294.7                  | NA              | 2,282.0         | 2,133.8         |   |                        |                               |                               |
| BR                        | 1,943.4                  | NA              | 1,722.5         | NA              |   |                        |                               |                               |
| IN                        | 1,622.0                  | NA              | 2,046.7         | NA              |   |                        |                               |                               |
| MX                        | 162.2                    | NA              | 170.2           | NA              |   |                        |                               |                               |
| PA                        | NA                       | NA              | NA              | NA              |   |                        |                               |                               |

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BIS LBS/N vs BIS CBS/IC – domestic claims of domestic banks vis-à-vis reporting countries<sup>1</sup> (cont.)

Excluding intragroup claims, amounts outstanding in USD billions

Table C2.1

| Parent /reporting country | Q4 2014      |               | Q4 2017      |               | Difference (amount)<br>(LBS/N – CBS/IC) |                        | Difference (percentage)       |                               |
|---------------------------|--------------|---------------|--------------|---------------|---|------------------------|-------------------------------|-------------------------------|
|                           | LBS/N<br>[1] | CBS/IC<br>[2] | LBS/N<br>[3] | CBS/IC<br>[4] | Q4 2014<br>[5] = [1]-[2]                | Q4 2017<br>[6]=[3]-[4] | Q4 2014<br>[7] = [5]*100 /[1] | Q4 2017<br>[8] = [6]*100 /[3] |
|                           | PT           | 364.0         | NA           | 263.5         | 224.0                                   |                        |                               |                               |
| SG                        | NA           | NA            | NA           | 378.7         |   |                        |                               |                               |
| TR                        | NA           | 666.2         | NA           | 595.2         |   |                        |                               |                               |
| US <sup>3</sup>           | \$\$\$       | 10,062.7      | \$\$\$       | 10,929.3      |   |                        |                               |                               |

<sup>1</sup> NA stands for data either not available or not derived because the home reporting country itself does not report either or both in local or foreign currency (See Section LD2); three dots ("...") stand for suppressed (ie restricted or confidential). <sup>2</sup> Only for countries from AT to TW. <sup>3</sup> The United States does not report local claims/liabilities vis-à-vis residents in LBS/N. The domestic claims of US banks in other BIS LBS reporting countries vis-à-vis US residents were \$495 billion and \$377 billion as of Q4 2014 and Q4 2017 respectively (shown as " \$\$ " and not included in the total).

Sources: BIS locational banking statistics by nationality and BIS consolidated banking statistics on an immediate counterparty basis ((QR June 2018, Released database for both sources).

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BIS LBS/N vs BIS CBS/IC – local claims in all currencies of domestic banks vis-à-vis reporting countries<sup>1</sup>

Excluding intragroup claims, amount outstanding in USD billions

Table C2.2

| Parent /reporting country | Q4 2014                  |                 | Q4 2017         |                 | Difference (amount)<br>(LBS/N – CBS/IC) |                        | Difference (percentage) |                        |
|---------------------------|--------------------------|-----------------|-----------------|-----------------|---|------------------------|-------------------------|------------------------|
|                           | LBS/N<br>[1]             | CBS/IC<br>[2]   | LBS/N<br>[3]    | CBS/IC<br>[4]   | Q4 2014<br>[5]=[1]–[2]                  | Q4 2017<br>[6]=[3]–[4] | Q4 2014<br>[5]*100/[1]  | Q4 2017<br>[6]*100/[3] |
|                           | <b>Total<sup>2</sup></b> | <b>29,123.6</b> | <b>25,520.7</b> | <b>30,731.6</b> | <b>27,015.4</b>                         | <b>3,602.9</b>         | <b>3,716.3</b>          | <b>12.4</b>            |
| BE                        | 277.7                    | 263.9           | 352.6           | 330.1           | 13.8                                    | 22.6                   | 5.0                     | 6.4                    |
| CA                        | 1,916.7                  | 1,916.7         | 2,042.0         | 2,042.0         | 0.0                                     | 0.0                    | 0.0                     | 0.0                    |
| CH                        | 1,145.9                  | 1,156.7         | 1,351.0         | 1,371.9         | -10.8                                   | -20.9                  | -0.9                    | -1.5                   |
| CL                        | 170.6                    | 172.7           | 191.8           | 190.9           | -2.1                                    | 0.9                    | -1.2                    | 0.5                    |
| DE                        | 5,276.7                  | 5,166.9         | 5,475.1         | 5,373.5         | 109.7                                   | 101.6                  | 2.1                     | 1.9                    |
| DK                        | 661.0                    | 628.1           | 653.8           | 622.0           | 32.8                                    | 31.8                   | 5.0                     | 4.9                    |
| ES                        | 2,327.3                  | 2,160.0         | 2,073.3         | 1,937.3         | 167.3                                   | 136.0                  | 7.2                     | 6.6                    |
| FI                        | 165.1                    | 78.0            | 198.1           | 100.9           | 87.1                                    | 97.3                   | 52.8                    | 49.1                   |
| FR                        | 3,903.0                  | 3,611.2         | 4,506.2         | 4,329.4         | 291.8                                   | 176.8                  | 7.5                     | 3.9                    |
| GB                        | 4,845.9                  | 2,632.5         | 5,028.5         | 2,635.9         | 2,213.5                                 | 2,392.6                | 45.7                    | 47.6                   |
| GR                        | 287.2                    | 296.4           | 246.5           | 255.5           | -9.3                                    | -8.9                   | -3.2                    | -3.6                   |
| IT                        | 3,249.9                  | 2,856.0         | 3,091.5         | 2,707.5         | 393.9                                   | 384.0                  | 12.1                    | 12.4                   |
| KR                        | 1,546.8                  | 1,530.4         | 1,868.8         | 1,848.2         | 16.5                                    | 20.6                   | 1.1                     | 1.1                    |
| NL                        | 1,584.4                  | 1,417.0         | 1,599.2         | 1,370.8         | 167.4                                   | 228.4                  | 10.6                    | 14.3                   |
| SE                        | 699.1                    | 658.8           | 748.6           | 704.5           | 40.3                                    | 44.0                   | 5.8                     | 5.9                    |
| TW                        | 1,066.2                  | 975.1           | 1,304.5         | 1,195.0         | 91.1                                    | 109.5                  | 8.5                     | 8.4                    |
| HK                        | 57.2                     | ...             | ...             | ...             | ...                                     | ...                    | ...                     | ...                    |
| IE                        | ...                      | 206.7           | ...             | 165.5           | ...                                     | ...                    | ...                     | ...                    |
| LU                        | ...                      | ...             | 61.2            | ...             | ...                                     | ...                    | ...                     | ...                    |
| NO                        | ...                      | ...             | ...             | ...             | ...                                     | ...                    | ...                     | ...                    |
| AT                        | 532.3                    | NA              | 491.5           | 406.0           | ...                                     | ...                    | ...                     | ...                    |
| AU                        | 2,269.2                  | NA              | 2,252.5         | 2,009.1         | ...                                     | ...                    | ...                     | ...                    |
| BR                        | 1,882.6                  | NA              | 1,677.1         | NA              | ...                                     | ...                    | ...                     | ...                    |
| IN                        | ...                      | NA              | ...             | NA              | ...                                     | ...                    | ...                     | ...                    |
| JP                        | 15,449.0                 | NA              | 19,210.5        | NA              | ...                                     | ...                    | ...                     | ...                    |
| MX                        | 159.0                    | NA              | 164.0           | NA              | ...                                     | ...                    | ...                     | ...                    |
| PA                        | NA                       | NA              | NA              | NA              | ...                                     | ...                    | ...                     | ...                    |
| PT                        | ...                      | NA              | ...             | NA              | ...                                     | ...                    | ...                     | ...                    |
| SG                        | NA                       | NA              | NA              | NA              | ...                                     | ...                    | ...                     | ...                    |
| TR                        | NA                       | NA              | NA              | NA              | ...                                     | ...                    | ...                     | ...                    |
| US                        | NA                       | 9,849.4         | NA              | 10,728.9        | ...                                     | ...                    | ...                     | ...                    |

<sup>1</sup> Local claims in currencies on residents of the reporting country by their domestic banks. See additional details in explanatory texts. Cells with "NA" mean data are not reported or not reported and three dots ("...") mean they are suppressed (ie either restricted or confidential).

<sup>2</sup> Only for countries from BE to TW, ie does not include suppressed values or those not available in both data sets in either of the periods.

Sources: BIS locational banking statistics by nationality and BIS consolidated banking statistics on an immediate counterparty basis (QR June 2018, Released database for both sources).

BIS LBS/N vs BIS CBS/IC – local liabilities of domestic banks vis-à-vis reporting countries<sup>1</sup>

Excluding intragroup liabilities, amount outstanding in USD billions

Table C2.3

| Parent /reporting country | Q4 2014                  |                 | Q4 2017         |                 | Difference (amount)<br>(LBS/N – CBS/IC) |                        | Difference (percentage) |                        |
|---------------------------|--------------------------|-----------------|-----------------|-----------------|---|------------------------|-------------------------|------------------------|
|                           | LBS/N<br>[1]             | CBS/IC<br>[2]   | LBS/N<br>[3]    | CBS/IC<br>[4]   | Q4 2014<br>[5]=[1]–[3]                  | Q4 2017<br>[6]=[2]–[4] | Q4 2014<br>[5]*100/[1]  | Q4 2017<br>[6]*100/[2] |
|                           | <b>Total<sup>2</sup></b> | <b>22,505.7</b> | <b>17,345.8</b> | <b>23,748.5</b> | <b>18,382.9</b>                         | <b>5,159.8</b>         | <b>5,365.6</b>          | <b>22.9</b>            |
| BE                        | 297.9                    | 267.0           | 355.8           | 315.6           | 30.9                                    | 40.2                   | 10.4                    | 11.3                   |
| CA                        | 1,256.7                  | 1,177.0         | 1,393.2         | 1,310.4         | 79.6                                    | 82.8                   | 6.3                     | 5.9                    |
| CH                        | 833.3                    | 837.0           | 933.2           | 935.6           | -3.7                                    | -2.4                   | -0.4                    | -0.3                   |
| CL                        | 128.7                    | 123.4           | 146.2           | 141.6           | 5.3                                     | 4.6                    | 4.1                     | 3.1                    |
| DE                        | 5,016.5                  | 4,340.4         | 5,160.6         | 4,545.5         | 676.1                                   | 615.0                  | 13.5                    | 11.9                   |
| DK                        | 161.9                    | 160.9           | 171.0           | 163.5           | 1.0                                     | 7.5                    | 0.6                     | 4.4                    |
| ES                        | 1,900.5                  | 2,038.1         | 1,914.6         | 1,894.5         | -137.6                                  | 20.1                   | -7.2                    | 1.1                    |
| FI                        | 102.0                    | 36.1            | 117.6           | 52.7            | 65.9                                    | 64.9                   | 64.6                    | 55.2                   |
| FR                        | 3,618.0                  | 2,102.2         | 3,873.3         | 2,332.8         | 1,515.9                                 | 1,540.5                | 41.9                    | 39.8                   |
| GB                        | 3,851.0                  | 1,873.1         | 4,076.6         | 2,062.8         | 1,977.9                                 | 2,013.8                | 51.4                    | 49.4                   |
| GR                        | 267.0                    | 263.9           | 194.9           | 192.6           | 3.1                                     | 2.3                    | 1.2                     | 1.2                    |
| IT                        | 3,256.4                  | 2,451.1         | 3,186.8         | 2,429.0         | 805.3                                   | 757.7                  | 24.7                    | 23.8                   |
| KR                        | 1,286.5                  | 1,286.5         | 1,585.2         | 1,585.2         | 0.0                                     | 0.0                    | 0.0                     | 0.0                    |
| LU                        | 48.6                     | 48.8            | 58.3            | 58.4            | -0.2                                    | -0.1                   | -0.3                    | -0.2                   |
| SE                        | 480.8                    | 340.4           | 581.4           | 362.9           | 140.3                                   | 218.5                  | 29.2                    | 37.6                   |
| HK                        | 58.2                     | ...             | 68.5            | ...             |   |                        |                         |                        |
| IE                        | ...                      | 135.8           | ...             | 137.6           |   |                        |                         |                        |
| NL                        | ...                      | ...             | ...             | ...             |   |                        |                         |                        |
| NO                        | ...                      | ...             | ...             | ...             |   |                        |                         |                        |
| AT                        | 463.6                    | NA              | 440.6           | 317.4           |   |                        |                         |                        |
| AU                        | 1,790.1                  | NA              | 1,759.7         | 1,514.7         |   |                        |                         |                        |
| BR                        | 1,692.1                  | NA              | 1,542.8         | NA              |   |                        |                         |                        |
| IN                        | 1,464.4                  | NA              | ...             | NA              |   |                        |                         |                        |
| JP                        | 16,078.2                 | NA              | 20,115.9        | NA              |   |                        |                         |                        |
| MX                        | 121.2                    | NA              | 122.5           | NA              |   |                        |                         |                        |
| PA                        | NA                       | NA              | NA              | NA              |   |                        |                         |                        |
| PT                        | ...                      | NA              | ...             | ...             |   |                        |                         |                        |
| SG                        | NA                       | NA              | NA              | ...             |   |                        |                         |                        |
| TR                        | NA                       | 0.1             | NA              | 0.4             |   |                        |                         |                        |
| TW                        | 1,018.6                  | NA              | 1,171.5         | NA              |   |                        |                         |                        |
| US                        | NA                       | NA              | NA              | NA              |   |                        |                         |                        |

<sup>1</sup> Local liabilities in local currency to residents of reporting countries by domestic banks located in the same country of residence of the reporting banking office. See additional details in explanatory texts. Cells with "NA" mean data are not reported and three dots ("...") mean they are suppressed (ie either restricted or confidential). <sup>2</sup> Only for countries from BE to SE, ie does not include suppressed values or those not available in both data sets in either of the periods.

Sources: BIS locational banking statistics by nationality and BIS consolidated banking statistics on an immediate counterparty basis (QR June 2018, Released database for both sources).

BIS LBS/R vs IMF IIP – loans claims of deposit-taking corporations except central bank<sup>1</sup>

Comparison BIS LBS/R and IMF IIP by country, in USD billions

Table C3.1

| Country                  | Q4 2014         |                 | Q4 2017         |                 | Difference (amount)<br>(IIP – LBS/R) |                 | Differences<br>(percentage) |             |
|--------------------------|-----------------|-----------------|-----------------|-----------------|--------------------------------------|-----------------|-----------------------------|-------------|
|                          | IIP             | LBS/R           | IIP             | LBS/R           | Q4 2014                              | Q4 2017         | Q4 2014                     | Q4 2017     |
|                          | [1]             | [2]             | [3]             | [4]             | [5]=[1]–[2]                          | [6]=[3]–[4]     | [5]*100/[1]                 | [6]*100/[3] |
| <b>Total<sup>2</sup></b> | <b>15,173.7</b> | <b>16,220.8</b> | <b>14,810.1</b> | <b>16,163.5</b> | <b>-1,047.1</b>                      | <b>-1,353.4</b> | <b>-6.9</b>                 | <b>-9.1</b> |
| AU                       | 236.8           | 187.0           | 236.2           | 238.9           | 49.8                                 | -2.7            | 21.0                        | -1.2        |
| AT                       | 214.2           | 211.5           | 166.5           | 163.6           | 2.7                                  | 2.9             | 1.2                         | 1.7         |
| BE                       | 367.8           | 372.0           | 338.8           | 341.7           | -4.2                                 | -2.9            | -1.1                        | -0.9        |
| BM <sup>3</sup>          | 3.0             | 4.6             | 2.6             | 3.6             | -1.6                                 | -1.0            | -53.7                       | -40.5       |
| BR                       | 17.1            | 46.8            | 8.5             | 26.0            | -29.7                                | -17.5           | --173.6                     | -205.3      |
| CA                       | 257.7           | 419.0           | 347.9           | 537.6           | -161.3                               | -189.7          | -62.6                       | -54.5       |
| CL                       | 9.1             | 9.6             | 7.0             | 7.5             | -0.5                                 | -0.5            | -5.4                        | -7.8        |
| HK <sup>4</sup>          | 825.3           | 859.8           | 967.0           | 974.6           | -34.5                                | -7.6            | -4.2                        | -0.8        |
| CY                       | 26.1            | 26.5            | 17.8            | 19.4            | -0.4                                 | -1.6            | -1.7                        | -8.9        |
| DK                       | 153.1           | 149.1           | 193.1           | 189.4           | 4.0                                  | 3.7             | 2.6                         | 1.9         |
| FI                       | 129.3           | 128.7           | 49.0            | 49.0            | 0.6                                  | 0.0             | 0.5                         | 0.1         |
| FR                       | 1,441.7         | 1,457.9         | 1,456.8         | 1,474.7         | -16.2                                | -17.9           | -1.1                        | -1.2        |
| DE                       | 1,594.9         | 1,594.2         | 1,443.8         | 1,442.9         | 0.7                                  | 0.9             | 0.0                         | 0.1         |
| GR                       | 38.0            | 36.5            | 21.4            | 20.8            | 1.5                                  | 0.6             | 4.0                         | 2.6         |
| IN                       | 11.4            | 31.1            | 20.3            | 60.5            | -19.7                                | -40.2           | -172.8                      | -198.6      |
| ID                       | 9.7             | 9.3             | 11.6            | 11.2            | 0.4                                  | 0.4             | 4.4                         | 3.4         |
| IE                       | 220.0           | 220.0           | 191.8           | 194.9           | 0.0                                  | -3.1            | 0.0                         | -1.6        |
| IT                       | 234.2           | 226.4           | 247.8           | 249.0           | 7.8                                  | -1.2            | 3.3                         | -0.5        |
| JP                       | 690.5           | 688.5           | 758.2           | 784.5           | 2.0                                  | -26.3           | 0.3                         | -3.5        |
| KR                       | 117.5           | 136.3           | 134.4           | 157.9           | -18.8                                | -23.5           | -16.0                       | -17.5       |
| LU                       | 531.3           | 531.5           | 479.5           | 479.4           | -0.2                                 | 0.1             | 0.0                         | 0.0         |
| MX                       | 10.3            | 10.0            | 11.8            | 16.4            | 0.3                                  | -4.6            | 3.0                         | -38.6       |
| NL                       | 763.4           | 762.8           | 765.1           | 764.1           | 0.6                                  | 1.0             | 0.1                         | 0.1         |
| NO                       | 116.0           | 110.5           | 109.0           | 106.1           | 5.5                                  | 2.9             | 4.7                         | 2.7         |
| PA                       | 39.8            | 42.4            | 36.5            | 37.9            | -2.6                                 | -1.4            | -6.4                        | -3.9        |
| PH                       | 14.7            | 14.7            | 15.3            | 16.4            | 0.0                                  | -1.1            | 0.0                         | -7.1        |
| PT                       | 52.5            | 52.7            | 29.3            | 30.8            | -0.2                                 | -1.5            | -0.4                        | -5.2        |
| RU                       | 189.5           | 189.5           | 134.2           | 134.5           | 0.0                                  | -0.3            | 0.0                         | -0.2        |
| ZA                       | 33.3            | 32.9            | 32.7            | 32.5            | 0.4                                  | 0.2             | 1.3                         | 0.5         |
| ES                       | 195.0           | 200.3           | 226.5           | 262.3           | -5.3                                 | -35.8           | -2.7                        | -15.8       |

BIS LBS/R vs IMF IIP – loans claims of deposit-taking corporations except central bank<sup>1</sup> (cont.)

Comparison BIS LBS/R and IMF IIP by country, in USD billions

Table C3.1

| Country         | Q4 2014 |         | Q4 2017 |         | Difference (amount)<br>(IIP – LBS/R) |             | Differences<br>(percentage) |             |
|-----------------|---------|---------|---------|---------|--------------------------------------|-------------|-----------------------------|-------------|
|                 | IIP     | LBS/R   | IIP     | LBS/R   | Q4 2014                              | Q4 2017     | Q4 2014                     | Q4 2017     |
|                 | [1]     | [2]     | [3]     | [4]     | [5]=[1]–[2]                          | [6]=[3]–[4] | [5]*100/[1]                 | [6]*100/[3] |
| SE              | 312.7   | 300.0   | 349.4   | 331.4   | 12.7                                 | 18.0        | 4.0                         | 5.1         |
| CH              | 541.5   | 453.6   | 455.0   | 438.5   | 87.9                                 | 16.5        | 16.2                        | 3.6         |
| TR              | 26.5    | 19.9    | 41.8    | 35.3    | 6.6                                  | 6.5         | 24.9                        | 15.6        |
| GB <sup>5</sup> | 3,989.0 | 4,030.7 | 3,690.7 | 3,740.0 | -41.7                                | -49.3       | -1.0                        | -1.3        |
| US              | 1,760.8 | 2,654.5 | 1,813.0 | 2,790.2 | -893.7                               | -977.2      | -50.8                       | -53.9       |

<sup>1</sup> Claims in IIP comprise "Other investments" on account of currency and deposits, and loans of deposit corporations excluding central banks, which is similar to LBS/R instrument G "Loans and deposits" including currency balances. <sup>2</sup> For the purposes of comparison, LBS/R total in Q4 2014 includes IIP amounts for PH and RU as both countries started reporting after Q4 2014 (PH from Q4 2016 and RU from Q4 2015). <sup>3</sup> Reports IIP data at annual frequency (Q4 of each year). <sup>4</sup> Data for Q4 2017 relate to that of Q4 2016 for both LBS/R and IIP (as IIP data not available for Q4 2017). <sup>5</sup> Data for Q4 2017 relate to that of Q4 2015 for both LBS/R and IIP (as IIP data not available for Q4 2016 and Q4 2017).

Sources: BIS locational banking statistics by residence (QR June 2018, Released database) and IMF IIP data from data set "Balance of Payments (BoP), 2018 M06" release.

BIS LBS/R vs IMF IIP – deposit liabilities of deposit-taking corporations excl.  
central bank<sup>1</sup>

Comparison BIS LBS/R and IMF IIP by country, in USD billions

Table C3.2

| Country                  | Q4 2014         |                 | Q4 2017         |                 | Difference (amount)<br>(IIP – LBS/R) |                 | Differences<br>(percentage) |             |
|--------------------------|-----------------|-----------------|-----------------|-----------------|--------------------------------------|-----------------|-----------------------------|-------------|
|                          | IIP             | LBS/R           | IIP             | LBS/R           | Q4 2014                              | Q4 2017         | Q4 2014                     | Q4 2017     |
|                          | [1]             | [2]             | [3]             | [4]             | [5]=[1]–[2]                          | [6]=[3]–[4]     | [5]*100/[1]                 | [6]*100/[3] |
| <b>Total<sup>2</sup></b> | <b>16,376.0</b> | <b>17,642.2</b> | <b>16,125.5</b> | <b>17,207.9</b> | <b>-1,266.2</b>                      | <b>-1,082.4</b> | <b>-7.7</b>                 | <b>-6.7</b> |
| AU                       | 204.4           | 174.0           | 239.1           | 216.2           | 30.4                                 | 22.9            | 14.9                        | 9.6         |
| AT                       | 130.2           | 128.4           | 96.9            | 95.2            | 1.8                                  | 1.7             | 1.4                         | 1.8         |
| BE                       | 331.2           | 344.4           | 302.1           | 301.6           | -13.2                                | 0.5             | -4.0                        | 0.2         |
| BM <sup>3</sup>          | 6.6             | 2.0             | 6.6             | 3.3             | 4.6                                  | 3.3             | 69.8                        | 50.2        |
| BR                       | 115.4           | 130.2           | 95.0            | 105.6           | -14.8                                | -10.6           | -12.8                       | -11.1       |
| CA                       | 395.6           | 467.2           | 516.7           | 517.4           | -71.6                                | -0.7            | -18.1                       | -0.1        |
| CL                       | 13.1            | 13.3            | 16.2            | 15.5            | -0.2                                 | 0.7             | -1.5                        | 4.6         |
| HK <sup>4</sup>          | 851.1           | 842.4           | 942.9           | 931.8           | 8.7                                  | 11.1            | 1.0                         | 1.2         |
| CY                       | 29.3            | 30.5            | 23.4            | 25.6            | -1.2                                 | -2.2            | -4.1                        | -9.3        |
| DK                       | 173.1           | 171.5           | 151.8           | 151.7           | 1.6                                  | 0.1             | 0.9                         | 0.1         |
| FI                       | 176.7           | 176.5           | 135.1           | 135.2           | 0.2                                  | -0.1            | 0.1                         | -0.1        |
| FR                       | 1,391.9         | 1,414.2         | 1,591.5         | 1,593.1         | -22.3                                | -1.6            | -1.6                        | -0.1        |
| DE                       | 1,015.1         | 1,005.1         | 1,088.7         | 1,077.7         | 10.0                                 | 11.0            | 1.0                         | 1.0         |
| GR                       | 88.9            | 61.2            | 38.6            | 29.3            | 27.7                                 | 9.3             | 31.2                        | 24.1        |
| IN                       | 114.8           | 113.0           | 129.1           | 135.6           | 1.8                                  | -6.5            | 1.5                         | -5.1        |
| ID                       | 23.2            | 27.4            | 23.1            | 25.8            | -4.2                                 | -2.7            | -18.0                       | -11.6       |
| IE                       | 240.1           | 240.1           | 162.1           | 164.1           | 0.0                                  | -2.0            | 0.0                         | -1.2        |
| IT                       | 374.5           | 374.5           | 353.6           | 355.4           | 0.0                                  | -1.8            | 0.0                         | -0.5        |
| JP                       | 899.7           | 1,192.1         | 1,018.7         | 1,280.3         | -292.4                               | -261.6          | -32.5                       | -25.7       |
| KR                       | 118.4           | 59.2            | 111.4           | 56.7            | 59.2                                 | 54.7            | 50.0                        | 49.1        |
| LU                       | 451.7           | 452.1           | 405.0           | 405.3           | -0.4                                 | -0.3            | -0.1                        | -0.1        |
| MX                       | 17.9            | 15.9            | 13.4            | 8.1             | 2.0                                  | 5.3             | 11.2                        | 39.6        |
| NL                       | 711.3           | 711.3           | 745.8           | 745.8           | 0.0                                  | 0.0             | 0.0                         | 0.0         |
| NO                       | 165.1           | 151.6           | 174.0           | 161.3           | 13.5                                 | 12.7            | 8.2                         | 7.3         |
| PA                       | 40.4            | 31.5            | 41.0            | 30.2            | 8.9                                  | 10.8            | 22.0                        | 26.4        |
| PH                       | 16.5            | 16.5            | 15.7            | 17.0            | 0.0                                  | -1.3            | 0.0                         | -8.3        |
| PT                       | 83.7            | 82.1            | 58.7            | 58.2            | 1.6                                  | 0.5             | 1.9                         | 0.9         |
| RU                       | 160.7           | 160.7           | 91.0            | 95.5            | 0.0                                  | -4.5            | 0.0                         | -5.0        |
| ZA                       | 28.7            | 28.2            | 24.9            | 23.6            | 0.5                                  | 1.3             | 1.6                         | 5.1         |
| ES                       | 376.2           | 383.7           | 321.4           | 322.2           | -7.5                                 | -0.8            | -2.0                        | -0.2        |

BIS LBS/R vs IMF IIP – deposit liabilities of deposit-taking corporations excl. central bank<sup>1</sup> (cont.)

Comparison BIS LBS/R and IMF IIP by country, in USD billions

Table C3.2

| Country         | Q4 2014 |         | Q4 2017 |         | Difference (amount)<br>(IIP – LBS/R) |             | Differences<br>(percentage) |             |
|-----------------|---------|---------|---------|---------|--------------------------------------|-------------|-----------------------------|-------------|
|                 | IIP     | LBS/R   | IIP     | LBS/R   | Q4 2014                              | Q4 2017     | Q4 2014                     | Q4 2017     |
|                 | [1]     | [2]     | [3]     | [4]     | [5]=[1]–[2]                          | [6]=[3]–[4] | [5]*100/[1]                 | [6]*100/[3] |
| CH              | 753.0   | 607.7   | 744.1   | 680.6   | 145.3                                | 63.5        | 19.3                        | 8.5         |
| TR              | 144.2   | 124.8   | 144.1   | 128.3   | 19.4                                 | 15.8        | 13.5                        | 11.0        |
| GB <sup>5</sup> | 4,182.5 | 4,176.6 | 3,770.1 | 3,765.3 | 5.9                                  | 4.8         | 0.1                         | 0.1         |
| US              | 2,341.3 | 3,537.6 | 2,298.6 | 3,333.0 | -1196.3                              | -1034.4     | -51.1                       | -45.0       |

<sup>1</sup> Liabilities in IIP comprise “Other investments” on account of currency and deposits, and loans of deposit corporations excluding central banks. <sup>2</sup> For the purpose of comparison, LBS/R total in Q4 2014 includes IIP amounts for PH and RU as both countries started reporting after Q4 2014 (PH from Q4 2016 and RU from Q4 2105). <sup>3</sup> Reports IIP data at annual frequency (Q4 of each year). <sup>4</sup> Data for Q4 2017 relate to that of Q4 2016 for both LBS/R and IIP (as IIP data not available for Q4 2017). <sup>5</sup> Data for Q4 2017 relate to that of Q4 2015 for both LBS/R and IIP (as IIP data not available for Q4 2016 and Q4 2017).

Sources: BIS locational banking statistics by residence (QR June 2018, Released database) and IMF IIP data from data set “Balance of Payments (BoP), 2018 M06” release.

LBS/R vs IMF IIP – loans and deposits of banks located in Portugal<sup>1</sup>

Comparison BIS LBS/R and IMF IIP by country, in USD billions

Table C3.3

| Period  | IMF IIP |             | BIS LBS/R |             | Difference in amount<br>(IIP – LBS/R) |             | Percentage difference |             |
|---------|---------|-------------|-----------|-------------|---------------------------------------|-------------|-----------------------|-------------|
|         | Claims  | Liabilities | Claims    | Liabilities | Claims                                | Liabilities | Claims                | Liabilities |
|         | [1]     | [2]         | [3]       | [4]         | [5]=[1]–[3]                           | [6]=[2]–[4] | [5]*100/[1]           | [6]*100/[2] |
| Q1 2011 |         | 179.6       | 86.2      | 178.7       |                                       | 1.0         |                       | 0.5         |
| Q2 2011 |         | 172.7       | 85.4      | 171.8       |                                       | 0.9         |                       | 0.5         |
| Q3 2011 |         | 154.7       | 76.5      | 153.9       |                                       | 0.9         |                       | 0.6         |
| Q4 2011 |         | 136.8       | 77.0      | 136.0       |                                       | 0.8         |                       | 0.6         |
| Q1 2012 |         | 135.0       | 83.5      | 134.2       |                                       | 0.8         |                       | 0.6         |
| Q2 2012 |         | 123.4       | 82.3      | 122.6       |                                       | 0.7         |                       | 0.6         |
| Q3 2012 |         | 119.7       | 81.8      | 119.0       |                                       | 0.7         |                       | 0.6         |
| Q4 2012 |         | 118.9       | 78.6      | 118.1       |                                       | 0.9         |                       | 0.7         |
| Q1 2013 | 74.8    | 112.9       | 75.1      | 112.1       | -0.3                                  | 0.8         | -0.4                  | 0.7         |
| Q2 2013 | 71.4    | 111.0       | 71.0      | 110.3       | 0.4                                   | 0.7         | 0.6                   | 0.7         |
| Q3 2013 | 57.7    | 95.1        | 57.4      | 94.4        | 0.3                                   | 0.7         | 0.5                   | 0.8         |
| Q4 2013 | 58.9    | 97.5        | 58.5      | 96.7        | 0.3                                   | 0.8         | 0.5                   | 0.8         |
| Q1 2014 | 60.1    | 95.9        | 59.7      | 95.1        | 0.3                                   | 0.8         | 0.5                   | 0.8         |
| Q2 2014 | 60.5    | 97.4        | 60.1      | 96.6        | 0.5                                   | 0.8         | 0.8                   | 0.9         |
| Q3 2014 | 60.6    | 83.0        | 58.4      | 81.4        | 2.3                                   | 1.6         | 3.7                   | 1.9         |
| Q4 2014 | 52.5    | 83.7        | 52.7      | 82.1        | -0.2                                  | 1.6         | -0.4                  | 1.9         |
| Q1 2015 | 45.5    | 73.2        | 45.8      | 72.0        | -0.2                                  | 1.3         | -0.5                  | 1.7         |
| Q2 2015 | 46.7    | 76.6        | 46.9      | 75.3        | -0.2                                  | 1.3         | -0.5                  | 1.7         |
| Q3 2015 | 39.6    | 70.5        | 40.0      | 69.2        | -0.5                                  | 1.3         | -1.2                  | 1.8         |
| Q4 2015 | 37.4    | 65.5        | 38.1      | 64.2        | -0.8                                  | 1.3         | -2.1                  | 2.0         |
| Q1 2016 | 36.5    | 67.2        | 37.0      | 65.8        | -0.5                                  | 1.4         | -1.4                  | 2.1         |
| Q2 2016 | 35.2    | 67.0        | 35.8      | 65.6        | -0.6                                  | 1.4         | -1.7                  | 2.0         |
| Q3 2016 | 34.4    | 62.9        | 35.7      | 62.4        | -1.3                                  | 0.5         | -3.7                  | 0.7         |
| Q4 2016 | 30.5    | 60.6        | 31.8      | 59.2        | -1.3                                  | 1.4         | -4.2                  | 2.2         |
| Q4 2017 | 29.3    | 58.7        | 30.8      | 58.2        | -1.5                                  | 0.5         | -5.1                  | 0.9         |

<sup>1</sup> Claims in IIP comprise "Other investments" on account of currency and deposits, and loans of deposit corporations excluding central banks, which is similar to LBS/R instrument G "Loans and deposits" including currency balances. On the liabilities side, total liabilities in IIP comprise "Other investments" on account of currency and deposits, and loans of deposit corporations excluding central banks.

BIS LBS/R vs IMF IIP – cross-border debt securities claims of deposit-taking corporations<sup>1</sup>

Amount outstanding, in USD billions

Table D1

| Country                  | BIS LBS/R      |                | IIP            |                | Difference in amount |               | Percentage difference |              |
|--------------------------|----------------|----------------|----------------|----------------|----------------------|---------------|-----------------------|--------------|
|                          | Q4 2014        | Q4 2017        | Q4 2014        | Q4 2017        | Q4 2014              | Q4 2017       | Q4 2014               | Q4 2017      |
|                          | [1]            | [2]            | [3]            | [4]            | [5]=[1]–[3]          | [6]=[2]–[4]   | [5]*100/[1]           | [6]*100/[2]  |
| <b>Total<sup>2</sup></b> | <b>3,343.6</b> | <b>2,963.3</b> | <b>3,558.1</b> | <b>3,268.0</b> | <b>-214.5</b>        | <b>-304.7</b> | <b>-6.4</b>           | <b>-10.3</b> |
| AU                       | 22.1           | 34.9           | 31.6           | 72.1           | -9.5                 | -37.3         | -42.7                 | -106.8       |
| AT                       | 77.4           | 60.8           | 77.9           | 61.8           | -0.5                 | -1.1          | -0.6                  | -1.7         |
| BE                       | 106.0          | 94.8           | 109.4          | 97.2           | -3.4                 | -2.4          | -3.2                  | -2.5         |
| BM <sup>3</sup>          | 7.2            | 8.7            | 8.9            | 10.0           | -1.7                 | -1.3          | -23.9                 | -14.8        |
| BR                       | 3.1            | 4.0            | 5.3            | 4.4            | -2.2                 | -0.4          | -69.7                 | -9.7         |
| CL                       | 1.3            | 1.3            | 1.0            | 0.9            | 0.3                  | 0.4           | 24.5                  | 28.3         |
| HK                       | 284.9          | 379.4          | 316.5          | 374.3          | -31.5                | 5.2           | -11.1                 | 1.4          |
| CY                       | 8.8            | 2.5            | 4.8            | 1.7            | 3.9                  | 0.7           | 44.7                  | 29.2         |
| DK                       | 35.7           | 19.3           | 38.4           | 22.2           | -2.7                 | -2.9          | -7.5                  | -14.8        |
| FI                       | 69.7           | 35.9           | 63.4           | 36.3           | 6.3                  | -0.3          | 9.1                   | -1.0         |
| FR                       | 519.1          | 484.1          | 407.4          | 298.5          | 111.8                | 185.6         | 21.5                  | 38.3         |
| DE                       | 630.4          | 573.3          | 671.5          | 598.3          | -41.1                | -25.0         | -6.5                  | -4.4         |
| GR                       | 70.9           | 19.3           | 71.0           | 19.3           | -0.1                 | 0.0           | -0.2                  | -0.1         |
| IN                       | 0.0            | 0.3            | 0.4            | 0.3            | -0.4                 | 0.0           |                       | 0.1          |
| ID                       | 1.5            | 1.1            | 1.7            | 0.9            | -0.2                 | 0.2           | -10.2                 | 21.2         |
| IE                       | 132.3          | 70.3           | 130.7          | 67.7           | 1.6                  | 2.5           | 1.2                   | 3.6          |
| IT                       | 72.5           | 112.1          | 62.6           | 107.2          | 9.9                  | 4.9           | 13.6                  | 4.4          |
| JP                       | ...            | ...            | 852.8          | 861.1          |                      |               |                       |              |
| KR                       | 2.6            | 13.4           | 10.4           | 34.6           | -7.8                 | -21.2         | -304.2                | -158.7       |
| LU                       | 176.0          | 133.0          | 166.3          | 126.5          | 9.7                  | 6.5           | 5.5                   | 4.9          |
| MX                       | 3.9            | 6.8            | 3.8            | 6.9            | 0.1                  | -0.1          | 1.9                   | -1.4         |
| NL                       | 134.7          | 110.6          | 138.2          | 111.4          | -3.5                 | -0.9          | -2.6                  | -0.8         |
| NO                       | 31.5           | 33.8           | 56.1           | 51.6           | -24.7                | -17.7         | -78.4                 | -52.4        |
| PA                       | 6.8            | 8.4            | 6.8            | 7.8            | -0.1                 | 0.6           | -0.9                  | 7.0          |
| PH                       | NA             | 9.9            | 7.3            | 10.1           | -7.3                 | -0.2          |                       | -1.6         |
| PT                       | 18.8           | 20.8           | 22.2           | 24.1           | -3.5                 | -3.3          | -18.5                 | -15.7        |
| RU                       | NA             | 38.8           | 37.7           | 37.9           | -37.7                | 0.9           |                       | 2.4          |
| ZA                       | 3.3            | 3.5            | 3.0            | 2.6            | 0.2                  | 0.9           | 7.5                   | 24.8         |
| ES                       | 111.4          | 98.7           | 93.2           | 84.7           | 18.1                 | 13.9          | 16.3                  | 14.1         |

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BIS LBS/R vs IMF IIP – cross-border debt securities claims of deposit-taking corporations<sup>1</sup> (cont.)

Amount outstanding, in USD billions

Table D1

| Country         | BIS LBS/R |         | IIP     |         | Difference in amount |             | Percentage difference |             |
|-----------------|-----------|---------|---------|---------|----------------------|-------------|-----------------------|-------------|
|                 | Q4 2014   | Q4 2017 | Q4 2014 | Q4 2017 | Q4 2014              | Q4 2017     | Q4 2014               | Q4 2017     |
|                 | [1]       | [2]     | [3]     | [4]     | [5]=[1]–[3]          | [6]=[2]–[4] | [5]*100/[1]           | [6]*100/[2] |
| CH              | 94.2      | 102.1   | 94.3    | 102.1   | 0.0                  | 0.0         | 0.0                   | 0.0         |
| TR              | 0.8       | 0.8     | 0.8     | 0.6     | 0.0                  | 0.2         | -4.9                  | 25.9        |
| GB <sup>4</sup> | 664.6     | 471.6   | 718.5   | 659.9   | -53.9                | -188.4      | -8.1                  | -39.9       |
| US              | 9.2       | 20.7    | 196.7   | 241.7   | -187.5               | -221.1      | -2,029.0              | -1,069.7    |

<sup>1</sup> The IMF IIP data for debt securities claims are available for 34 of 47 countries. In the BIS LBS/R, two countries (Bahrain and Curaçao) do not report cross-border debt securities claims in the LBS and the data for remaining 11 countries including Japan are either restricted or confidential. <sup>2</sup> Of 34 countries in the table, the total excludes values of JP, PH and RU. <sup>3</sup> IIP data available up to Q4 2016, and hence LBS/R data of Q4 2016 are used in Q4 2017 for fair comparison. <sup>4</sup> IIP data available only up to Q4 2015, and hence LBS/R data used for Q4 2015 are used in Q4 2017 for fair comparison.

Sources: BIS locational banking statistics by residence (QR June 2018, Released database) and IMF international investment positions (IIP, 2018 M06 release).

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BIS LBS/R vs IMF CPIS – counterparty country breakdown of cross-border debt securities liabilities between the BIS LBS/R and the IMF CPIS<sup>1</sup>

Amount outstanding, in USD billions

Table D2

| Period       | CPIS: Cross-border by individual country |                | LBS/R: Cross-border by individual country |                | Difference (CPIS – LBS/R) |             | Memo: LBS/R: unallocated cross-border |                |
|--------------|--|----------------|---|----------------|---------------------------|-------------|---------------------------------------|----------------|
|              | 2015 Q4                                  | 2017Q2         | 2015 Q4                                   | 2017Q2         | 2015 Q4                   | 2017Q2      | 2015 Q4                               | 2017Q2         |
|              | [1]                                      | [2]            | [3]                                       | [4]            | [5]=[1]–[3]               | [6]=[2]–[4] | [7]                                   | [8]            |
| <b>Total</b> | <b>1,904.2</b>                           | <b>1,925.0</b> | <b>1,711.5</b>                            | <b>1,842.4</b> | <b>192.7</b>              | <b>82.6</b> | <b>1,541.4</b>                        | <b>1,604.9</b> |
| GB           | 379.5                                    | 355.1          | 12.8                                      | 12.3           | 366.7                     | 342.7       | 808.2                                 | 854.1          |
| FR           | 238.7                                    | 206.2          | 646.2                                     | 699.3          | -407.5                    | -493.2      |                                       |                |
| AU           | 120.5                                    | 113.6          | 367.1                                     | 342.5          | -246.6                    | -228.9      |                                       |                |
| US           | 74.9                                     | 108.9          | 108.3                                     | 152.3          | -33.4                     | -43.4       |                                       |                |
| IT           | 55.2                                     | 64.5           | 2.7                                       | 5.3            | 52.5                      | 59.2        |                                       |                |
| NO           | 30.9                                     | 62.0           | 41.4                                      | 38.2           | -10.6                     | 23.7        | 1.7                                   | 4.7            |
| AT           | 41.4                                     | 31.0           | 51.5                                      | 79.7           | -10.1                     | -48.8       | 11.7                                  |                |
| BE           | 24.4                                     | 30.3           | 16.5                                      | 38.9           | 7.9                       | -8.6        |                                       |                |
| FI           | 26.9                                     | 27.7           | 91.9                                      | 88.8           | -64.9                     | -61.1       |                                       |                |
| IE           | 33.8                                     | 26.6           | 45.3                                      | 52.8           | -11.5                     | -26.2       |                                       |                |
| KR           | 20.4                                     | 6.5            | 82.8                                      | 75.2           | -62.4                     | -68.7       |                                       |                |
| GG           | 11.7                                     | 6.7            | 8.8                                       | 9.2            | 2.9                       | -2.4        |                                       |                |
| JE           | 2.3                                      | 6.4            | 1.7                                       | 0.4            | 0.6                       | 6.1         |                                       |                |
| BR           | 7.7                                      | 6.2            | 19.0                                      | 13.1           | -11.3                     | -6.9        |                                       |                |
| CN           | 1.8                                      | 4.0            | 123.2                                     | 115.0          | -121.4                    | -111.1      | 16.7                                  | 15.6           |
| HK           | 4.0                                      | 3.9            | 9.7                                       | 25.4           | -5.6                      | -21.5       |                                       |                |
| CL           | 5.3                                      | 3.3            | 9.9                                       | 9.2            | -4.7                      | -5.9        |                                       |                |
| IN           | 1.7                                      | 3.2            | 2.2                                       | 0.3            | -0.5                      | 2.9         |                                       |                |
| PT           | 5.7                                      | 2.7            | 0.4                                       | 0.3            | 5.4                       | 2.4         |                                       |                |
| MX           | 1.9                                      | 1.5            | 11.6                                      | 7.9            | -9.8                      | -6.4        |                                       |                |
| PA           | 0.7                                      | 0.6            | 16.2                                      | 14.4           | -15.5                     | -13.8       |                                       |                |
| BS           | 0.6                                      | 0.4            | 25.1                                      | 20.7           | -24.5                     | -20.3       |                                       |                |
| ID           | 0.3                                      | 0.3            | 4.7                                       | 3.6            | -4.4                      | -3.3        |                                       |                |
| BM           | 0.1                                      | 0.1            | 0.1                                       | 0.1            | 0.0                       | 0.0         |                                       |                |
| RU           | 0.1                                      | 0.1            | 2.0                                       | 2.5            | -1.8                      | -2.4        | 3.8                                   | 3.1            |
| MO           | 0.0                                      | 0.1            | 0.6                                       | 3.7            | -0.6                      | -3.6        |                                       |                |
| PH           | 0.1                                      | 0.0            | 0.0                                       | 1.5            |                           | -1.4        |                                       |                |
| CY           | 0.0                                      | 0.0            | 0.5                                       | 0.1            | -0.5                      | -0.1        |                                       |                |
| TW           | 0.2                                      | 0.0            | 1.5                                       | 0.3            | -1.3                      |             |                                       |                |

BIS LBS/R vs IMF CPIS – counterparty country breakdown of cross-border debt securities liabilities between the BIS LBS/R and the IMF CPIS<sup>1</sup> (cont.)

Amount outstanding, in USD billions

Table D2

| Period          | CPIS: Cross-border by individual country |         | LBS/R: Cross-border by individual country |         | Difference<br>(CPIS – LBS/R) |             | Memo: LBS/R:<br>unallocated cross-<br>border |         |
|-----------------|--|---------|---|---------|------------------------------|-------------|--|---------|
|                 | Q4 2015                                  | Q2 2017 | Q4 2015                                   | Q2 2017 | Q4 2015                      | Q2 2017     | Q4 2015                                      | Q2 2017 |
|                 | [1]                                      | [2]     | [3]                                       | [4]     | [5]=[1]–[3]                  | [6]=[2]–[4] | [7]  | [8]     |
| CA              | 113.8                                    | 151.0   | 0.3                                       | ...     | 113.5                        |             |  |         |
| ES              | 101.1                                    | 78.3    | ...                                       | ...     |                              |             |  |         |
| MY              | 4.6                                      | 0.2     | ...                                       | ...     |                              |             |  |         |
| DE <sup>2</sup> | 112.6                                    | 108.5   |   |         |                              |             | 646.0  | 693.9   |
| KY <sup>2</sup> | 5.5                                      | 2.6     |   |         |                              |             | 51.4   | 31.9    |
| ZA <sup>2</sup> | 0.2                                      | 0.2     |   |         |                              |             | 2.1  | 1.7     |
| SG              | 15.4                                     | 17.6    |   |         |                              |             |  |         |
| BH              | 0.2                                      | 0.1     |   |         |                              |             |  |         |
| CW              | 0.7                                      | 0.1     |   |         |                              |             |  |         |
| GR              | 0.2                                      | 0.0     |   |         |                              |             |  |         |
| IM              |  |         |   |         |                              |             |  |         |
| NL <sup>3</sup> | 233.8                                    | 227.3   |   |         |                              |             |  |         |
| SE <sup>3</sup> | 111.7                                    | 114.7   |   |         |                              |             |  |         |
| DK <sup>3</sup> | 60.3                                     | 57.6    |   |         |                              |             |  |         |
| JP <sup>3</sup> | 19.2                                     | 41.1    |   |         |                              |             |  |         |
| LU <sup>3</sup> | 23.0                                     | 29.7    |   |         |                              |             |  |         |
| CH <sup>3</sup> | 6.8                                      | 19.9    |   |         |                              |             |  |         |
| TR <sup>3</sup> | 4.0                                      | 4.3     |   |         |                              |             |  |         |

<sup>1</sup> CPIS data on holdings of cross-border debt securities issued by deposit corporations excluding central banks. As the sector breakdown of issuers is an encouraged item in the CPIS, only 26 of 85 plus countries report these data. <sup>2</sup> Reports only vis-à-vis unallocated by location without classifying vis-à-vis residents or cross-border. <sup>3</sup> In the LBS/R, amounts are reported almost entirely without any country breakdown (ie only total cross-border amounts are reported).

Sources: BIS locational banking statistics by residence (QR June 2018, Released database) and IMF CPIS survey (15 March 2018 release).

## BIS LBS/R vs BIS IDS – international debt securities liabilities<sup>1,2</sup>

Amount outstanding, in USD billions

Table D3

| Period       | BIS LBS/R      |                | BIS IDS        |                | Difference in amount<br>(LBS/R – IDS) |                 | Percentage difference |              |
|--------------|----------------|----------------|----------------|----------------|---------------------------------------|-----------------|-----------------------|--------------|
|              | Q4 2015        | Q4 2017        | Q4 2015        | Q4 2017        | Q4 2015                               | Q4 2017         | Q4 2015               | Q4 2017      |
|              | [1]            | [2]            | [3]            | [4]            | [5]=[1]–[3]                           | [6]=[2]–[4]     | [5]/[1]               | [6]/[2]      |
| <b>Total</b> | <b>4,444.1</b> | <b>4,832.8</b> | <b>6,227.4</b> | <b>6,736.6</b> | <b>-1,783.3</b>                       | <b>-1,903.8</b> | <b>-40.1</b>          | <b>-39.4</b> |
| AT           | 68.0           | 68.1           | 101.3          | 83.8           | -33.2                                 | -15.7           | -48.8                 | -23.1        |
| AU           | 372.1          | 356.6          | 329.7          | 338.0          | 42.4                                  | 18.6            | 11.4                  | 5.2          |
| BE           | 18.1           | 49.1           | 20.1           | 21.9           | -1.9                                  | 27.2            | -10.7                 | 55.3         |
| BR           | 20.1           | 12.5           | 36.6           | 28.6           | -16.6                                 | -16.1           | -82.4                 | -128.5       |
| BS           | 26.6           | 26.6           | 5.5            | 7.4            | 21.0                                  | 19.2            | 79.2                  | 72.1         |
| CA           | 2.2            | 5.8            | 263.8          | 309.3          | -261.6                                | -303.5          | -11,820.0             | -5,213.9     |
| CH           | 21.2           | 42.8           | 27.7           | 34.9           | -6.5                                  | 7.9             | -30.8                 | 18.5         |
| CN           | 139.9          | 183.9          | 48.6           | 79.1           | 91.3                                  | 104.8           | 65.2                  | 57.0         |
| DE           | 678.8          | 721.8          | 466.7          | 570.5          | 212.1                                 | 151.3           | 31.2                  | 21.0         |
| DK           | 89.8           | 97.8           | 60.0           | 63.1           | 29.9                                  | 34.8            | 33.2                  | 35.5         |
| ES           | 13.0           | 48.5           | 131.7          | 140.5          | -118.7                                | -92.0           | -915.1                | -189.6       |
| FI           | 93.3           | 95.9           | 65.5           | 69.9           | 27.8                                  | 26.0            | 29.8                  | 27.1         |
| FR           | 662.9          | 741.9          | 588.6          | 648.2          | 74.3                                  | 93.7            | 11.2                  | 12.6         |
| GB           | 923.2          | 1,011.5        | 1,289.8        | 1,333.6        | -366.6                                | -322.0          | -39.7                 | -31.8        |
| HK           | 116.8          | 160.6          | 98.7           | 140.3          | 18.1                                  | 20.3            | 15.5                  | 12.7         |
| IE           | 46.0           | 52.0           | 115.0          | 101.2          | -69.0                                 | -49.2           | -150.1                | -94.5        |
| IT           | 20.6           | 28.5           | 266.2          | 258.3          | -245.7                                | -229.8          | -1,193.9              | -805.7       |
| KR           | 85.5           | 84.3           | 96.6           | 99.6           | -11.1                                 | -15.3           | -12.9                 | -18.2        |
| KY           | 51.4           | 34.5           | 94.5           | 96.7           | -43.1                                 | -62.2           | -83.9                 | -180.4       |
| LU           | 31.7           | 31.7           | 128.3          | 136.0          | -96.6                                 | -104.2          | -305.0                | -328.3       |
| NL           | 269.1          | 249.7          | 616.9          | 636.6          | -347.9                                | -386.9          | -129.3                | -154.9       |
| NO           | 45.5           | 48.3           | 180.9          | 188.2          | -135.4                                | -139.9          | -297.9                | -289.6       |
| RU           | 9.4            | 7.6            | 32.9           | 29.3           | -23.5                                 | -21.7           | -251.1                | -287.0       |
| SE           | 299.1          | 302.0          | 203.4          | 208.5          | 95.7                                  | 93.5            | 32.0                  | 31.0         |
| TR           | 27.5           | 34.5           | 40.5           | 65.1           | -13.0                                 | -30.6           | -47.5                 | -88.7        |
| US           | 108.3          | 130.4          | 550.6          | 622.5          | -442.3                                | -492.1          | -408.4                | -377.5       |
| JP           | ...            | ...            | 148.2          | 222.5          |                                       |                 |                       |              |
| MY           | ...            | ...            | 13.5           | 15.5           |                                       |                 |                       |              |
| Others       | 115.7          | 121.9          | 205.6          | 187.5          | -89.9                                 | -65.6           | -77.7                 | -53.8        |

<sup>1</sup> Banks in five jurisdictions, namely, BH, CW, GR, IM and SG do not report international debt securities in the LBS/R. However, the IDS database shows that BH, CW, GR and SG have issued debt securities in international markets. On the other hand, GG and JE report international debt securities in LBS/R but the IDS database shows no issuances of debt securities in international markets by banks. <sup>2</sup> The cell with “...” means reported data are either restricted or confidential.

Sources: BIS locational banking statistics by residence and BIS international debt securities database (QR June 2018, Released database for both sources).

Table E: ISO codes and country/jurisdiction names

| ISO code | Name of jurisdiction |    |                |
|----------|----------------------|----|----------------|
| AT       | Austria              | IM | Isle of Man    |
| AU       | Australia            | IN | India          |
| BE       | Belgium              | IT | Italy          |
| BH       | Bahrain              | JE | Jersey         |
| BM       | Bermuda              | JP | Japan          |
| BR       | Brazil               | KR | Korea          |
| BS       | Bahamas              | KY | Cayman Islands |
| CA       | Canada               | LU | Luxembourg     |
| CH       | Switzerland          | MO | Macao SAR      |
| CL       | Chile                | MX | Mexico         |
| CN       | China                | MY | Malaysia       |
| CW       | Curaçao              | NL | Netherlands    |
| CY       | Cyprus               | NO | Norway         |
| DE       | Germany              | PA | Panama         |
| DK       | Denmark              | PH | Philippines    |
| ES       | Spain                | PT | Portugal       |
| FI       | Finland              | RU | Russia         |
| FR       | France               | SE | Sweden         |
| GB       | United Kingdom       | SG | Singapore      |
| GG       | Guernsey             | TR | Turkey         |
| GR       | Greece               | TW | Chinese Taipei |
| HK       | Hong Kong SAR        | US | United States  |
| ID       | Indonesia            | ZA | South Africa   |
| IE       | Ireland              |    |                |

Ninth IFC Conference on "Are post-crisis statistical initiatives completed?"

Basel, 30-31 August 2018

## Uses of mirror data: examples from the BIS international banking statistics and other external statistics<sup>1</sup>

João Falcão Silva, Bank of Portugal,  
and Swapan-Kumar Pradhan, Bank for International Settlements

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<sup>1</sup> This presentation was prepared for the meeting. The views expressed are those of the authors and do not necessarily reflect the views of the BIS, the IFC or the central banks and other institutions represented at the meeting.

# **USES OF MIRROR DATA**

**examples from the  
BIS International Banking Statistics  
and other external statistics**

**João Falcão Silva  
Swapan-Kumar Pradhan**

9th biennial IFC Conference on “Are post-crisis statistical initiatives completed?”  
30-31 August 2018



BANCO DE  
PORTUGAL  
EUROSYSTEM



BANK FOR  
INTERNATIONAL  
SETTLEMENTS



## THE 2 MAIN QUESTIONS: WHY?

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### WHY MIRROR DATA?

- **Mirror data:** different sources that capture similar concepts
- **Mirror data are important statistical tools** that allows common data items to be validated across statistical domains. Promotes **consistency** and **accuracy**, **raise statistical quality standards**

### WHY THIS PAPER?

- Existence of **common data elements**: BIS International Banking Statistics (BIS IBS), International Investment Position (IIP) and other external sources (IMF CPIS, BIS IDS)
- Validity of **mirror relationship** at a country aggregated data level [consistency tests]
- Possible **reasons for differences** between pair of mirror data [fill gaps?]

**Background:** This topic was discussed in Biennial meeting of central bank experts (2017) on BIS international banking and financial statistics (Swapan with a colleague from Bank of Canada explored the issues). Agreed to jointly explore further, develop methodological framework and provide guidance

# CONSISTENCY TESTS



## LD1

INTERBANK CLAIMS and INTERBANK LIABILITIES comparison for LOANS and DEPOSITS based on BIS LOCATIONAL BANKING STATISTICS BY RESIDENCE (LBS\R)

$$\text{Interbank claims (liabilities)}_{i;j}^{LBS \setminus R} \approx \text{Interbank liabilities (claims)}_{j;i}^{LBS \setminus R}$$

"i" is the reporting country and "j" the counterparty (reporting) country

This comparison is only possible among LBS reporting countries. We use reported bilateral positions and aggregate to overall positions.

For a give reporting **country i**, the **net interbank claims/liabilities** are defined by:

$$\text{Net interbank claims} = \sum_{\substack{j=1 \\ i \neq j}}^x \text{Claims}_i^j - \sum_{\substack{j=1 \\ i \neq j}}^x \text{Liabilities}_j^i \quad \text{and}$$

$$\text{Net interbank liabilities} = \sum_{\substack{j=1 \\ i \neq j}}^x \text{Liabilities}_i^j - \sum_{\substack{j=1 \\ i \neq j}}^x \text{Claims}_j^i$$

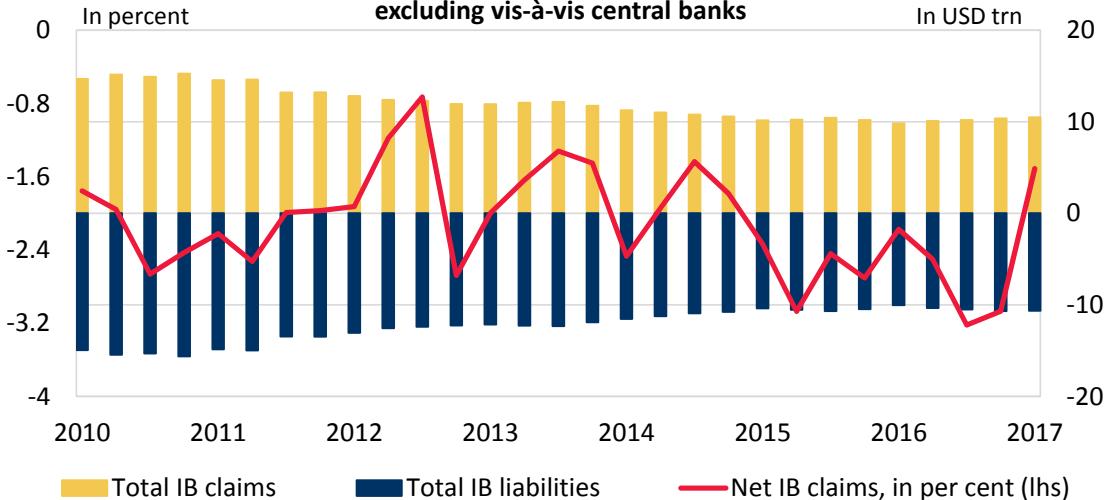
# CONSISTENCY TESTS



**LD1**

INTERBANK CLAIMS and INTERBANK LIABILITIES comparison for LOANS and DEPOSITS based on BIS LOCATIONAL BANKING STATISTICS BY RESIDENCE (LBS\R)

CROSS-BORDER NET INTERBANK CLAIMS IN REPORTING COUNTRIES  
excluding vis-à-vis central banks



Between 2011 and 2017 the size of **net claims differences**, at the level of all reporting countries, **fell from -2,2% to -1,5%** of the stock of net interbank claims.

## POSSIBLE REASONS TO THE DIFFERENCES

- Coverage CB's positions
- Definition of bank sector
- Instrument breakdown
- Valuation
- Banking laws
- Legal/confidentiality restrictions
- Different reporting practices

# CONSISTENCY TESTS



## LD2

DOMESTIC CLAIMS in ALL CURRENCIES, LOCAL CLAIMS in ALL CURRENCY and LOCAL LIABILITIES in LOCAL CURRENCY vis-à-vis residents of the respective reporting countries between Consolidated Banking Statistics by Immediate Counterparty Basis (CBS\IC) and Locational Banking Statistics by Nationality (LBS\N)

$$LBS\N \text{ claims}_i^{\text{Domestic All excl.intragroup}} \approx CBS\text{\IC} \text{ claims}_i^{\text{DomesticAll}}$$



$$\begin{aligned} LBS\N \text{ claims}_i^{\text{Local in all currencies excl.intragrop}} \\ \approx CBS\text{\IC} \text{ claims}_i^{\text{Local in all currencies}} \end{aligned}$$

$$\begin{aligned} LBS\N \text{ liabilities}_i^{\text{Local in local currency excl.intragroup}} \\ \approx CBS\text{\IC} \text{ liabilities}_i^{\text{Local in local currency}} \end{aligned}$$

### POSSIBLE REASONS TO THE DIFFERENCES

- Coverage
- Different geographical coverage (CBS\IC vs LBS\N)
- Different scope of consolidation (CBS\IC vs LBS\N)
- Reporting issues



# CONSISTENCY TESTS

## LD3

LOANS and DEPOSITS comparison between BIS Locational Banking Statistics by Residency (LBS\R) and IMF International Investment Position (IIP)

$$LBS\backslash R \text{ assets}_i^{\text{Loans and deposits}} \approx IIP \text{ assets}_i^{\text{Loans and deposits}}$$



$$LBS\backslash R \text{ liabilities}_i^{\text{Loans and deposits}} \approx IIP \text{ liabilities}_i^{\text{Loans and deposits}}$$

### POSSIBLE REASONS TO THE DIFFERENCES

- Geographical breakdown on interest owned not yet paid
- Reporting population may be different
- Inclusion of inter-office positions – equity and retained earnings in the LBS/R loans and deposits
- Exclusion of repo transactions in the IMF IIP and the inclusion of covered bonds in the LBS/R (Liabilities) ==> country specific reason

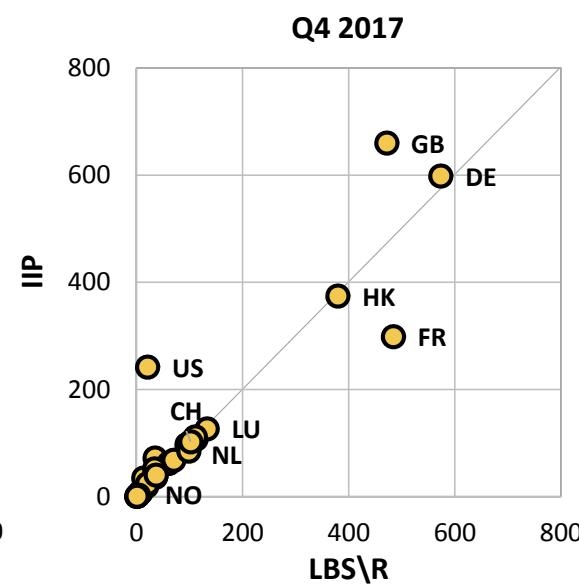
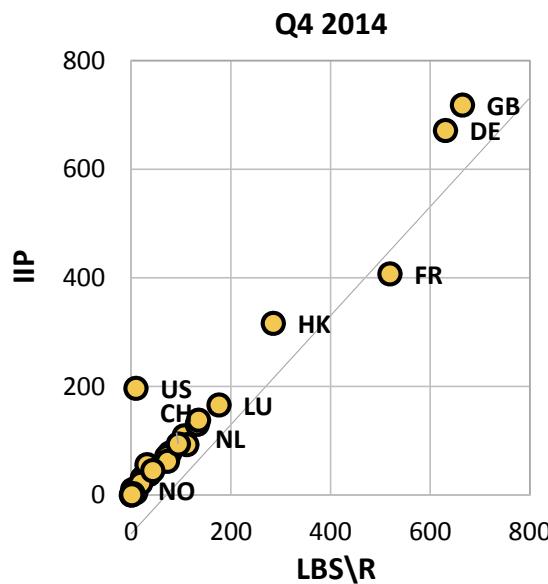


# CONSISTENCY TESTS

## DS1

CROSS-BOARDER DEBT SECURITIES CLAIMS comparison between BIS Locational Banking Statistics by Residency (LBS\R) and IMF International Investment Position (IIP)

$$LBS\backslash R \ assets_i^{Cross-border\ debt\ securities} \approx IIP\ assets_i^{Debt\ securities}$$



### POSSIBLE REASONS TO THE DIFFERENCES

- Coverage sources
- Definition treatment of instruments

# CONSISTENCY TESTS



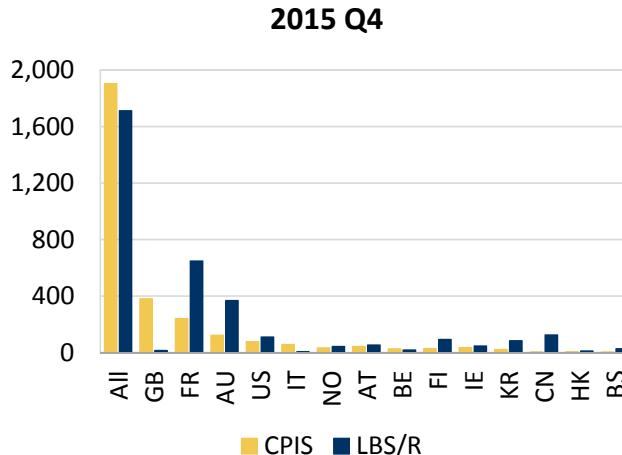
**DS2**

CROSS-BOARDER DEBT SECURITIES LIABILITIES comparison between **BIS Locational Banking Statistics by Residency (LBS\R)** and the **IMF Coordinated Portfolio Investment Survey (CPIS)**

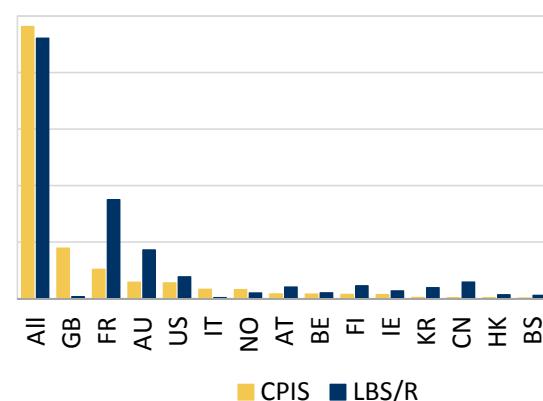
$$LBS\backslash R \text{ liabilities}_{i,j}^{\text{Cross-border debt securities}} > CPIS \text{ liabilities}_{i,j}^{\text{Derived debt securities}}$$

## CROSS-BORDER DEBT SECURITIES LIABILITIES OF BANKS BY ISSUING COUNTRY

Amount outstanding; in billions of US dollars



## 2017 Q2



## POSSIBLE REASONS TO THE DIFFERENCES

- Frequency vintages
- Reporting population
- Practical issues in knowing residency of holder of liabilities (LBS\R)
- Different sources
- Different valuation



# CONSISTENCY TESTS

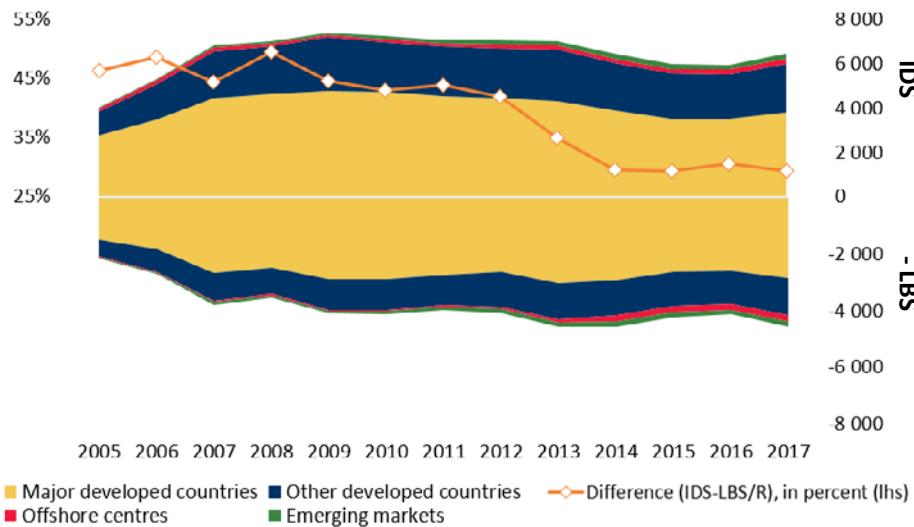
**DS3**

INTERNATIONAL DEBT SECURITIES LIABILITIES comparison between **BIS Locational Banking Statistics by Residency (LBS\R)** and the **International Debt Securities (IDS)**

$$LBS\backslash R \text{ liabilities}_i^{\text{international debt securities}} \approx International \text{ liabilities}_i^{\text{debt securities}}$$

INTERNATIONAL DEBT SECURITIES LIABILITIES OF BANKS IN LBS\R  
REPORTING COUNTRIES BY ISSUER REGION

in billions of US dollars



## POSSIBLE REASONS TO THE DIFFERENCES

- Concepts
- Definition
- Sources
- Practical issues in knowing residency of holder of liabilities (LBS\R)



## WHY SHOULD WE USE MIRROR DATA?

1

**Improve quality, better estimates and fill-in data gaps** (need granular level details)

2

**Data availability in multiple sources** albeit with **reporting differences**

3

Our approach offers tools and consistency tests to **validate data quality/reconciliation** amongst countries, different datasets aiming to complement statistical analysis

4

**Similarities and differences** between different **data domains**, once explored and explained would help data analysts to a better **understand of correctly use statistical data**

5

**BIS, IMF and other international institutions** should play an active role in implementing consistency tests to permit comparable analyses and help countries to improve statistical data

USES OF MIRROR DATA  
Examples from the BIS international banking  
statistics and other external statistics

# QUESTIONS?

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