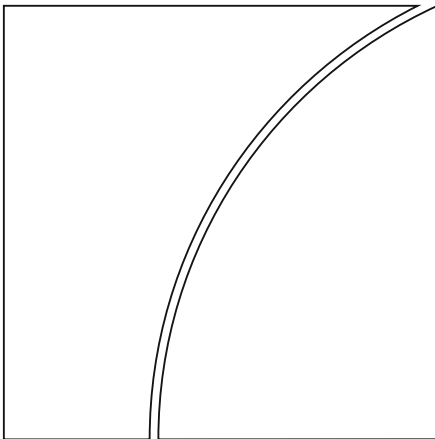




BANK FOR INTERNATIONAL SETTLEMENTS



# **Triennial Central Bank Survey**

## OTC interest rate derivatives turnover in April 2016

Monetary and Economic Department

September 2016

Annex tables revised on 11 December 2016

Tools to access and download the results of the BIS Triennial Central Bank Survey:

- [BIS website](#) – tables in PDF of the BIS's most current data
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Questions about the BIS Triennial Central Bank Survey may be addressed to [statistics@bis.org](mailto:statistics@bis.org).

This publication is available on the BIS website ([www.bis.org/publ/rpfx16.htm](http://www.bis.org/publ/rpfx16.htm)).

# OTC interest rate derivatives turnover in April 2016

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This publication presents the global results of the 2016 BIS Triennial Central Bank Survey of turnover in over-the-counter (OTC) interest rate derivatives markets. A separate publication presents the results of turnover in foreign exchange markets ([www.bis.org/publ/rpfx16.htm](http://www.bis.org/publ/rpfx16.htm)). Many participating authorities also publish their national results, links to which are available on the BIS website ([www.bis.org/statistics/triennialrep/national.htm](http://www.bis.org/statistics/triennialrep/national.htm)). The global results for a companion survey on amounts outstanding in OTC derivatives markets will be published in November 2016.

Data are subject to change. Revised data will be released concurrently with the *BIS Quarterly Review* in December 2016. The December 2016 *BIS Quarterly Review* will include several special feature articles that analyse the results of the 2016 Triennial Survey.

## Notations

billion	thousand million
trillion	thousand billion
e	estimated
lhs	left-hand scale
rhs	right-hand scale
\$	US dollar unless specified otherwise
...	not available
.	not applicable
–	nil or negligible

Differences in totals are due to rounding.

The term “country” as used in this publication also covers territorial entities that are not states as understood by international law and practice but for which data are separately and independently maintained.

## Abbreviations

ARS	Argentine peso	LTL	Lithuanian litas
AUD	Australian dollar	LVL	Latvian lats
BGN	Bulgarian lev	MXN	Mexican peso
BHD	Bahraini dinar	MYR	Malaysian ringgit
BRL	Brazilian real	NOK	Norwegian krone
CAD	Canadian dollar	NZD	New Zealand dollar
CHF	Swiss franc	OTH	other currencies
CLP	Chilean peso	PEN	Peruvian new sol
CNY	Chinese yuan (renminbi)	PHP	Philippine peso
COP	Colombian peso	PLN	Polish zloty
CZK	Czech koruna	RMB	renminbi; see CNY
DKK	Danish krone	RON	new Romanian leu
EUR	euro	RUB	Russian rouble
GBP	pound sterling	SAR	Saudi riyal
HKD	Hong Kong dollar	SEK	Swedish krona
HUF	Hungarian forint	SGD	Singapore dollar
IDR	Indonesian rupiah	THB	Thai baht
ILS	Israeli new shekel	TRY	Turkish lira
INR	Indian rupee	TWD	new Taiwan dollar
JPY	yen	USD	US dollar
KRW	Korean won	ZAR	South African rand

## 1. BIS Triennial Central Bank Survey

The BIS Triennial Central Bank Survey is the most comprehensive source of information on the size and structure of global foreign exchange (FX) and OTC derivatives markets. The Triennial Survey aims to increase the transparency of OTC markets and to help central banks, other authorities and market participants monitor developments in global financial markets. It also helps to inform discussions on reforms to OTC markets.

FX market activity has been surveyed every three years since 1986, and OTC interest rate derivatives market activity since 1995. The Triennial Survey is coordinated by the BIS under the auspices of the Markets Committee (for the FX part) and the Committee on the Global Financial System (for the interest rate derivatives part). It is supported through the Data Gaps Initiative endorsed by the G20.

The latest survey of turnover took place in April 2016. Central banks and other authorities in 52 jurisdictions participated in the 2016 survey (see page 13). They collected data from close to 1,300 banks and other dealers in their jurisdictions and reported national aggregates to the BIS, which then calculated global aggregates. Turnover data are reported by the sales desks of reporting dealers, regardless of where a trade is booked, and are reported on an unconsolidated basis, ie including trades between related entities that are part of the same group.

### Highlights

Highlights from the 2016 Triennial Survey of turnover in OTC interest rate derivatives markets:

- Daily turnover in OTC interest rate derivatives averaged \$2.7 trillion in April 2016. This was up from \$2.3 trillion in 2013 and \$2.1 trillion in 2010. Turnover in 2016 was boosted in part by more comprehensive reporting by dealers. Even so, the increase between 2013 and 2016 would have been larger still, but for the depreciation of many currencies against the US dollar, which reduced the US dollar value of turnover in currencies other than the US dollar.
- Interest rate swaps remained the most actively traded instruments in April 2016, at \$1.9 trillion per day, followed by forward rate agreements (FRAs) at \$651 billion.
- US dollar-denominated instruments overtook euro-denominated instruments as the most actively traded OTC interest rate derivatives. The average daily turnover of US dollar contracts rose from \$639 billion in April 2013 to \$1.4 trillion in April 2016. In contrast, that of euro-denominated contracts – historically the most actively traded segment – declined from \$1.1 trillion in April 2013 to \$638 billion in April 2016. Turnover in yen-denominated contracts rose to \$83 billion, but remained below pre-crisis levels. Among emerging market currencies, interest rate derivatives denominated in Mexican pesos and South African rand were the most actively traded, at \$26 billion and \$16 billion, respectively.
- The importance of financial institutions other than reporting dealers continued to increase. Their share of turnover rose from 59% in April 2013 to 66% in April 2016. Over the same period, the share of trading volume among reporting dealers declined from 34% to 26%. That of trades with non-financial customers edged up slightly to 8%.
- The geographical distribution of OTC interest rate derivatives trading saw the United States become the largest centre, surpassing the United Kingdom. Owing to the jump in the turnover of US dollar contracts, the United States' share of global turnover rose from 23% in April 2013 to 41% in April 2016. The United Kingdom's share fell from 50% to 39%, explained in part by the weakness of euro-related activity, where the United Kingdom remained the main centre. In the Asia-Pacific region, trades moved away from Japan and Australia, in particular for local currency contracts, while volumes in Hong Kong SAR and Singapore rose substantially.

## 2. Turnover in OTC interest rate derivatives markets

Average daily turnover in single currency OTC interest rate derivatives reached \$2.7 trillion in April 2016, up from \$2.3 trillion in April 2013 and \$2.1 trillion in April 2010 (Graph 1 and Table 1).<sup>1</sup> Data for 2016 were boosted in part by more comprehensive reporting by dealers. Exchange rate movements also influenced comparisons with previous surveys. In particular, the appreciation of the US dollar between 2013 and 2016 reduced the US dollar value of turnover in currencies other than the US dollar. Whereas, at current exchange rates, turnover increased by 15% between the 2013 and 2016 surveys, at constant exchange rates – adjusted for exchange rate changes – turnover grew almost twice as fast, by 28% (Table 1).

### Turnover by currency

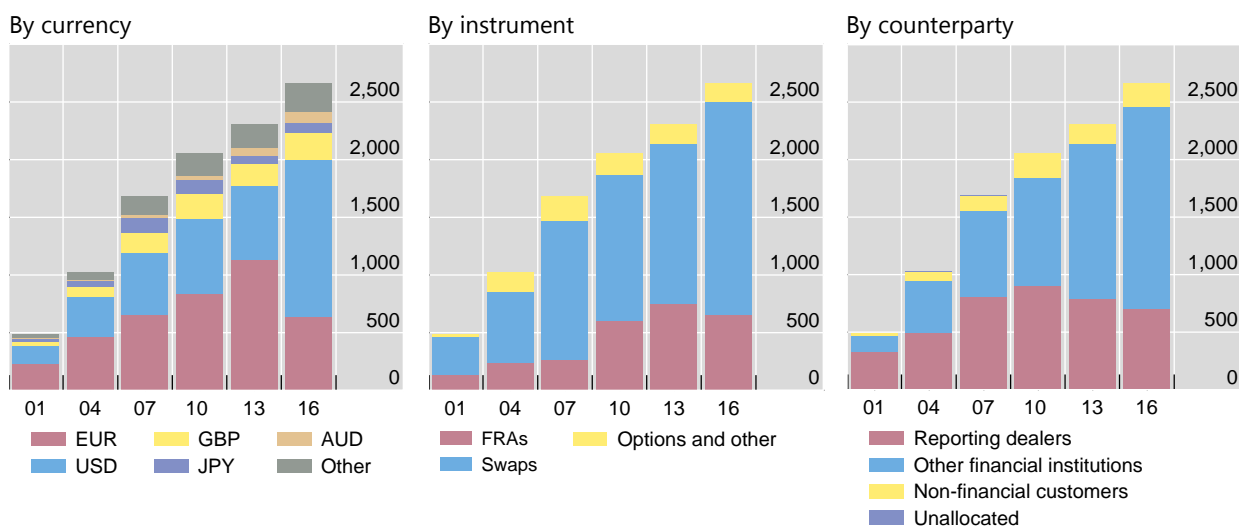
While OTC interest rate derivatives contracts in euros used to be the most traded by some margin, in April 2016 they were supplanted by the US dollar market. The turnover of US dollar-denominated interest rate derivatives rose by 112% between April 2013 and April 2016, to \$1.4 trillion (Graph 1, left-hand panel, and Table 3). This stood in contrast to the 44% contraction for euro-denominated instruments, to \$638 billion.

Turnover generally declined for currencies with negative short-term interest rates, such as the Swedish krona (–46% change from April 2013, to \$19.4 billion in April 2016), the Swiss franc (–5.1%, to \$14 billion) and the Danish krona (–57%, to \$1.7 billion). By contrast, turnover in yen-denominated contracts picked up by 20% from April 2013 to \$83 billion in April 2016, although it is still

### Turnover of OTC interest rate derivatives

Net-net basis,<sup>1</sup> daily averages in April, in billions of US dollars

Graph 1



<sup>1</sup> Adjusted for local and cross-border inter-dealer double-counting.

Source: BIS Triennial Central Bank Survey. For additional data by instrument, counterparty and currency, see Tables 1–4 on pages 8–11.

<sup>1</sup> Unless otherwise noted, data in this commentary refer to net-net turnover, adjusted for local and cross-border trades between reporting dealers. For an explanation of how net-net turnover is calculated, see pages 17–18.

substantially below its level of 2010 (\$124 billion).<sup>2</sup> Other OTC interest rate derivatives contracts in major currencies have also seen increases, including sterling (+27% from April 2013, to \$237 billion in April 2016), the Australian dollar (+33%, to \$101 billion) and the Canadian dollar (+30%, to \$39 billion).

OTC interest rate derivatives turnover for emerging market currencies tended to increase. The depreciation of many of these currencies against the US dollar between 2013 and 2016 caused the increase in turnover to be understated when measured in US dollars, and sometimes even resulted in declines when turnover actually increased when measured in local currency. Trading rose multiple times in contracts involving the Mexican peso (168% increase since April 2013, to \$26 billion in April 2016), the Hungarian forint (+213%, to \$7.6 billion), the Chilean peso (+239%, to \$4.2 billion) and the Colombian peso (+259%, to \$1.4 billion). Further, OTC interest rate derivatives denominated in Singapore and Hong Kong dollars recorded substantial gains in turnover, more than doubling between April 2013 and April 2016 to \$12 billion and \$5.2 billion, respectively.

OTC interest rate derivatives turnover fell for contracts denominated in the Brazilian real (–60%, to 6.6 billion) and the Indian rupee (–13%, to \$5.7 billion); but exchange rate effects were major drivers in those cases.<sup>3</sup> Average daily turnover for renminbi-denominated instruments fell by 30% from April 2013 to just \$10 billion in April 2016, in contrast to the increase in CNY trading in FX markets.<sup>4</sup>

## Turnover by instrument

The increase in OTC market turnover for interest rate derivatives was entirely driven by interest rate swaps. Swap turnover increased 33% from April 2013 to \$1.9 trillion in April 2016, bringing the share of swaps in total OTC interest rate derivatives turnover to 69%. All other categories of instrument covered by the Triennial Survey recorded declining average daily turnover in notional amounts (Graph 1, centre panel, and Table 1). In particular, turnover for FRAs decreased by 13% to \$651 billion, reducing their share of the total to 24%. This partly reversed the increase in FRA turnover reported in the 2013 survey.<sup>5</sup>

The remaining instruments – options and other products – accounted for only 6% of total turnover. Their trading declined by a further 5% to \$165 billion per day in April 2016. In this segment, the US dollar has taken an outsize role, accounting for over 71% of the global market in April 2016, up from 51% in April 2013 (Table 4).

## Turnover by counterparty

Trading between reporting dealers and other financial institutions – composed of smaller (non-reporting) banks and dealers, institutional investors, hedge funds and proprietary trading firms – has been behind the bulk of the increase in interest rate derivatives turnover since 2013, continuing a trend observed in previous surveys (Table 2). The volume of such trades increased by 30% to \$1.8 trillion in April 2016, which accounted for two thirds of average daily turnover. Interest rate swaps accounted for

<sup>2</sup> When valued at constant (April 2016) exchange rates, turnover in yen-denominated contracts increased by 36% between April 2013 and April 2016 but declined by 21% between April 2010 and April 2016. The observed changes in the unadjusted turnover can therefore not be (fully) attributed to exchange rate effects.

<sup>3</sup> When valued at constant (April 2016) exchange rates, average daily turnover for contracts denominated in the Brazilian real declined by 28% from April 2013 to April 2016, and increased by about 6% for Indian rupee-denominated contracts over the same period.

<sup>4</sup> See BIS, *Triennial Central Bank Survey: Foreign exchange turnover in April 2016*, September 2016, [www.bis.org/publ/rpfx16.htm](http://www.bis.org/publ/rpfx16.htm).

<sup>5</sup> See J Gyntelberg and C Upper, "The OTC interest rate derivatives market in 2013", *BIS Quarterly Review*, December 2013, pp 69–82, [www.bis.org/publ/qtrpdf/r\\_qt1312h.htm](http://www.bis.org/publ/qtrpdf/r_qt1312h.htm).

almost the entire increase (54% growth from April 2013, to \$1.2 trillion in April 2016). Turnover in FRAs between reporting dealers and other financial institutions decreased slightly by 4.0% to \$472 billion, while the trading volume of options and other instruments increased by 9.3% to \$93 billion.

The remaining increase in daily turnover came from trades with non-financial customers, which rose by 25% to \$210 billion (7.9% of total turnover). Trading with non-financial counterparties was entirely driven by swaps, which showed an increase of 39% from April 2013 to \$194 billion in April 2016.

The average daily volume of OTC interest rate derivatives trades among reporting dealers continued its decline, contracting by 12% to \$694 billion, with reductions across all categories of instruments. As a result, the share of inter-dealer trades fell further, to 26% of total turnover in April 2016 – a new low since the inception of the Triennial Survey in 1995.

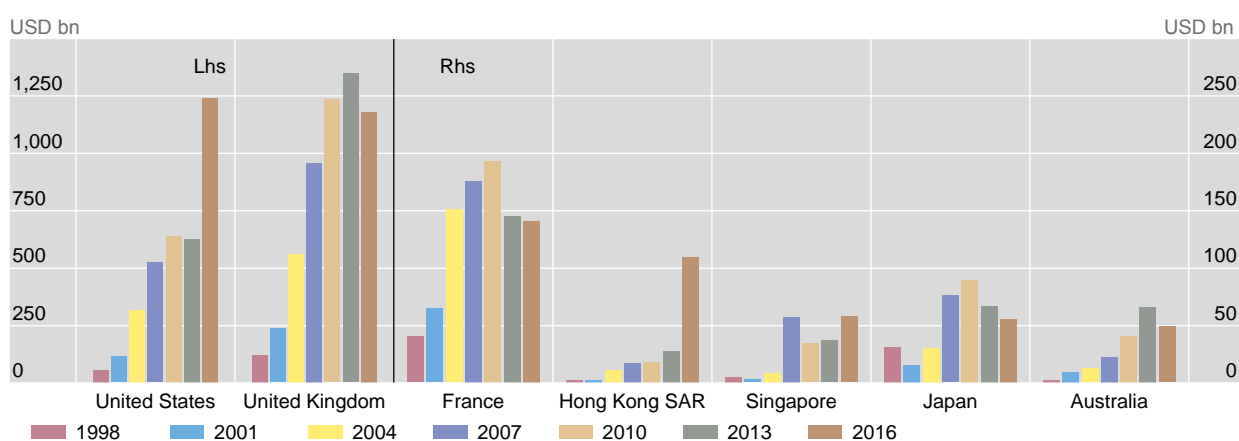
## Geographical distribution of turnover

In April 2016, sales desks located in the United States recorded the highest average daily turnover in OTC interest rate derivatives on a “net-gross” basis<sup>6</sup> (Graph 2 and Table 5), in tandem with the rapid increase in US dollar-denominated interest rate contracts. Turnover in the United States was up 98% compared with April 2013, amounting to \$1.2 trillion in April 2016 and representing 41% of the global daily trading volume in OTC interest rate derivatives. Traditionally, the United Kingdom had been the top global trading hub, but turnover there fell by 12% from April 2013, to \$1.2 trillion in April 2016 (39% of global turnover). In part, this reflects the fall in euro-denominated OTC interest rate derivatives contracts discussed above, since the United Kingdom is a major trading hub for euro-denominated contracts. Seventy-five per cent of all trades in euro-denominated derivatives were executed in the United Kingdom in April 2016.

### Geographical distribution of OTC interest rate derivatives turnover

Net-gross basis,<sup>1</sup> daily averages in April

Graph 2



<sup>1</sup> Adjusted for local inter-dealer double-counting.

Source: BIS Triennial Central Bank Survey. For additional data by country, see Table 5 on page 12.

<sup>6</sup> “Net-gross” turnover is adjusted for inter-dealer trades within the same jurisdiction, but not for cross-border trades between dealers. All turnover numbers by trading location are reported on a “net-gross” basis.



The drop in the turnover of euro-denominated contracts also affected turnover at sales desks located in continental Europe. While turnover in France fell only slightly (–3% change from April 2013, to \$141 billion in April 2016), activity in Germany and Switzerland fell sharply (by 69% and 75%, to \$31 billion and \$8 billion, respectively). Only in Belgium did business increase, gaining 93% to stand at \$17 billion in April 2016.

In the Asia-Pacific region, turnover in Japan was down 17% from April 2013 to \$56 billion in April 2016 – despite the global rise in the turnover of yen-denominated contracts. Turnover in yen contracts at sales desks in Japan fell by 16% to \$51 billion, while the United Kingdom reported a 122% increase to \$30 billion (30% of the global turnover in yen). Overall trading volume in Australia fell by 26% to \$49 billion, as fewer contracts denominated in Australian dollars were traded locally (\$39 billion in April 2016, equal to 35% of global turnover in Australian dollars). The major offshore trading centres for OTC interest rate derivatives in Australian dollars were the United Kingdom (26% of global turnover in AUD), Hong Kong SAR (20%) and Singapore (13%). OTC interest rate derivatives turnover volume picked up in Hong Kong SAR and Singapore, to \$110 billion and \$58 billion, respectively.

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#### OTC interest rate derivatives turnover by instrument<sup>1</sup>

Net-net basis,<sup>2</sup> daily averages in April, in billions of US dollars

Table 1

Instrument	2001	2004	2007	2010	2013	<b>2016</b>
Interest rate instruments	489	1,025	1,686	2,054	2,311	<b>2,677</b>
FRAs	129	233	258	600	749	<b>653</b>
Swaps	331	620	1,210	1,272	1,388	<b>1,859</b>
Options and other products <sup>3</sup>	29	171	217	182	174	<b>166</b>
<i>Memo:</i>						
<i>Turnover at April 2016 exchange rates<sup>4</sup></i>	570	980	1,526	1,861	2,084	<b>2,677</b>
<i>Exchange-traded derivatives<sup>5</sup></i>	2,164	4,497	6,068	7,695	4,699	<b>5,066</b>

<sup>1</sup> Single currency interest rate contracts only. <sup>2</sup> Adjusted for local and cross-border inter-dealer double-counting (ie "net-net" basis).

<sup>3</sup> The category "other interest rate products" covers highly leveraged transactions and/or trades whose notional amount is variable and where a decomposition into individual plain vanilla components was impractical or impossible. <sup>4</sup> Non-US dollar legs of foreign currency transactions were converted into original currency amounts at average exchange rates for April of each survey year and then reconverted into US dollar amounts at average April 2016 exchange rates. <sup>5</sup> Sources: Euromoney Tradedata; Futures Industry Association; The Options Clearing Corporation; BIS derivatives statistics. Foreign exchange futures and options traded worldwide.

## OTC interest rate derivatives turnover by instrument and counterparty<sup>1</sup>

Net-net basis,<sup>2</sup> daily averages in April, in billions of US dollars and percentages

Table 2

Instrument/counterparty	2001		2004		2007		2010		2013		2016	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
Total	489	100	1,025	100	1,686	100	2,054	100	2,311	100	<b>2,677</b>	<b>100</b>
with reporting dealers	323	66	494	48	800	47	896	44	786	34	<b>693</b>	<b>26</b>
with other financial institutions	142	29	450	44	747	44	937	46	1,352	59	<b>1,772</b>	<b>66</b>
with non-financial customers	25	5	79	8	136	8	221	11	169	7	<b>210</b>	<b>8</b>
Local	207	42	414	40	564	33	756	37	1,059	46	<b>890</b>	<b>33</b>
Cross-border	282	58	609	59	1,120	66	1,298	63	1,248	54	<b>1,785</b>	<b>67</b>
FRAs	129	26	233	23	258	15	600	29	749	32	<b>653</b>	<b>24</b>
with reporting dealers	88	68	112	48	143	55	296	49	241	32	<b>171</b>	<b>26</b>
with other financial institutions	37	28	113	48	89	34	266	44	492	66	<b>475</b>	<b>73</b>
with non-financial customers	5	4	8	3	27	10	37	6	16	2	<b>7</b>	<b>1</b>
Swaps	331	68	620	61	1,210	72	1,272	62	1,388	60	<b>1,859</b>	<b>69</b>
with reporting dealers	219	66	325	52	552	46	535	42	473	34	<b>461</b>	<b>25</b>
with other financial institutions	98	30	241	39	574	47	585	46	775	56	<b>1,204</b>	<b>65</b>
with non-financial customers	14	4	55	9	85	7	154	12	139	10	<b>194</b>	<b>10</b>
Options and other products <sup>3</sup>	29	6	171	17	217	13	182	9	174	8	<b>166</b>	<b>6</b>
with reporting dealers	16	55	57	34	106	49	65	36	71	41	<b>61</b>	<b>37</b>
with other financial institutions	7	26	96	56	85	39	86	47	85	49	<b>93</b>	<b>56</b>
with non-financial customers	5	18	16	9	24	11	30	16	13	8	<b>9</b>	<b>5</b>

<sup>1</sup> Single currency interest rate contracts only. <sup>2</sup> Adjusted for local and cross-border inter-dealer double-counting (ie "net-net" basis). <sup>3</sup> The category "other interest rate products" covers highly leveraged transactions and/or trades whose notional amount is variable and where a decomposition into individual plain vanilla components was impractical or impossible.

## OTC interest rate derivatives turnover by currency<sup>1</sup>

Net-net basis,<sup>2</sup> daily averages in April, in billions of US dollars

Table 3

Currency	2001	2004	2007	2010	2013	2016
Total	489	1,025	1,686	2,054	2,311	<b>2,677</b>
USD	152	347	532	654	639	<b>1,357</b>
EUR	232	461	656	834	1,133	<b>641</b>
GBP	37	90	172	213	187	<b>237</b>
AUD	8	12	19	37	76	<b>108</b>
JPY	27	46	137	124	69	<b>83</b>
CAD	6	8	15	48	30	<b>39</b>
NZD <sup>3</sup>	0	2	7	4	5	<b>26</b>
MXN <sup>3</sup>	0	2	5	5	10	<b>26</b>
SEK	5	13	33	20	36	<b>19</b>
ZAR <sup>3</sup>	0	2	3	5	16	<b>16</b>
NOK <sup>3</sup>	3	8	8	15	9	<b>15</b>
CHF	6	10	19	20	14	<b>14</b>
KRW <sup>3</sup>	0	0	5	16	12	<b>13</b>
SGD <sup>3</sup>	0	3	4	4	4	<b>12</b>
CNY <sup>3</sup>	...	...	0	2	14	<b>10</b>
HUF <sup>3</sup>	0	0	1	0	2	<b>8</b>
BRL <sup>3</sup>	0	1	2	3	16	<b>7</b>
INR <sup>3</sup>	0	0	3	2	6	<b>6</b>
PLN <sup>3</sup>	0	1	2	1	7	<b>6</b>
HKD <sup>3</sup>	1	4	9	3	2	<b>5</b>
CLP <sup>3</sup>	...	...	0	0	1	<b>4</b>
MYR <sup>3</sup>	0	0	0	0	2	<b>3</b>
THB <sup>3</sup>	0	0	0	1	3	<b>2</b>
DKK <sup>3</sup>	5	2	1	2	4	<b>2</b>
TWD <sup>3</sup>	0	0	1	1	1	<b>2</b>
COP <sup>3</sup>	...	...	0	0	0	<b>1</b>
CZK <sup>3</sup>	0	0	1	0	1	<b>1</b>
ILS <sup>3</sup>	...	...	0	0	2	<b>1</b>
SAR <sup>3</sup>	0	0	0	0	0	<b>1</b>
IDR <sup>3</sup>	0	0	0	0	0	<b>0</b>
RON <sup>3</sup>	...	...	...	0	0	<b>0</b>
RUB <sup>3</sup>	...	...	0	0	0	<b>0</b>
ARS <sup>3</sup>	...	...	...	...	0	<b>0</b>
TRY <sup>3</sup>	...	...	...	...	0	<b>0</b>
PHP <sup>3</sup>	...	0	0	1	0	<b>0</b>
PEN <sup>3</sup>	...	...	0	0	0	<b>0</b>
BGN <sup>3</sup>	...	...	...	...	0	<b>0</b>
BHD <sup>3</sup>	...	...	0	...	0	<b>0</b>
LTL <sup>3</sup>	...	...	0	0	0	...
LVL <sup>3</sup>	...	...	0	0	0	...
OTH	4	12	50	36	7	<b>14</b>

<sup>1</sup> Single currency interest rate contracts only. <sup>2</sup> Adjusted for local and cross-border inter-dealer double-counting (ie "net-net" basis). <sup>3</sup> Turnover for years prior to 2013 may be underestimated owing to incomplete reporting in previous surveys. Methodological changes in the 2013 survey ensured more complete coverage of activity in emerging market and other currencies.

## OTC interest rate derivatives turnover by instrument and currency<sup>1</sup>

Net-net basis,<sup>2</sup> daily averages in April, in billions of US dollars

Table 4

Instrument/currency	2001	2004	2007	2010	2013	2016
Total	489	1,025	1,686	2,054	2,311	<b>2,677</b>
AUD	8	12	19	37	76	<b>108</b>
CAD	6	8	15	48	30	<b>39</b>
EUR	232	461	656	834	1,133	<b>641</b>
GBP	37	90	172	213	187	<b>237</b>
JPY	27	46	137	124	69	<b>83</b>
MXN <sup>3</sup>	0	2	5	5	10	<b>26</b>
NZD <sup>3</sup>	0	2	7	4	5	<b>26</b>
SEK	5	13	33	20	36	<b>19</b>
USD	152	347	532	654	639	<b>1,357</b>
ZAR <sup>3</sup>	0	2	3	5	16	<b>16</b>
Other	21	43	106	110	111	<b>125</b>
FRAs	129	233	258	600	749	<b>653</b>
AUD	4	5	3	8	11	<b>2</b>
CAD	1	2	1	9	2	<b>0</b>
EUR	48	116	66	202	395	<b>170</b>
GBP	12	25	42	53	88	<b>91</b>
JPY	9	0	4	2	0	<b>0</b>
MXN <sup>3</sup>	0	1	0	0	0	<b>...</b>
NZD <sup>3</sup>	0	1	1	1	1	<b>0</b>
SEK	4	9	18	10	19	<b>10</b>
USD	39	59	98	282	193	<b>341</b>
ZAR <sup>3</sup>	0	1	2	4	11	<b>12</b>
OTH	12	16	23	29	28	<b>25</b>
Swaps	331	620	1,210	1,272	1,388	<b>1,859</b>
AUD	4	7	14	28	63	<b>105</b>
CAD	4	5	12	38	27	<b>38</b>
EUR	173	288	528	561	684	<b>445</b>
GBP	23	59	124	141	92	<b>138</b>
JPY	16	35	110	114	59	<b>76</b>
MXN <sup>3</sup>	0	1	5	4	9	<b>25</b>
NZD <sup>3</sup>	0	1	6	3	3	<b>26</b>
SEK	1	4	13	7	15	<b>9</b>
USD	100	195	322	302	356	<b>898</b>
ZAR <sup>3</sup>	0	0	1	1	4	<b>3</b>
OTH	9	25	77	72	75	<b>96</b>
Options and other products <sup>4</sup>	29	171	217	182	174	<b>166</b>
AUD	0	1	1	1	2	<b>2</b>
CAD	1	1	3	1	1	<b>0</b>
EUR	11	57	62	70	54	<b>26</b>
GBP	2	6	6	19	7	<b>8</b>
JPY	2	10	23	8	10	<b>7</b>
MXN <sup>3</sup>	0	0	1	0	0	<b>0</b>
NZD <sup>3</sup>	0	0	0	0	0	<b>0</b>
SEK	0	0	1	4	2	<b>1</b>
USD	12	93	113	70	89	<b>117</b>
ZAR <sup>3</sup>	0	0	1	1	0	<b>1</b>
OTH	1	3	6	8	8	<b>4</b>

<sup>1</sup> Single currency interest rate contracts only. <sup>2</sup> Adjusted for local and cross-border inter-dealer double-counting (ie "net-net" basis). <sup>3</sup> Turnover for years prior to 2013 may be underestimated owing to incomplete reporting in previous surveys. Methodological changes in the 2013 survey ensured more complete coverage of activity in emerging market and other currencies. <sup>4</sup> The category "other interest rate products" covers highly leveraged transactions and/or trades whose notional amount is variable and where a decomposition into individual plain vanilla components was impractical or impossible.

## Geographical distribution of OTC interest rate derivatives turnover<sup>1</sup>

Net-gross basis,<sup>2</sup> daily averages in April, in billions of US dollars and percentages

Table 5

Country	2001		2004		2007		2010		2013		2016	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
Argentina	...	...	...	...	...	...	...	...	0	0.0	<b>0</b>	<b>0.0</b>
Australia	10	1.5	13	1.0	23	1.0	41	1.5	66	2.4	<b>56</b>	<b>1.9</b>
Austria	4	0.6	14	1.0	5	0.2	5	0.2	1	0.0	<b>1</b>	<b>0.0</b>
Bahrain	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	<b>1</b>	<b>0.0</b>
Belgium	14	2.1	31	2.3	22	1.0	10	0.4	9	0.3	<b>17</b>	<b>0.5</b>
Brazil	0	0.0	1	0.1	0	0.0	7	0.3	4	0.1	<b>1</b>	<b>0.0</b>
Bulgaria	...	...	...	...	0	0.0	0	0.0	0	0.0	<b>0</b>	<b>0.0</b>
Canada	10	1.5	12	0.9	21	0.9	42	1.6	34	1.3	<b>33</b>	<b>1.1</b>
Chile	...	...	0	0.0	0	0.0	0	0.0	0	0.0	<b>0</b>	<b>0.0</b>
China	...	...	...	...	...	...	2	0.1	13	0.5	<b>4</b>	<b>0.1</b>
Chinese Taipei	0	0.0	2	0.1	1	0.1	2	0.1	1	0.0	<b>1</b>	<b>0.0</b>
Colombia	...	...	...	...	0	0.0	0	0.0	0	0.0	<b>0</b>	<b>0.0</b>
Czech Republic	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	<b>0</b>	<b>0.0</b>
Denmark	6	0.9	11	0.8	10	0.5	16	0.6	59	2.2	<b>10</b>	<b>0.3</b>
Estonia	...	...	...	...	0	0.0	0	0.0	0	0.0	...	...
Finland	1	0.1	0	0.0	3	0.1	1	0.1	2	0.1	<b>2</b>	<b>0.1</b>
France	65	9.6	151	11.4	176	8.1	193	7.3	146	5.4	<b>141</b>	<b>4.6</b>
Germany	94	13.9	43	3.2	90	4.2	48	1.8	101	3.8	<b>31</b>	<b>1.0</b>
Greece	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	<b>0</b>	<b>0.0</b>
Hong Kong SAR	3	0.4	11	0.8	17	0.8	18	0.7	28	1.0	<b>110</b>	<b>3.6</b>
Hungary	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	<b>0</b>	<b>0.0</b>
India	0	0.0	1	0.1	3	0.2	3	0.1	3	0.1	<b>2</b>	<b>0.1</b>
Indonesia	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	<b>0</b>	<b>0.0</b>
Ireland	6	0.9	12	0.9	7	0.3	7	0.3	3	0.1	<b>1</b>	<b>0.0</b>
Israel	...	...	...	...	...	...	...	...	0	0.0	<b>0</b>	<b>0.0</b>
Italy	24	3.5	38	2.8	30	1.4	27	1.0	24	0.9	<b>14</b>	<b>0.5</b>
Japan	16	2.3	31	2.3	76	3.5	90	3.4	67	2.5	<b>56</b>	<b>1.8</b>
Korea	0	0.0	1	0.1	5	0.2	11	0.4	8	0.3	<b>7</b>	<b>0.2</b>
Latvia	...	...	...	...	...	...	...	...	...	...	...	...
Lithuania	...	...	0	0.0	0	0.0	0	0.0	...	...	<b>0</b>	<b>0.0</b>
Luxembourg	4	0.7	7	0.6	3	0.2	2	0.1	0	0.0	<b>0</b>	<b>0.0</b>
Malaysia	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	<b>0</b>	<b>0.0</b>
Mexico	0	0.1	1	0.1	3	0.1	1	0.1	2	0.1	<b>1</b>	<b>0.0</b>
Netherlands	24	3.6	19	1.4	27	1.2	61	2.3	29	1.1	<b>22</b>	<b>0.7</b>
New Zealand	0	0.0	1	0.1	3	0.1	2	0.1	3	0.1	<b>5</b>	<b>0.2</b>
Norway	3	0.4	5	0.4	7	0.3	12	0.5	6	0.2	<b>4</b>	<b>0.1</b>
Peru	...	...	...	...	0	0.0	0	0.0	0	0.0	...	...
Philippines	...	...	0	0.0	0	0.0	1	0.0	0	0.0	<b>0</b>	<b>0.0</b>
Poland	0	0.1	1	0.1	3	0.1	2	0.1	3	0.1	<b>2</b>	<b>0.1</b>
Portugal	0	0.0	1	0.1	1	0.0	1	0.0	1	0.0	<b>0</b>	<b>0.0</b>
Romania	...	...	...	...	0	0.0	0	0.0	0	0.0	<b>0</b>	<b>0.0</b>
Russia	...	...	...	...	...	...	...	...	0	0.0	<b>0</b>	<b>0.0</b>
Saudi Arabia	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	<b>1</b>	<b>0.0</b>
Singapore	3	0.5	9	0.6	57	2.6	35	1.3	37	1.4	<b>58</b>	<b>1.9</b>
Slovakia	0	0.0	...	...	...	...	0	0.0	0	0.0	<b>0</b>	<b>0.0</b>
Slovenia	...	...	...	...	0	0.0	...	...	...	...	...	...
South Africa	1	0.1	3	0.2	4	0.2	6	0.2	11	0.4	<b>9</b>	<b>0.3</b>
Spain	20	3.0	12	0.9	17	0.8	31	1.2	14	0.5	<b>6</b>	<b>0.2</b>
Sweden	3	0.5	7	0.6	12	0.6	18	0.7	17	0.6	<b>14</b>	<b>0.5</b>
Switzerland	10	1.4	12	0.9	61	2.8	75	2.8	33	1.2	<b>8</b>	<b>0.3</b>
Thailand	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	<b>0</b>	<b>0.0</b>
Turkey	...	...	0	0.0	0	0.0	0	0.0	0	0.0	<b>0</b>	<b>0.0</b>
United Kingdom	238	35.2	563	42.3	957	44.0	1,235	46.6	1,348	49.9	<b>1,180</b>	<b>38.8</b>
United States	116	17.1	317	23.9	525	24.2	642	24.2	628	23.2	<b>1,241</b>	<b>40.8</b>
<b>Total</b>	<b>676</b>	<b>100.0</b>	<b>1,330</b>	<b>100.0</b>	<b>2,173</b>	<b>100.0</b>	<b>2,649</b>	<b>100.0</b>	<b>2,702</b>	<b>100.0</b>	<b>3,039</b>	<b>100.0</b>

<sup>1</sup> Single currency interest rate contracts only. Data may differ from national survey data owing to differences in aggregation procedures and rounding. Data for the Netherlands are not fully comparable over time due to reporting improvements in 2013. <sup>2</sup> Adjusted for local inter-dealer double-counting (ie "net-gross" basis).

## B Explanatory notes

The methodology and structure of the interest rate derivatives turnover part of the 2016 Triennial Central Bank Survey was unchanged from 2013. However, in some jurisdictions reporting was more comprehensive and thus the completeness and quality of data improved in the 2016 Triennial Survey.

### Participating authorities

Central banks and other authorities in 52 jurisdictions participated in the 2016 Triennial Survey. Authorities in the same jurisdictions, plus Estonia, participated in the 2013 survey.

<b>Argentina</b>	Central Bank of Argentina	<b>Korea</b>	Bank of Korea
<b>Australia</b>	Reserve Bank of Australia	<b>Latvia</b>	Bank of Latvia
<b>Austria</b>	Central Bank of the Republic of Austria	<b>Lithuania</b>	Bank of Lithuania
<b>Bahrain</b>	Bahrain Monetary Agency	<b>Luxembourg</b>	Central Bank of Luxembourg
<b>Belgium</b>	National Bank of Belgium	<b>Malaysia</b>	Central Bank of Malaysia
<b>Brazil</b>	Central Bank of Brazil	<b>Mexico</b>	Bank of Mexico
<b>Bulgaria</b>	Bulgarian National Bank	<b>Netherlands</b>	Netherlands Bank
<b>Canada</b>	Bank of Canada	<b>New Zealand</b>	Reserve Bank of New Zealand
<b>Chile</b>	Central Bank of Chile	<b>Norway</b>	Central Bank of Norway
<b>China</b>	People's Bank of China State Administration of Foreign Exchange	<b>Peru</b>	Central Reserve Bank of Peru
<b>Chinese Taipei</b>	Central Bank of China	<b>Philippines</b>	Bangko Sentral ng Pilipinas
<b>Colombia</b>	Bank of the Republic	<b>Poland</b>	National Bank of Poland
<b>Czech Republic</b>	Czech National Bank	<b>Portugal</b>	Bank of Portugal
<b>Denmark</b>	Danmarks Nationalbank	<b>Romania</b>	National Bank of Romania
<b>Finland</b>	Bank of Finland	<b>Russia</b>	Central Bank of the Russian Federation
<b>France</b>	Bank of France	<b>Saudi Arabia</b>	Saudi Arabian Monetary Agency
<b>Germany</b>	Deutsche Bundesbank	<b>Singapore</b>	Monetary Authority of Singapore
<b>Greece</b>	Bank of Greece	<b>Slovakia</b>	National Bank of Slovakia
<b>Hong Kong SAR</b>	Hong Kong Monetary Authority	<b>South Africa</b>	South African Reserve Bank
<b>Hungary</b>	Magyar Nemzeti Bank	<b>Spain</b>	Bank of Spain
<b>India</b>	Reserve Bank of India	<b>Sweden</b>	Sveriges Riksbank Statistics Sweden
<b>Indonesia</b>	Bank Indonesia	<b>Switzerland</b>	Swiss National Bank
<b>Ireland</b>	Central Bank of Ireland	<b>Thailand</b>	Bank of Thailand
<b>Israel</b>	Bank of Israel	<b>Turkey</b>	Central Bank of the Republic of Turkey
<b>Italy</b>	Bank of Italy	<b>United Kingdom</b>	Bank of England
<b>Japan</b>	Bank of Japan	<b>United States</b>	Federal Reserve Bank of New York

## Coverage

The Triennial Survey of OTC interest rate derivatives turnover covers contracts related to an interest bearing financial instrument whose cash flows are determined by referencing interest rates or another interest rate contract, eg an option on a futures contract to purchase a Treasury bill. This category is restricted to those deals where all the legs are exposed to only one currency's interest rate. Thus it excludes contracts involving the exchange of one or more foreign currencies, eg cross-currency swaps, and other contracts whose predominant risk characteristic is foreign exchange risk, which are to be reported as foreign exchange contracts.

The basis for reporting was in principle the location of the sales desk of any trade, even if deals entered into in different locations were booked in a central location. Thus, transactions concluded by offices located abroad were not reported by the country of location of the head office, but by that of the office abroad (insofar as the latter was a reporting institution in one of the other reporting countries). Where no sales desk was involved in a deal, the trading desk was used to determine the location of deals.

The survey collected turnover data for both proprietary and commissioned business of the reporting institutions. Commissioned business refers to reporting institutions' transactions as a result of deals as an agent or trustee in their own name, but on behalf of third parties, such as customers or other entities.

## Turnover data

Turnover data provide a measure of market activity, and can also be seen as a rough proxy for market liquidity. Turnover is defined as the gross value of all new deals entered into during a given period, and is measured in terms of the nominal or notional amount of the contracts. No distinction was made between sales and purchases (eg a purchase of \$5 million and a sale of \$7 million would amount to a gross turnover of \$12 million). The gross amount of each transaction was recorded once, and netting arrangements and offsets were ignored.

OTC derivatives transactions that are centrally cleared via central counterparties (CCPs) were reported on a pre-novation basis (ie with the original execution counterpart as counterparty). Any post-trade transaction records that arise from central clearing via CCPs (eg through novation) were not reported as additional transactions.

Turnover data were collected over a one-month period, the month of April, in order to reduce the likelihood of very short-term variations in activity contaminating the data. The data collected for the survey reflected all transactions entered into during the calendar month of April 2016, regardless of whether delivery or settlement was made during that month. In order to allow comparison across countries, daily averages of turnover were computed by dividing aggregate monthly turnover for the country in question by the number of days in April on which the foreign exchange and derivatives markets in that country were open.

Transactions are reported to the BIS in US dollar equivalents, with non-dollar amounts generally converted into US dollars using the exchange rate prevailing on the date of the trade.

## Instruments

The Triennial Survey of interest rate derivatives turnover covers forward rate agreements (FRAs), interest rate swaps and interest rate options. The instruments are defined and categorised as follows.



<b>Forward rate agreements (FRAs)</b>	Interest rate forward contracts in which the rate to be paid or received on a specific obligation for a set period of time, beginning at some time in the future, is determined at contract initiation.
<b>Swaps</b>	Agreements to exchange periodic payments related to interest rates on a single currency; can be fixed for floating, or floating for floating based on different indices. This group includes those swaps whose notional principal is amortised according to a fixed schedule independent of interest rates.
<b>OTC options</b>	<p>Option contracts that give the right to pay or receive a specific interest rate on a predetermined principal for a set period of time.</p> <p>OTC options include:</p> <ul style="list-style-type: none"> <li>• The interest rate cap: an OTC option that pays the difference between a floating interest rate and the cap rate.</li> <li>• The interest rate floor: an OTC option that pays the difference between the floor rate and a floating interest rate.</li> <li>• The interest rate collar: a combination of cap and floor.</li> <li>• The interest rate corridor: (i) a combination of two caps, one purchased by a borrower at a set strike and the other sold by the borrower at a higher strike to, in effect, offset part of the premium of the first cap; (ii) a collar on a swap created with two swaptions, the structure and participation interval being determined by the strikes and types of the swaptions; (iii) a digital knockout option with two barriers bracketing the current level of a long-term interest rate.</li> <li>• The interest rate swaption: an OTC option to enter into an interest rate swap contract, purchasing the right to pay or receive a certain fixed rate.</li> <li>• The interest rate warrant: an OTC option; long-dated (over one year) interest rate option.</li> </ul>
<b>Other products</b>	Other derivative products are instruments where decomposition into individual plain vanilla instruments such as FRAs, swaps or options is impractical or impossible. An example of "other" products is instruments with leveraged payoffs and/or those whose notional principal varies as a function of interest rates, such as swaps based on Libor squared or index-amortising rate swaps.

## Counterparties

Reporting institutions were requested to provide for each instrument a breakdown of contracts by counterparty as follows: reporting dealers, other financial institutions and non-financial customers, with separate information on local and cross-border transactions. The distinction between local and cross-border was determined according to the location of the counterparty and not its nationality.

<b>Reporting dealers</b>	<p>Financial institutions that participate as reporters in the Triennial Survey.</p> <p>These are mainly large commercial and investment banks and securities houses that (i) participate in the inter-dealer market and/or (ii) have an active business with large customers, such as large corporate firms, governments and non-reporting financial institutions; in other words, reporting dealers are institutions that actively buy and sell currency and OTC derivatives both for their own account and/or in meeting customer demand.</p> <p>In practice, reporting dealers are often those institutions that actively or regularly deal through electronic platforms, such as EBS or Reuters dealing facilities.</p> <p>This category also includes the branches and subsidiaries of institutions operating in multiple locations that do not have a trading desk but do have a sales desk in those locations that conducts active business with large customers.</p> <p>The identification of transactions with reporting dealers allows the BIS to adjust for double-counting in inter-dealer trades.</p>
<b>Other financial institutions</b>	<p>Financial institutions that are not classified as “reporting dealers” in the survey.</p> <p>These are typically regarded as foreign exchange and interest rate derivatives market end users. They mainly cover all other financial institutions, such as smaller commercial banks, investment banks and securities houses, and mutual funds, pension funds, hedge funds, currency funds, money market funds, building societies, leasing companies, insurance companies, other financial subsidiaries of corporate firms and central banks.</p>
<b>Non-financial customers</b>	<p>Any counterparty other than those described above, ie mainly non-financial end users, such as corporations and non-financial government entities. May also include private individuals who directly transact with reporting dealers for investment purposes, either on the online retail trading platforms operated by the reporting dealers or by other means (eg giving trading instructions by phone).</p>

Reporting dealers were requested to identify how much of their total turnover was attributed to “related party” transactions. Related party trades are defined as transactions between desks and offices, transactions with branches and subsidiaries and transactions between affiliated firms. These trades are included regardless of whether the counterparty is resident in the same country as the reporting dealer or in another country. However, trades that are conducted as back-to-back deals and trades to facilitate internal bookkeeping and internal risk management within a given reporting dealer are excluded, be they on a local or cross-border basis.

## Currencies

For turnover of single currency interest rate contracts, the following breakdown of currencies was requested: ARS, AUD, BGN, BHD, BRL, CAD, CHF, CLP, CNY, COP, CZK, DKK, EUR, GBP, HKD, HUF, IDR, ILS, INR, JPY, KRW, MXN, MYR, NOK, NZD, PEN, PHP, PLN, RON, RUB, SAR, SEK, SGD, THB, TRY, TWD, USD, ZAR and other.

Transactions conducted in a special unit of account adjusted to inflation (like CLF, COU and MXV) were treated as having been done in the main currency (respectively, CLP, COP and MXN). Transactions in offshore renminbi (CNH) are included in CNY.

## Elimination of double-counting

Double-counting arises because transactions between two reporting entities are recorded by each of them, ie twice. In order to derive meaningful measures of overall market size, it is therefore necessary to

halve the data on transactions between reporting dealers. To permit this, reporters are asked to distinguish deals contracted with other reporters (dealers).

The following methods of adjustment were applied: data on local deals with other reporters were first divided by two, and this figure was subtracted from total gross data to arrive at so-called "net-gross" figures, ie business net of local inter-dealer double-counting. In a second step, data on cross-border deals with other reporters were also divided by two, and this figure was subtracted from total "net-gross" data to obtain so-called "net-net" figures, ie business net of local and cross-border inter-dealer double-counting.

<b>Gross turnover</b>	Minus	<b>= Net-gross turnover</b>	Minus	<b>= Net-net turnover</b>
Not adjusted for inter-dealer double-counting (ie "gross-gross" basis)	half of the turnover with local reporting dealers	Adjusted for local inter-dealer double-counting (ie "net-gross" basis)	half of the turnover with reporting dealers abroad	Adjusted for local and cross-border inter-dealer double-counting (ie "net-net" basis)