



November 2017

Research Note

Asia-Pacific OTC Derivatives Study

Derivatives markets have grown markedly in Asia-Pacific in the past decade, with Hong Kong and Singapore now pre-eminent in regional trading of FX and interest rate derivatives (IRD). Total IRD daily average turnover in Asia-Pacific markets increased to \$298.3 billion (US dollars unless otherwise specified) in April 2016 from \$187.4 billion in April 2007, while the equivalent figure in FX increased to \$1.7 trillion from \$1 trillion.

This rate of growth has outstripped that of global derivatives markets. Between 2007 and 2016, IRD turnover in Asia-Pacific markets grew at 5% compound annual growth rate (CAGR), while FX turnover grew at 6%. Global IRD and FX turnover grew at 4% and 5% CAGR, respectively, over the same period.

Despite the increasing trading activity in Asia-Pacific markets, the trading volumes in those markets still remain low as a percentage of global trading volumes. For example, Hong Kong, the largest Asia-Pacific market by IRD trading activity on a net-gross basis, had only a 3.6% global market share, while the US and the European Union (EU) accounted for 40.8% and 47.5%, respectively, of global daily average IRD turnover in April 2016. Singapore, the largest Asia-Pacific market by FX trading activity on a net-gross basis, accounted for only 7.9% of the global daily average turnover, while the US and EU represented 36.9% and 47.6%, respectively, in April 2016.

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This study analyzes OTC derivatives trading in 13 Asia-Pacific countries

SUMMARY

The study analyzes OTC derivatives trading in 13 Asia-Pacific countries – Australia, China, Chinese Taipei, Hong Kong, India, Indonesia, Japan, Malaysia, New Zealand, Philippines, Singapore, South Korea, and Thailand. The analysis is based on data from the Bank for International Settlements (BIS) Triennial Central Bank Survey of foreign exchange and OTC derivatives markets, and focuses mainly on FX and IRD.

The second part of the report provides more detailed analysis on four key Asia-Pacific markets – Singapore, Hong Kong, Australia and Japan – based on data reported to local trade repositories and publicly disclosed.

Highlights of the report include:

- Daily average turnover for IRD and FX in Asia-Pacific markets totaled \$2 trillion in April 2016 compared with \$1.2 trillion in April 2007 on a net-gross basis^{1,2}. The share of IRD trading in Asia-Pacific markets contributed 10% of global IRD daily average turnover, while the share of FX trading was 26% of global FX daily average turnover.
- Between 2007 and 2016, IRD turnover in Asia-Pacific markets grew at about 5% CAGR, while FX turnover grew at 6%. This growth was a little higher compared with IRD and FX global markets turnover, which grew at 4% and 5% CAGR, respectively, over the same period.
- Total IRD daily average turnover in Asia-Pacific markets increased to \$298.3 billion in April 2016 from \$187.4 billion in April 2007. Swaps accounted for 82% of total IRD turnover, while options and other products contributed 14% and forward rate agreements (FRAs) comprised 4%.
- FX transactions accounted for about 85% of total daily average turnover in Asia-Pacific markets in April 2016^{3,4}. Total FX daily average turnover increased to \$1.7 trillion in April 2016 from \$1 trillion in April 2007. FX swaps accounted for more than half of daily average turnover. In 2016, FX swaps contributed 54% of FX daily average turnover and outright forwards comprised 14%. Spot FX represented 26% of daily trades.
- Despite increasing trading activity in Asia-Pacific markets, trading volumes in those markets remain low as a percentage of global trading volumes. For example, Hong Kong, the largest Asia-Pacific market by IRD trading activity on a net-gross basis, had only a 3.6% global market share, while the US and EU accounted for 40.8% and 47.5%, respectively, of global daily average IRD turnover in April 2016⁵. Singapore, the largest Asia-Pacific market by FX trading activity on a net-gross basis, accounted for only 7.9% of global daily average turnover, while the US and EU represented 36.9% and 47.6%, respectively, of global daily average FX turnover in April 2016.

¹ The BIS Triennial Central Bank Survey provides turnover data, which measures market activity and can 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. The survey is conducted on a triennial basis and collects turnover data over a one-month period in April (<http://www.bis.org/statistics/derstats3y.htm?m=6%7C32%7C617>). Throughout this study, historical annual daily average turnover data represents the turnover data for the month of April of the corresponding year. The survey is based on turnover data “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”

² The BIS adjusts the turnover data for local interdealer double counting (net-gross basis) and for local and cross-border interdealer double counting (net-net basis)

³ FX includes FX derivatives (exotics, forwards, non-deliverable forwards (NDFs), non-deliverable options) and spot transactions

⁴ Turnover data does not include equity linked, commodities and credit default swaps, which have low turnover in Asia-Pacific markets

⁵ EU data does not include data for Croatia, Cyprus and Malta

- Australia, Hong Kong, Japan and Singapore are the major OTC derivatives markets in the region. Combined, these four markets account for 94% of total daily average IRD turnover in Asia-Pacific, and 87% of total daily average FX turnover in the region.
- Daily average IRD turnover increased in Hong Kong and Singapore from April 2013 to April 2016, but declined in Australia and Japan over the same period. Daily average IRD turnover was \$109.8 billion in Hong Kong, \$58 billion in Singapore, \$56.4 billion in Australia and \$55.9 billion in Japan in April 2016.
- Daily average FX turnover increased in Japan, Hong Kong and Singapore from April 2013 to April 2016, but declined in Australia over the same period. Daily average FX turnover was \$517.2 billion in Singapore, \$436.6 billion in Hong Kong, \$399 billion in Japan and \$121.3 billion in Australia in April 2016.
- The majority of both IRD and FX trades were with reporting dealers abroad and other financial institutions. Non-financial customers contributed an insignificant share of IRD and FX turnover. The share of reporting local dealers was also relatively small.
- Most IRD transactions in Hong Kong were executed in US dollar, while most IRD transactions in Singapore were in Australian dollars. In Japan and Australia, most IRD daily average turnover was in local currencies.
- Most FX transactions were executed in US dollar. The share of FX transactions executed in local currencies was significant in Australia and Japan, but relatively small in Hong Kong and Singapore.
- Total outstanding notional of OTC derivatives reported to the Hong Kong Trade Repository (HKTR) was \$13.3 trillion, including \$12.2 trillion of interest rate swaps and \$1.2 trillion of non-deliverable forwards (NDFs) at the end of the third quarter of 2017⁶.
 - The notional outstanding of interest rate swaps intended to clear has reached \$6.6 trillion.
 - The notional outstanding of NDFs intended to clear totaled \$317.6 billion.
 - 48% of interest rate swaps notional outstanding had a residual maturity of less than a year.
 - NDFs with a residual maturity of less than six months represented the majority of the notional outstanding.
- Total notional outstanding of OTC derivatives in Singapore reported to DTCC Data Repository (Singapore) Pte. Ltd. (DDRS)⁷ was \$37.3 trillion, including \$27.1 trillion of IRD, \$10.1 trillion of FX and FX derivatives, and \$190.5 billion of credit derivatives as of June 30, 2017.
 - \$1.3 trillion of IRD was traded on execution venues, representing 5% of IRD notional outstanding and 7% of outstanding number of contracts.

⁶ The Hong Kong Trade Repository (HKTR) reports only include OTC derivatives data collected by the trade repository under the mandatory reporting obligations. The published data covers certain interest rate swaps (fixed versus floating swaps, basis swap and overnight indexed swaps (OIS)) and NDFs

⁷ DTCC Global Trade Repository (GTR) provides trade reporting services in Singapore via its legal entity, DTCC Data Repository (Singapore) Pte. Ltd. (DDRS), which is regulated and licensed by the Monetary Authority of Singapore (MAS)

- \$8 trillion of IRD notional was cleared compared with \$19.1 trillion that was non-cleared.
- IRD with a tenor of less than one year totaled \$4.8 trillion, outstanding trades with a tenor of between one and five years equaled \$16.9 trillion, and IRD with a tenor of more than five years totaled \$5.5 trillion.
- 9% of FX outstanding notional (\$897.1 billion) and 13% of outstanding contracts were traded on execution venues.
- \$286.3 billion (3% of FX notional outstanding and 5% of outstanding contracts) was cleared.
- \$7.7 trillion of FX notional outstanding had a tenor of less than one year. FX products with a tenor of between one and five years totaled \$2.3 trillion, while the notional of the products with a tenor of more than five years was only \$69.6 billion.
- Almost 100% of credit derivatives were not traded on execution venues.
- \$35.4 billion – about 19% of credit derivatives notional outstanding – was cleared.
- 91% of credit derivatives notional outstanding had a tenor of more than one year.
- Total OTC derivatives notional outstanding in Australia reported to DTCC Data Repository (Singapore) Pte. Ltd. (DDRS)⁸ was \$42.3 trillion, including \$34.7 trillion of IRD, \$7.3 trillion of FX and FX derivatives, and \$264.1 billion of credit derivatives as of June 30, 2017.
 - \$4 trillion of IRD was traded on swap execution facilities (SEFs), representing 12% of IRD notional outstanding and 10% of number of outstanding contracts.
 - \$15.3 trillion of IRD notional was cleared compared with \$19.5 trillion that was non-cleared.
 - IRD with a tenor of less than one year totaled \$10.2 trillion, outstanding trades with a tenor of between one and five years equaled \$15.1 trillion, and IRD with a tenor of more than five years totaled \$9.4 trillion.
 - 7% of FX notional outstanding (\$540 billion) and 5% of outstanding contracts was traded on SEFs.
 - About \$35 billion of FX notional outstanding was cleared as of June 30, 2017, representing 0.5% of notional outstanding.
 - \$6.3 trillion of FX notional outstanding had a tenor of less than one year. FX products with a tenor between one and five years totaled \$1 trillion, while the notional of the products with a tenor of more than five years was only \$74.6 billion.
 - About 2% of credit derivatives notional outstanding was traded on SEFs, most of which was index credit default swaps (CDS).

⁸ DTCC Global Trade Repository provides trade reporting services in Australia via its legal entity, DTCC Data Repository (Singapore) Pte Ltd (DDRS). DDRS is a holder of the Australian derivative trade repository (ADTR) license, which was awarded by the Australian Securities and Investment Commission (ASIC)

- \$72.7 billion – about 28% of credit derivatives notional outstanding – was cleared.
- 50% of credit derivatives notional outstanding had a tenor of between one and five years, and 47% of notional outstanding had a tenor of more than five years.
- Total notional outstanding of OTC derivatives in Japan was \$41.1 trillion, including \$39.6 trillion of IRD, \$0.9 trillion of FX derivatives⁹, \$0.3 trillion of credit derivatives and \$0.2 trillion of equity derivatives as of September 30, 2016^{10,11}.
 - \$6.7 trillion of notional outstanding was reported by banks, \$4.7 trillion by Type I financial instruments business operators¹², and \$0.1 trillion by insurance companies.
 - About 72% of outstanding derivatives was cleared, most of which were interest rate swaps.

⁹ Under the classification of Japanese transaction reporting in 2016, FX derivatives include exotics, NDFs, NDOs and vanilla options (do not include forwards)

¹⁰ Based on public data published by the Japan Financial Services Agency (JFSA)

¹¹ Based on the US dollar / yen exchange rate as of September 30, 2016 (<http://www.x-rates.com/historical/?from=JPY&amount=1&date=2016-09-30>)

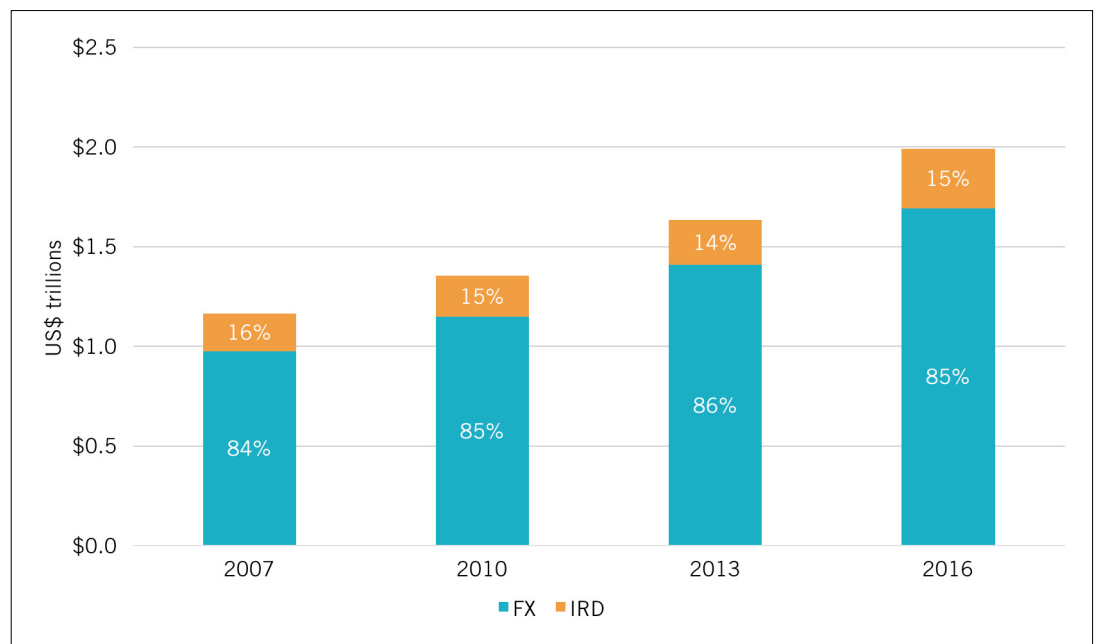
¹² For example, securities firms

DAILY AVERAGE IRD AND FX TURNOVER IN ASIA-PACIFIC MARKETS

Daily average turnover for IRD and FX in Asia-Pacific markets totaled \$2 trillion in 2016

Daily average turnover for IRD and FX in Asia-Pacific markets totaled \$2 trillion in 2016 compared with \$1.2 trillion in 2007 on a net-gross basis¹³. FX, as the primary driver of turnover growth, accounted for about 85% of total turnover in April 2016^{14,15}.

FX and IRD Daily Average Turnover in Asia-Pacific Markets



Source: ISDA analysis based on BIS data

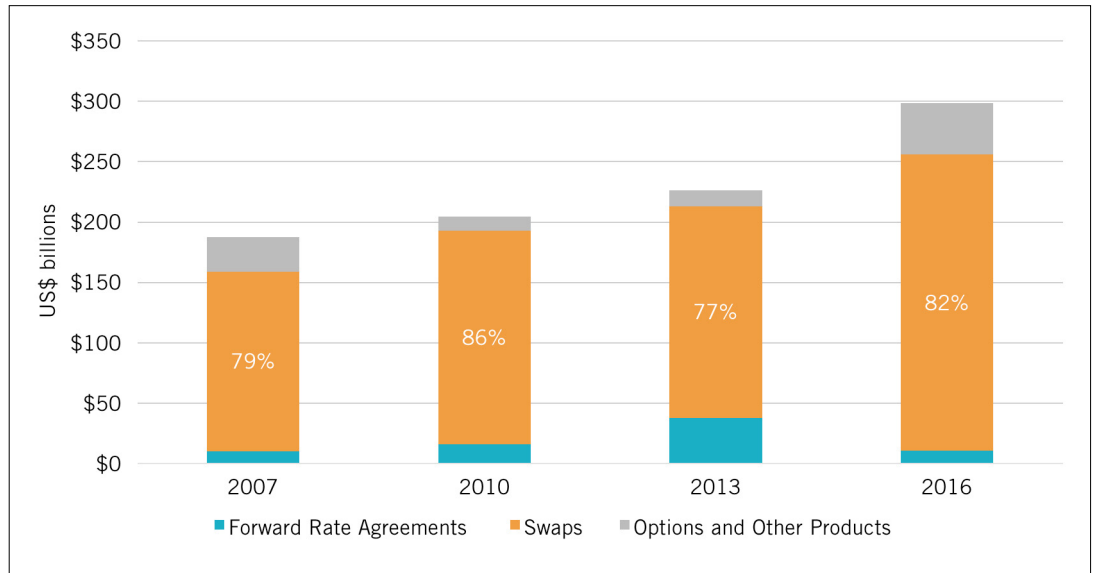
Total IRD daily average turnover in Asia-Pacific markets increased to \$298.3 billion in April 2016 from \$187.4 billion in April 2007. Swaps accounted for 82% of total IRD turnover, while options and other products contributed 14% and FRAs contributed 4% in 2016.

¹³ The BIS adjusts the turnover data for local interdealer double counting (net-gross basis) and for local and cross-border interdealer double counting (net-net basis)

¹⁴ FX products include FX derivatives (exotics, forwards, NDFs, NDOs, vanilla options) and spot transactions

¹⁵ This turnover data does not include equity linked, commodities and credit default swaps, which have low turnover in Asian markets

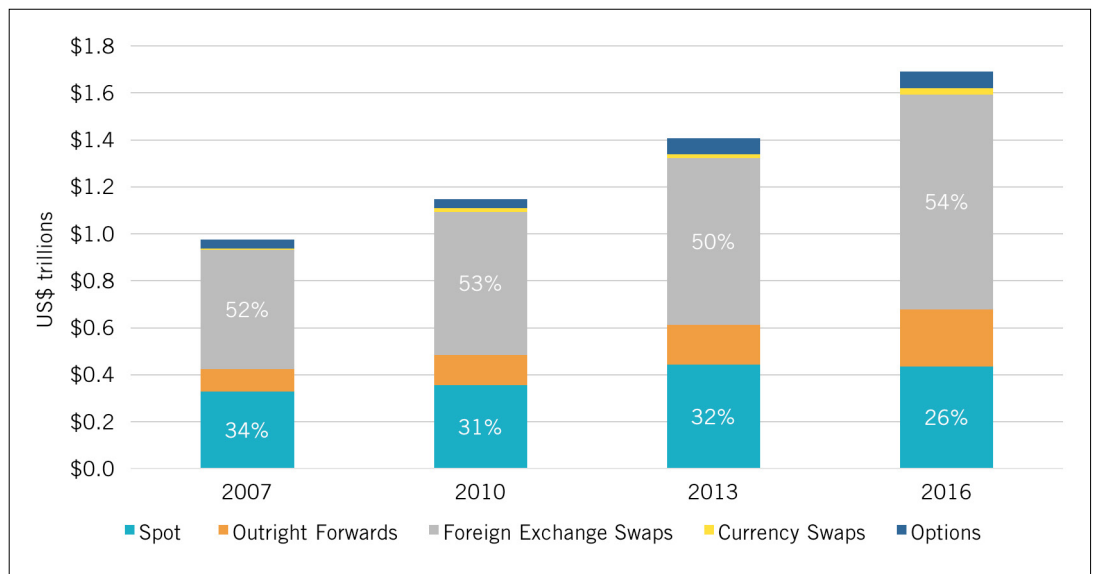
IRD Daily Average Turnover



Source: ISDA analysis based on BIS data

The total average daily turnover of FX increased to \$1.7 trillion in April 2016 from \$1 trillion in April 2007. FX swaps accounted for more than half of daily average turnover. In 2016, FX swaps contributed 54% of FX daily average turnover and outright forwards comprised 14%. Spot FX represented 26% of daily trades.

FX and FX Derivatives Daily Average Turnover



Source: ISDA analysis based on BIS data

Between 2007 and 2016, IRD turnover in Asia-Pacific markets grew at about 5% CAGR, while FX turnover grew at 6% CAGR. This growth was a little higher compared with the IRD and FX global markets turnover, which grew at 4% and 5% CAGR, respectively, over the same period.

Total IRD Average Daily Turnover for Asia-Pacific Markets (US\$ billions)

Derivatives reporting country	2007	2010	2013	2016	CAGR
Australia	22.7	40.6	66.2	56.4	11%
China*	0.0	1.5	13.0	4.1	18%
Chinese Taipei	1.5	1.6	0.6	0.6	-10%
Hong Kong SAR	17.3	18.5	27.9	109.8	23%
India	3.4	3.5	3.2	1.9	-6%
Indonesia	0.1	0.0	0.0	0.0	-20%
Japan	76.4	89.9	67.1	55.9	-3%
Malaysia	0.1	0.1	0.1	0.1	-9%
New Zealand	2.8	1.5	2.5	4.6	6%
Philippines	0.0	1.1	0.0	0.0	31%
Singapore	57.4	34.6	37.1	58.0	0%
South Korea	5.4	10.7	7.8	6.6	2%
Thailand	0.4	0.7	0.8	0.3	-2%
Total IRD Turnover for Asia-Pacific Markets	187.4	204.3	226.5	298.3	5%

*No data available for 2007; CAGR is calculated between 2010 and 2016

Total FX Average Daily Turnover for Asia-Pacific Markets (US\$ billions)

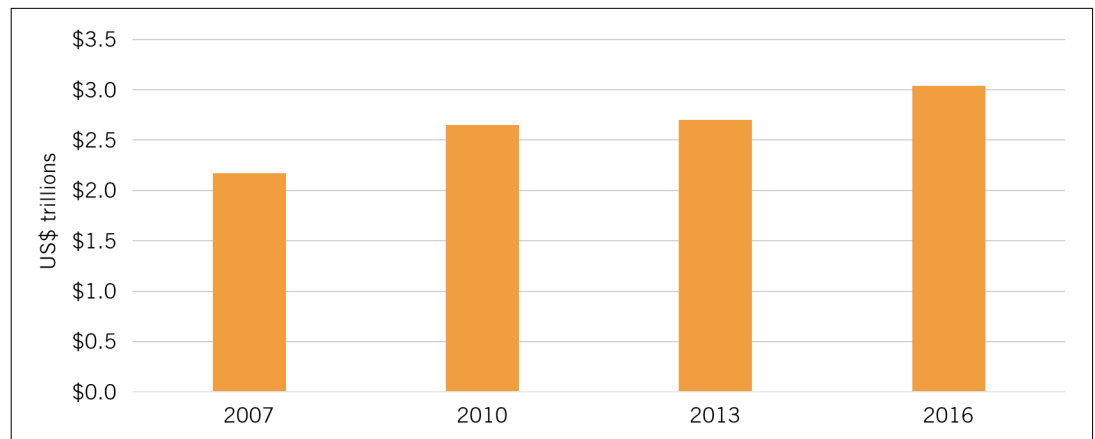
Derivatives reporting country	2007	2010	2013	2016	CAGR
Australia	176.3	192.1	181.7	121.3	-4%
China	9.3	19.8	44.3	72.8	26%
Chinese Taipei	15.5	18.0	26.1	26.6	6%
Hong Kong SAR	181.0	237.6	274.6	436.6	10%
India	38.4	27.4	31.3	34.3	-1%
Indonesia	3.0	3.4	5.0	4.6	5%
Japan	250.2	312.3	374.2	399.0	5%
Malaysia	3.5	7.1	11.1	8.4	10%
New Zealand	12.8	8.8	11.8	10.0	-3%
Philippines	2.3	5.0	3.7	2.6	1%
Singapore	241.8	266.0	383.1	517.2	9%
South Korea	35.2	43.8	47.5	47.8	3%
Thailand	6.3	7.4	12.8	10.5	6%
Total FX Turnover for Asia-Pacific Markets	975.6	1148.6	1407.1	1691.7	6%

GLOBAL DAILY AVERAGE IRD AND FX TURNOVER

Global daily average FX turnover increased to \$6.5 trillion from \$4.3 trillion between April 2007 and April 2016

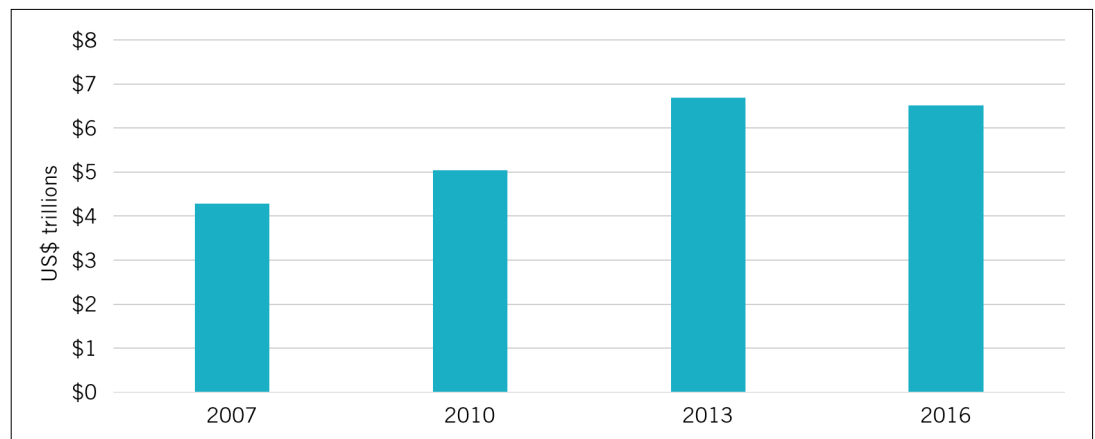
Global daily average IRD turnover increased to \$3 trillion in April 2016 from \$2.2 trillion in April 2007. Global daily average turnover in FX increased to \$6.5 trillion from \$4.3 trillion over the same period.

Global Daily Average IRD Turnover



Source: ISDA analysis based on BIS data

Global Daily Average FX Turnover

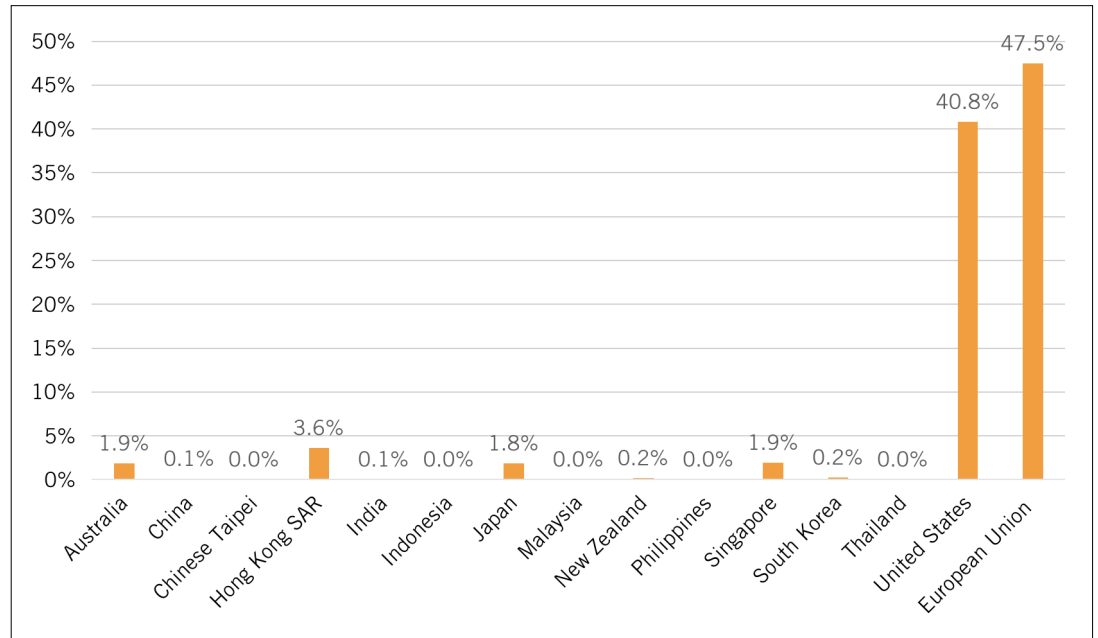


Source: ISDA analysis based on BIS data

Despite increased trading activity in Asia-Pacific, trading volumes in those markets remain low as a percentage of global trading volumes. In April 2016, most of the Asia-Pacific markets represented less than 1% of global daily average turnover both in IRD and FX. Hong Kong, the largest Asia-Pacific market by IRD trading activity on a net-gross basis, had only a 3.6% global market share, while the US and EU accounted for 40.8% and 47.5%, respectively, of global daily average IRD turnover¹⁶.

¹⁶ EU data does not include data for Croatia, Cyprus and Malta

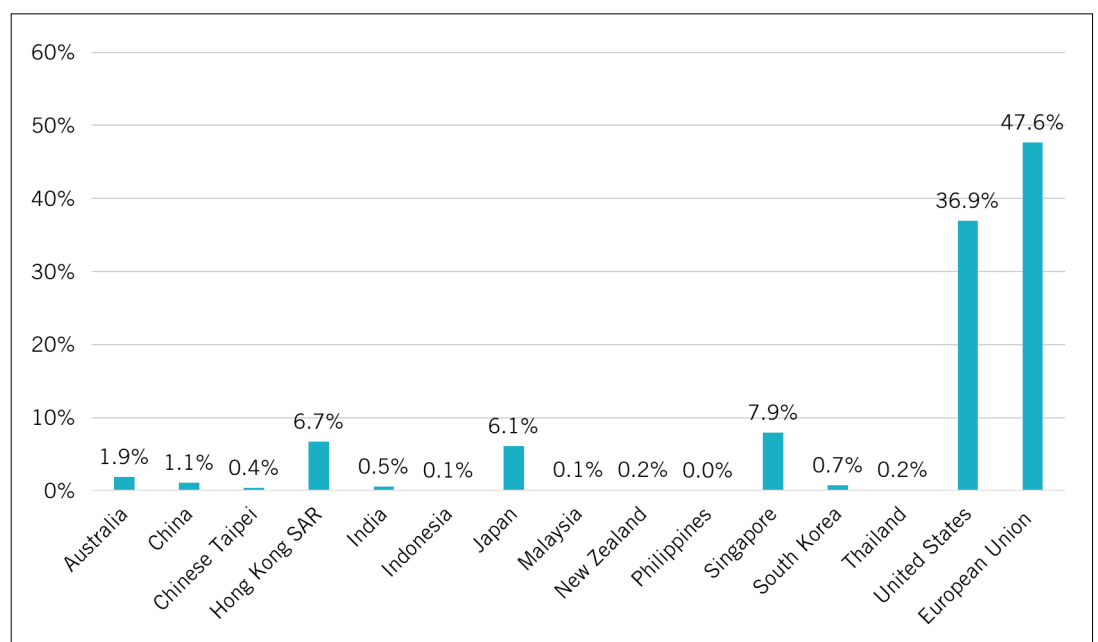
Global Market Share by Daily Average IRD Turnover



Source: ISDA analysis based on BIS data

In April 2016, the US and EU contributed 36.9% and 47.6%, respectively, of global daily average FX turnover. Singapore, which had the largest global market share in FX among Asia-Pacific markets, accounted for only 7.9% of global daily average turnover.

Global Market Share by Daily Average FX Turnover



Source: ISDA analysis based on BIS data

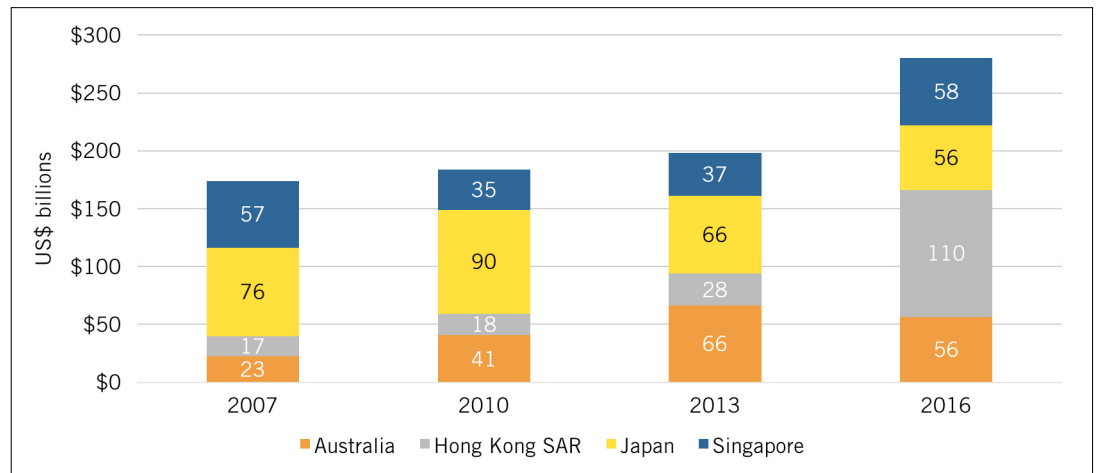
REGIONAL MARKET SHARE

Australia, Hong Kong, Japan and Singapore are the major OTC derivatives markets in the region. Combined, these four markets account for 94% of total daily average IRD turnover and 87% of total daily average FX turnover in Asia-Pacific markets

Australia, Hong Kong, Japan and Singapore are the major OTC derivatives markets in the region. Combined, these four markets account for 94% of total daily average IRD turnover in Asia-Pacific and 87% of total daily average FX turnover. While the combined market share remained relatively stable over time, there were some changes in the share of each market from 2007 to 2016.

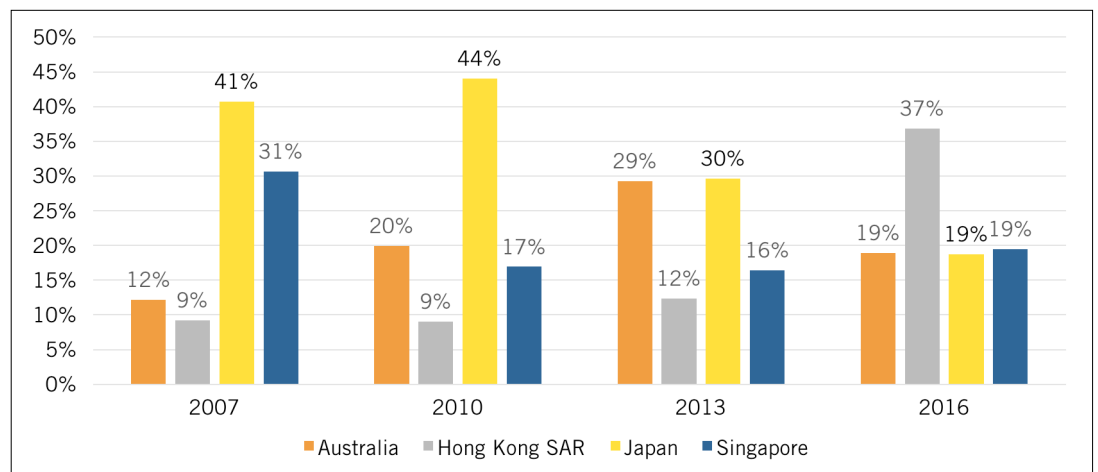
The regional market share of Hong Kong IRD trading activity jumped to 37% in 2016 from 12% in 2013, while daily average turnover increased to \$109.8 billion from \$27.9 billion. The daily average IRD turnover in Japan has been declining, and its market share fell to 19% in 2016 from 30% in 2013. Daily average IRD turnover in Australia declined to \$56.4 billion in 2016 from \$66.2 billion in 2013, and its regional market share decreased to 19% in 2016 from 29% in 2013.

Daily Average IRD Turnover



Source: ISDA analysis based on BIS data

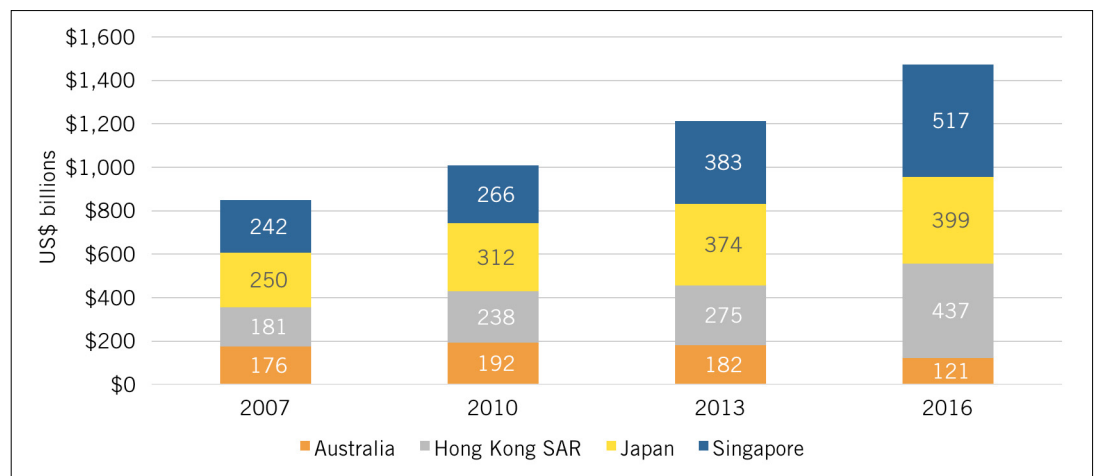
Regional Market Share by IRD Turnover



Source: ISDA analysis based on BIS data

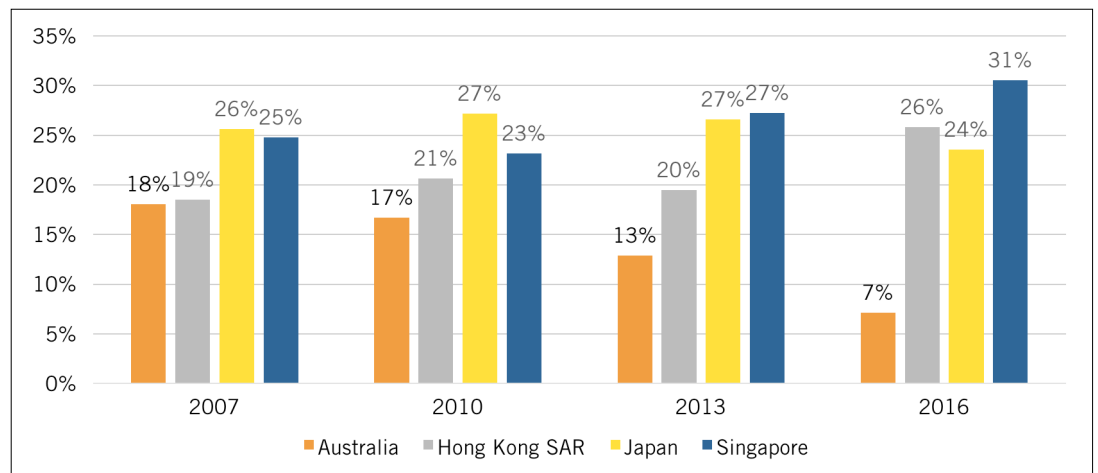
The regional market share of FX trading in Singapore and Hong Kong has been gradually increasing since 2007, and reached 31% and 26%, respectively, in 2016. Daily average FX turnover in Singapore and Hong Kong reached \$517.2 billion and \$436.6 billion, respectively, in April 2016. Daily average FX turnover in Japan increased to \$399 billion, but the market share of Japanese FX turnover declined to 24% in 2016. Australian market share has been gradually decreasing and was significantly smaller compared with the other three jurisdictions in 2016. Daily average FX turnover in Australia declined to \$121.3 billion in 2016.

Daily Average FX Turnover



Source: ISDA analysis based on BIS data

Regional Market Share by FX Turnover



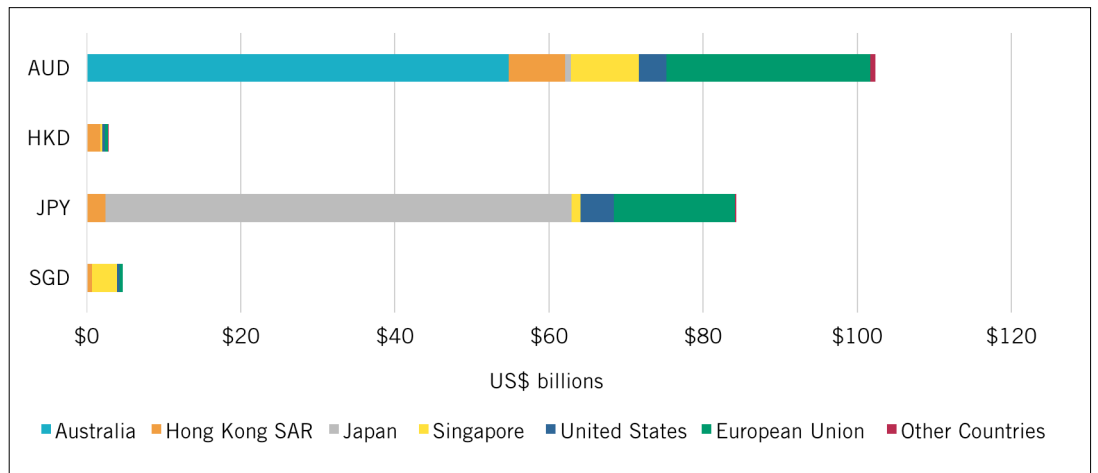
Source: ISDA analysis based on BIS data

GLOBAL IRD TURNOVER BY LOCAL CURRENCIES

In April 2016, global IRD turnover in Australian dollars totaled \$120.4 billion, while turnover denominated in yen was \$98.5 billion

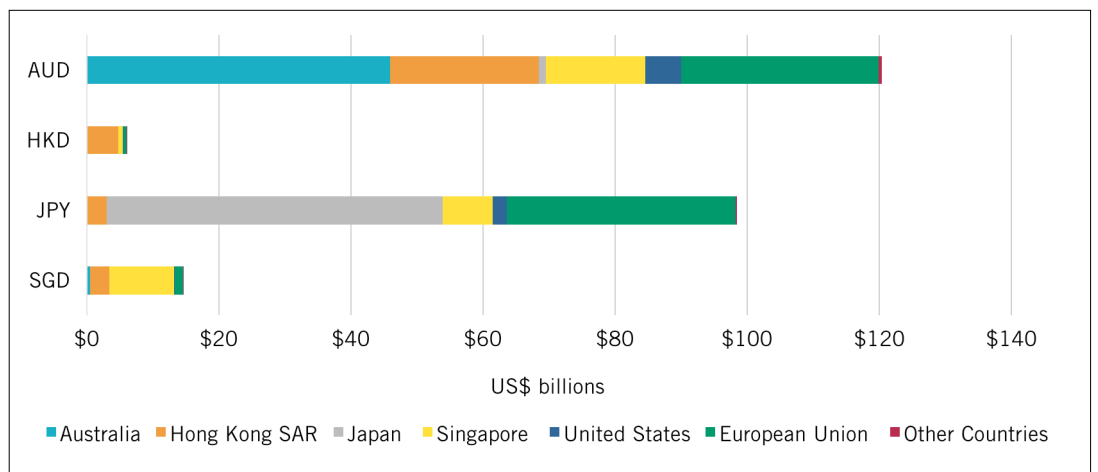
In April 2016, global IRD turnover in Australian dollars totaled \$120.4 billion, up 18% from \$102.4 billion in April 2013. Global IRD turnover denominated in yen increased to \$98.5 billion, while turnover denominated in Hong Kong dollars and Singapore dollars totaled \$14.7 billion and \$6.1 billion, respectively, in April 2016. The share of Australian dollar-denominated contracts traded locally declined to 38% in April 2016 from 53% in April 2013. The major offshore trading centers for IRD in Australian dollars were Hong Kong, Singapore and the EU. Global daily average IRD turnover denominated in yen increased to \$98.5 billion, but the share of yen denominated contracts declined to 52% from 72%. 78% of global IRD contracts in Hong Kong dollars, 52% of global IRD contracts in yen and 67% of global IRD contracts in Singapore dollars were traded locally in Hong Kong, Japan and Singapore, respectively.

Global IRD Turnover by Local Currencies (April 2013)



Source: ISDA analysis based on BIS data

Global IRD Turnover by Local Currencies (April 2016)



Source: ISDA analysis based on BIS data

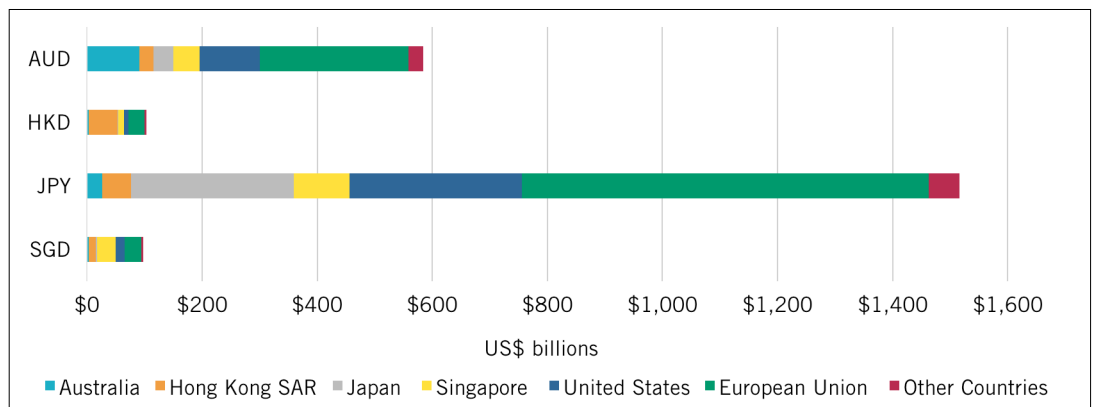
GLOBAL FX TURNOVER BY LOCAL CURRENCIES

In April 2016, global FX turnover in Australian dollars totaled \$452.3 billion, while turnover denominated in yen was \$1.4 trillion

In April 2016, global FX turnover in Australian dollars totaled \$452.3 billion, down 23% from \$584.4 billion in April 2013. Global daily average trades denominated in yen were \$1.4 trillion in 2016, down 5% compared with April 2013. Hong Kong dollar and Singapore dollar-denominated trades increased by 18% and 23%, respectively, over the same period and totaled \$121.9 billion and \$119.7 billion¹⁷.

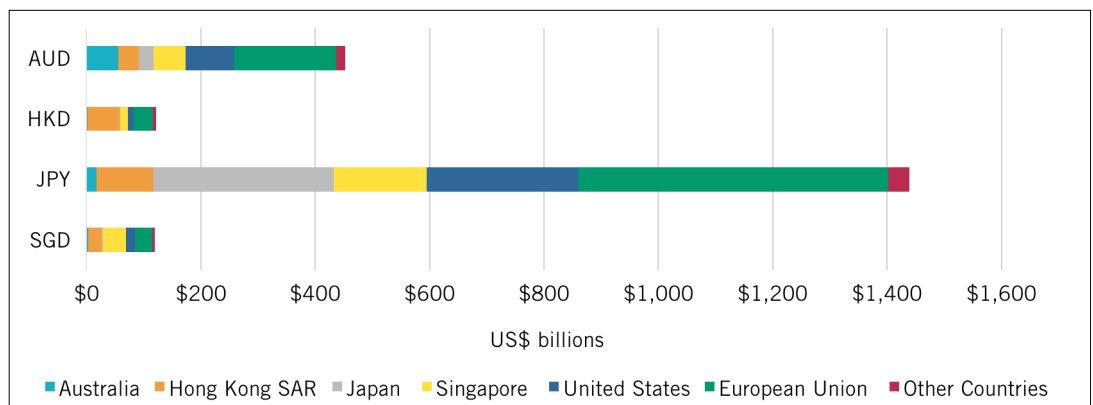
In April 2016, only \$56 billion of global FX contracts denominated in Australian dollars was traded locally compared with \$91.3 billion in 2013. The decline in local trading was offset by the increase in offshore trading in Hong Kong and Singapore. The major offshore trading centers for FX in Australian dollars were the EU (\$178.5 billion), the US (\$85.6 billion) and Singapore (\$55.3 billion). Out of \$1.4 trillion of FX contracts denominated in yen, 22% was traded locally, 38% was traded in the EU, and 18% was traded in the US. 46% of global FX contracts in Hong Kong dollars and 34% of global FX in Singapore dollars were traded locally.

Global FX Turnover by Local Currencies (April 2013)



Source: ISDA analysis based on BIS data

Global FX Turnover by Local Currencies (April 2016)



Source: ISDA analysis based on BIS data

¹⁷ The numbers are daily averages calculated on a net-gross basis

HONG KONG

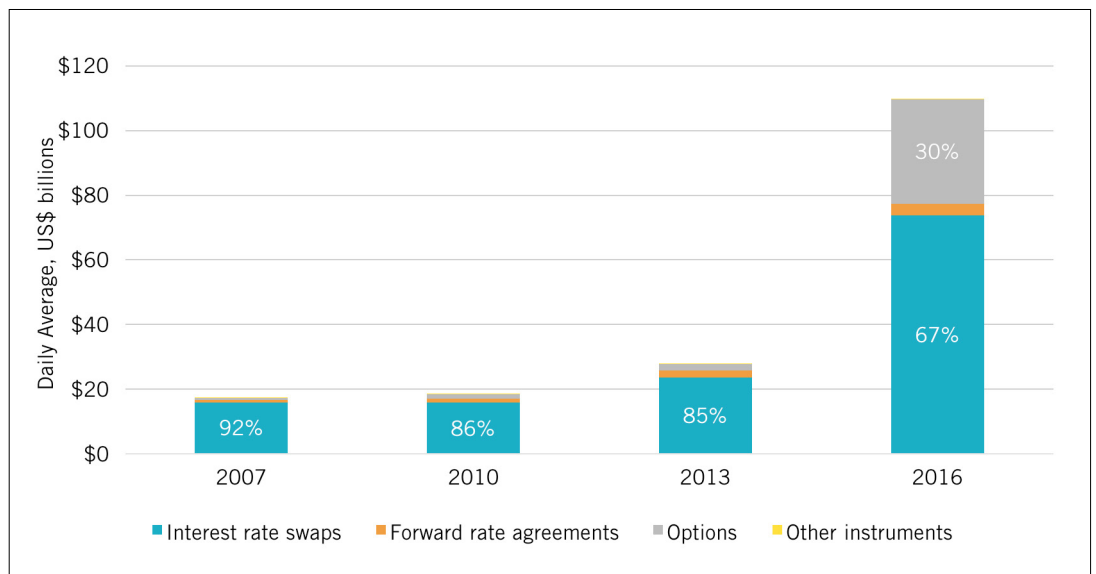
In 2016, Hong Kong was largest IRD market and the second largest FX market in Asia-Pacific by average daily turnover

Hong Kong has one of the most active OTC derivatives markets in Asia. In 2016, it was the fourth largest FX market in the world and the second largest in Asia-Pacific by daily average turnover on a net-gross basis. Hong Kong is also a significant player in IRD. It was the largest IRD market in Asia-Pacific and the fourth largest in the world. However, Hong Kong global market share in both FX and IRD, at 6.7% and 3.6%, respectively, still remains small compared with US and EU markets.

Daily Average IRD Turnover

Daily average IRD turnover by product was \$109.8 billion in April 2016 compared with \$27.9 billion in April 2013. Most of the growth was driven by daily average interest rate swap turnover, which increased to \$73.8 billion in April 2016. Interest rate swaps represented about 67% of IRD turnover, followed by options, which contributed about 30%.

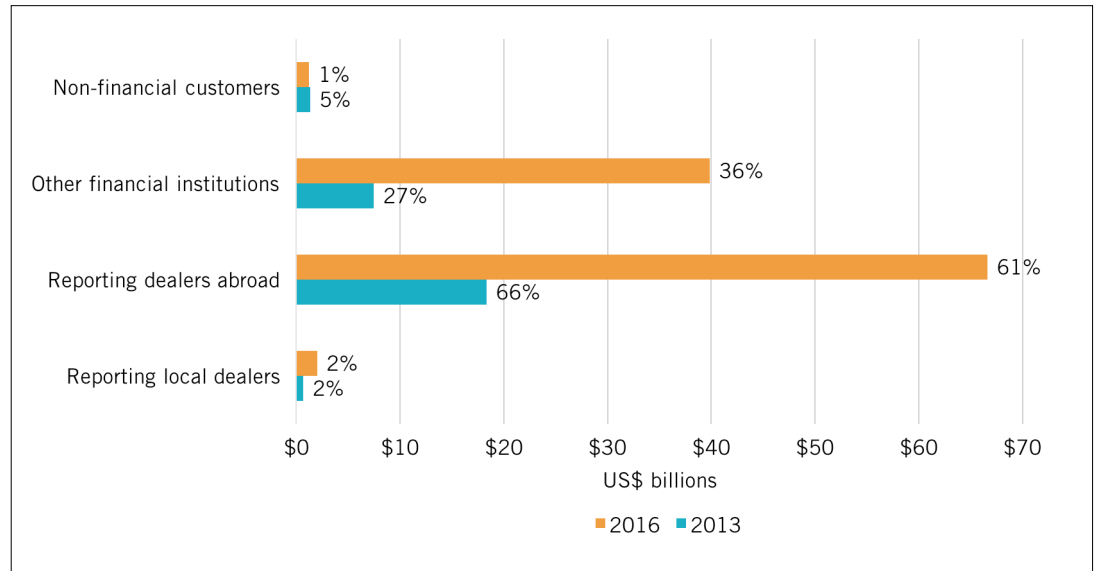
Hong Kong IRD Turnover by Product



Source: ISDA analysis based on BIS data

IRD trading with reporting dealers abroad increased to \$66.6 billion in April 2016 from \$18.3 billion in April 2013 on a net-gross basis. The share of IRD trading with reporting dealers abroad declined to 61% from 66% over the same period. The share of trading with other financial institutions increased to \$39.9 billion and accounted for 36% of total daily average IRD turnover in April 2016. The share of trading with reporting local dealers and non-financial customers was extremely small.

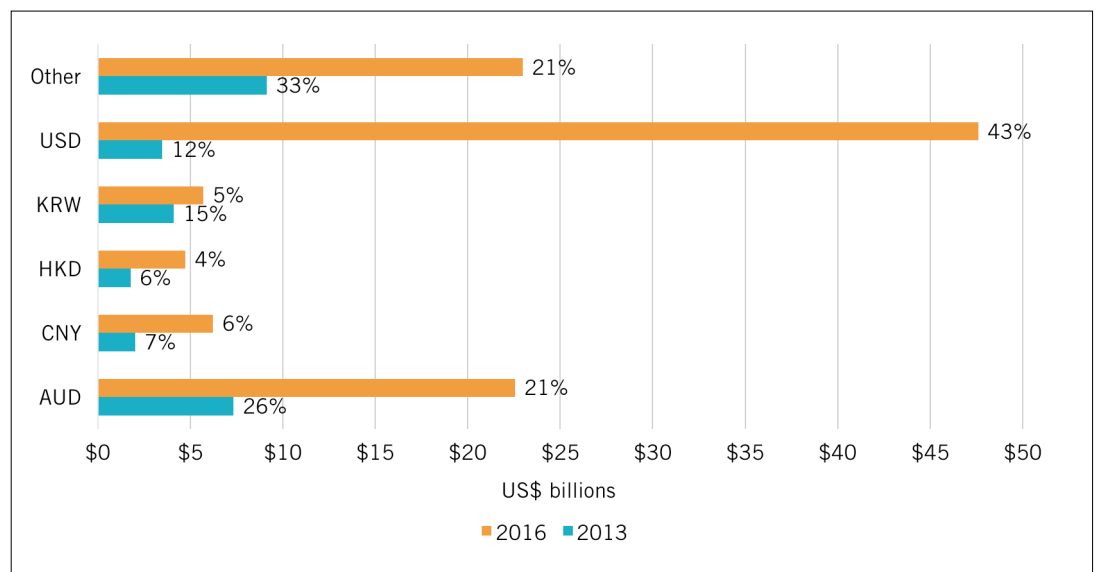
Hong Kong IRD Turnover by Counterparty



Source: ISDA analysis based on BIS data

Daily average IRD trading in US dollars jumped to \$47.6 billion in April 2016 from \$3.5 billion in April 2013, and the share of IRD turnover in US dollars increased to 43% from 12% over the same period. While the daily average IRD volume increased among most of the currencies, the share of contracts denominated in some currencies (including Korean won and Hong Kong dollar) declined in 2016 compared with 2013. In 2016, daily average turnover denominated in Australian dollars totaled \$22.5 billion and accounted for 21% of all IRD trades in Hong Kong compared with only 4% of trades in Hong Kong dollars.

Hong Kong IRD Turnover by Currency

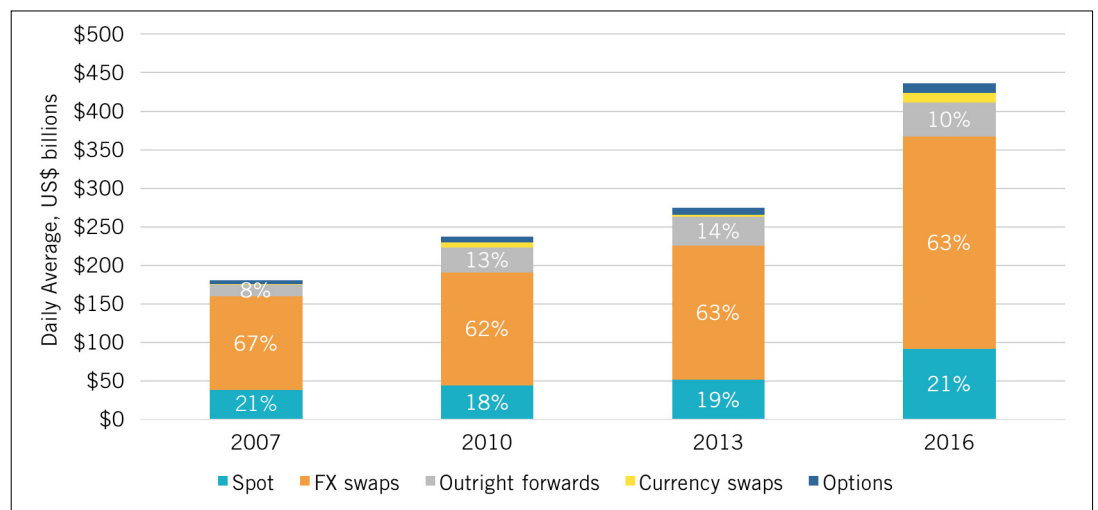


Source: ISDA analysis based on BIS data

Daily Average FX Turnover

FX trading has been consistently growing, averaging \$436.6 billion per day in April 2016 compared with \$274.6 billion in April 2013. Most of the growth was driven by daily average FX swaps turnover, which increased to \$275.9 billion in April 2016. FX swaps represented about 63% of FX turnover, followed by FX spot, which contributed about 21%.

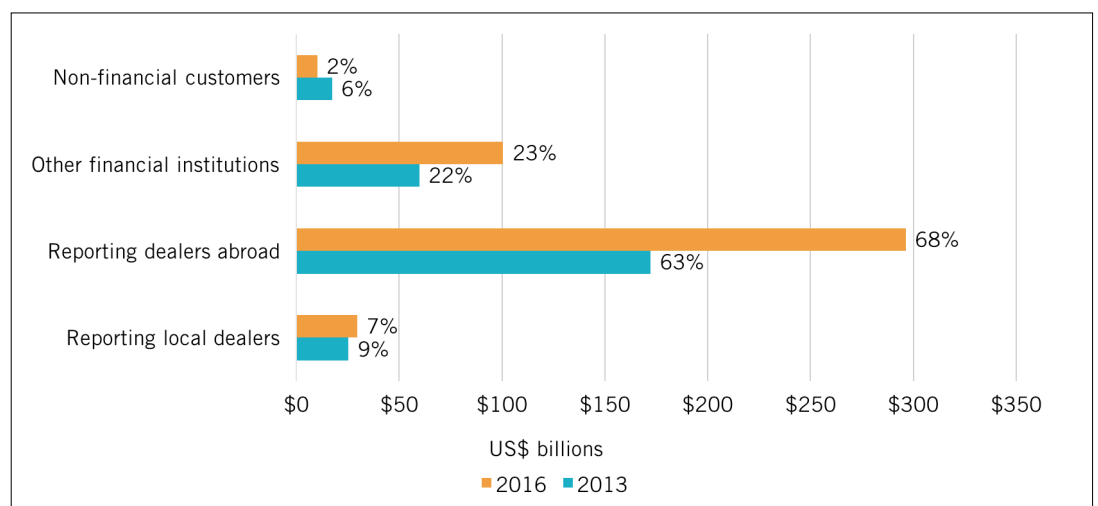
Hong Kong FX Turnover by Product



Source: ISDA analysis based on BIS data

FX trading with reporting dealers abroad increased to \$296.2 billion in April 2016 from \$172.2 billion in April 2013 on a net-gross basis. FX trading with other financial institutions grew to \$100.6 billion from \$59.8 billion over the same period. The share of FX trading by reporting dealers abroad accounted for 68% of daily FX turnover in April 2016, while the share of trading with other financial institutions was 23%.

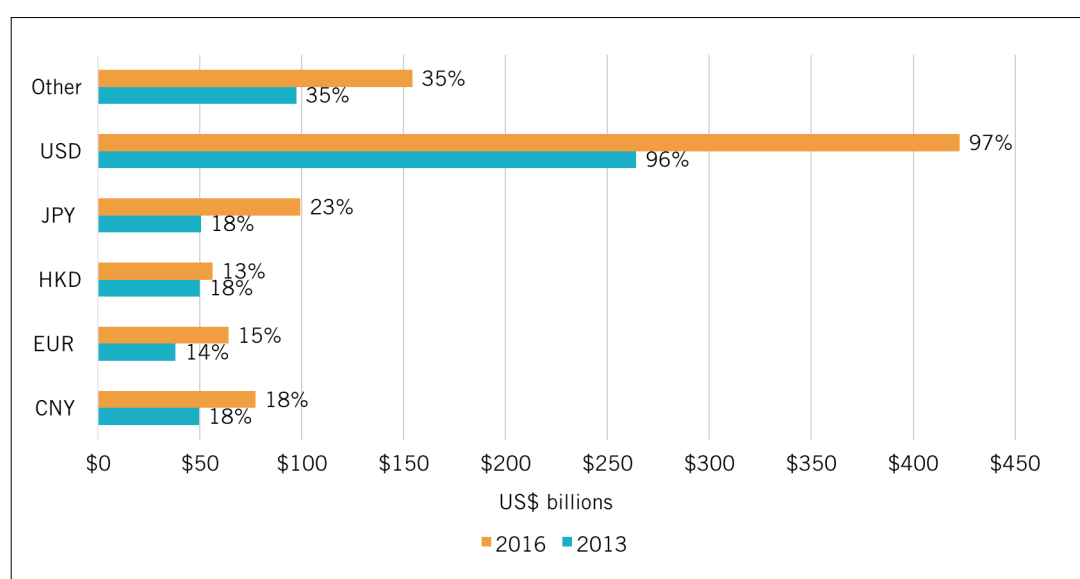
Hong Kong FX Turnover by Counterparty



Source: ISDA analysis based on BIS data

US dollar was the most widely traded currency in FX trading. In 2016, it was on one side of 97% of all trades in Hong Kong. Daily average FX trading in US dollars jumped to \$422.7 billion in April 2016 from \$264 billion in April 2013. Yen-denominated transactions increased to \$99.2 billion and Chinese yuan-denominated transactions totaled \$77.1 billion. The share of yen-denominated FX transactions increased to 23% in 2016 from 18% in 2013, while the share of Chinese yuan transactions remained unchanged at 18%. Hong Kong dollar denominated transactions totaled \$56 billion and accounted for 13% of daily FX trades in Hong Kong¹⁸.

Hong Kong FX Turnover by Currency



Source: ISDA analysis based on BIS data

Hong Kong Trade Repository Data

In line with Group-of-20 nations' commitments to reform the OTC derivatives market, the Hong Kong Monetary Authority (HKMA) and the Securities and Futures Commission (SFC) have been working on implementing a regulatory regime for OTC derivatives. Phase 1 reporting requirements took effect from July 2015, which covered certain interest rate swaps – basis swaps, floating versus fixed swaps and overnight indexed swaps (OIS) – and FX NDFs¹⁹. Phase 2 reporting, which expands mandatory reporting to cover all OTC derivatives in five key asset classes – interest rates, FX, equity, credit and commodities – commenced in July 2017. The analysis is based on HKTR public disclosures²⁰.

¹⁸ As each transaction involves two currencies, the sum of shares in individual currencies totals 200%

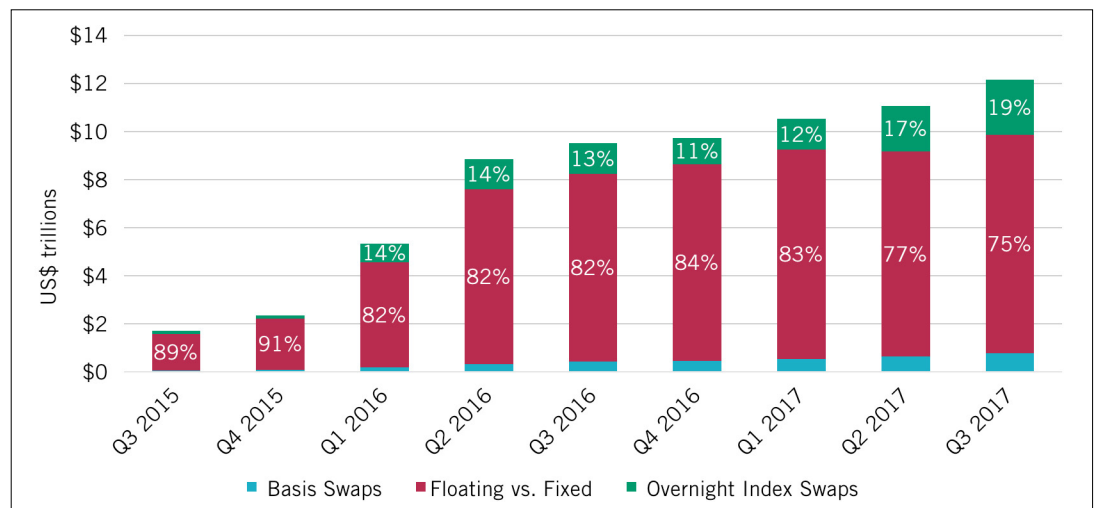
¹⁹ Although Phase 1 reporting commenced in July 2015, there was a six-month concession period and a further three-month grace period for backloading. As a result, the population of trades reported to the HKTR prior to the second quarter of 2016 and reported afterwards is very different

²⁰ The HKTR reports only include OTC derivatives data collected by the trade repository under the mandatory reporting obligations. The published data covers certain interest rate swaps (fixed versus floating, basis swaps and OIS) and NDFs. As such, they are not exhaustive of all derivatives in the asset classes of interest rates and FX, and this data set is not directly comparable to the BIS data

Interest Rate Swaps Outstanding Positions²¹

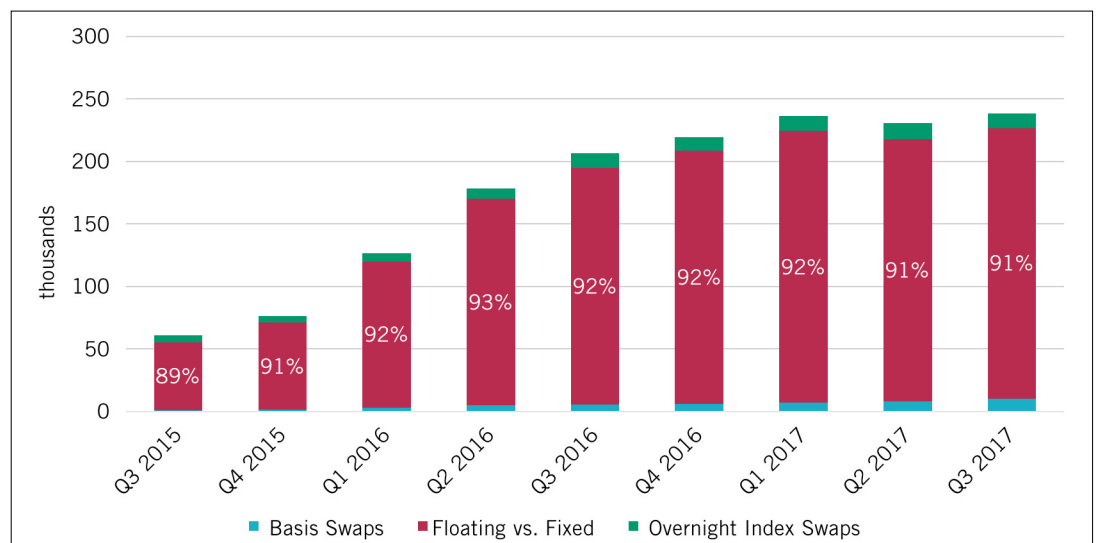
The notional outstanding of interest rate swaps totaled \$12.2 trillion at the end of the third quarter of 2017. The number of outstanding trades was about 238,000 at the end of the third quarter of 2017 compared with about 207,000 at the end of the third quarter of 2016. The growth was primarily driven by floating versus fixed swaps. At the end of the third quarter of 2017, floating versus fixed swaps totaled \$9.1 trillion and represented 75% of total notional outstanding, while OIS and basis swaps comprised 19% and 6%, respectively. Floating versus fixed swaps contributed 91% of outstanding trades.

Interest Rate Swaps Notional Outstanding



Source: ISDA analysis based on HKTR data

Interest Rate Swaps Number of Outstanding Trades

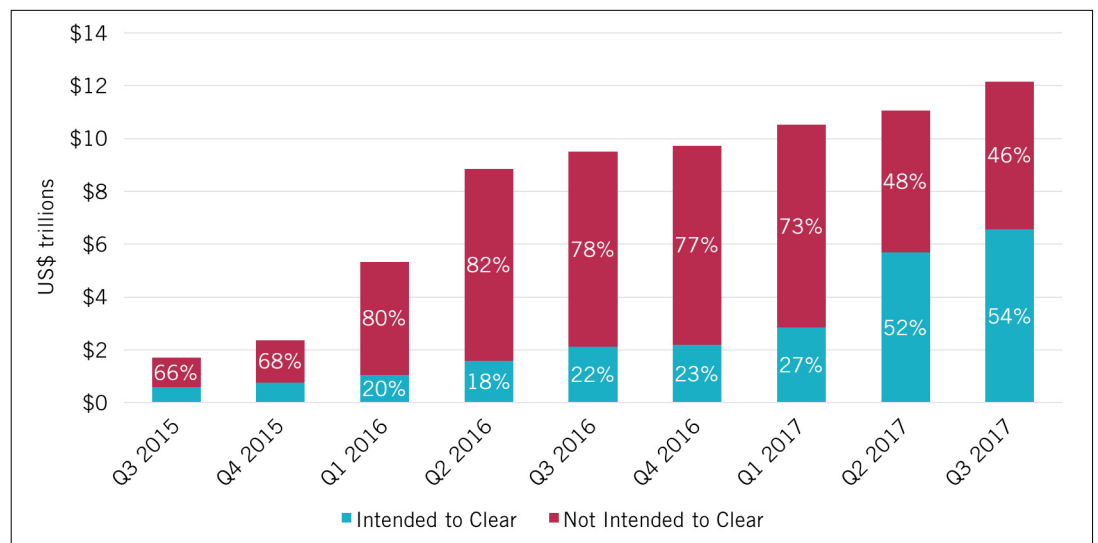


Source: ISDA analysis based on HKTR data

²¹ The HKTR covers only three interest rate swaps: basis swaps, fixed versus floating and OIS

Notional outstanding of interest rate swaps intended to clear reached \$6.6 trillion at the end of the third quarter of 2017. Trades intended to clear contributed 54% of notional outstanding, but this figure varied among different products. 66% of basis swaps notional outstanding, 48% of floating versus fixed swaps notional outstanding and 71% of OIS notional outstanding was intended to clear at the end of the third quarter 2017.

Notional Outstanding by Intention to Clear



Source: ISDA analysis based on BIS data

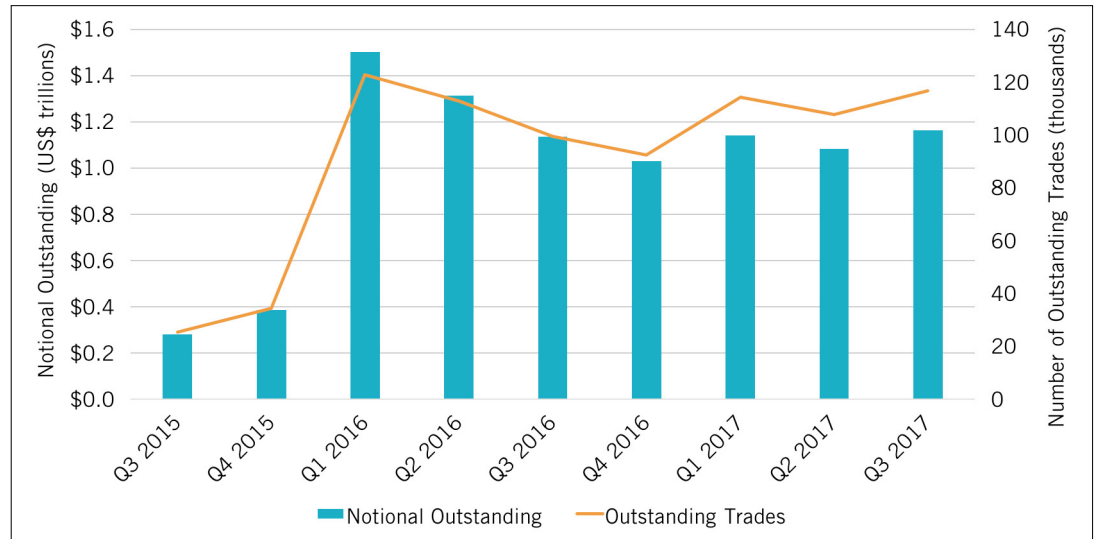
At the end of the third quarter 2017, 48% of interest rate swaps notional outstanding had a maturity of less than a year. This includes \$214.9 billion of basis swaps, \$3.5 trillion of floating versus fixed swaps and \$2.1 trillion of OIS. The swap notional outstanding with maturities of between one and two years totaled \$1.8 trillion (15% of total notional), and the notional outstanding with maturities of between two and five years was \$2.9 trillion (23% of total notional). A residual maturity of between zero and one year and between two and five years was most common for basis swaps, while most floating versus fixed swaps and OIS had a residual maturity of between zero and one year.

NDF Outstanding Positions²²

The notional outstanding of NDFs totaled \$1.2 trillion at the end of the third quarter of 2017. The number of outstanding trades was about 117,000 at the end of the third quarter of 2017, compared with 99,500 at the end of the third quarter of 2016.

²² For FX, the HKTR only provides data on NDFs

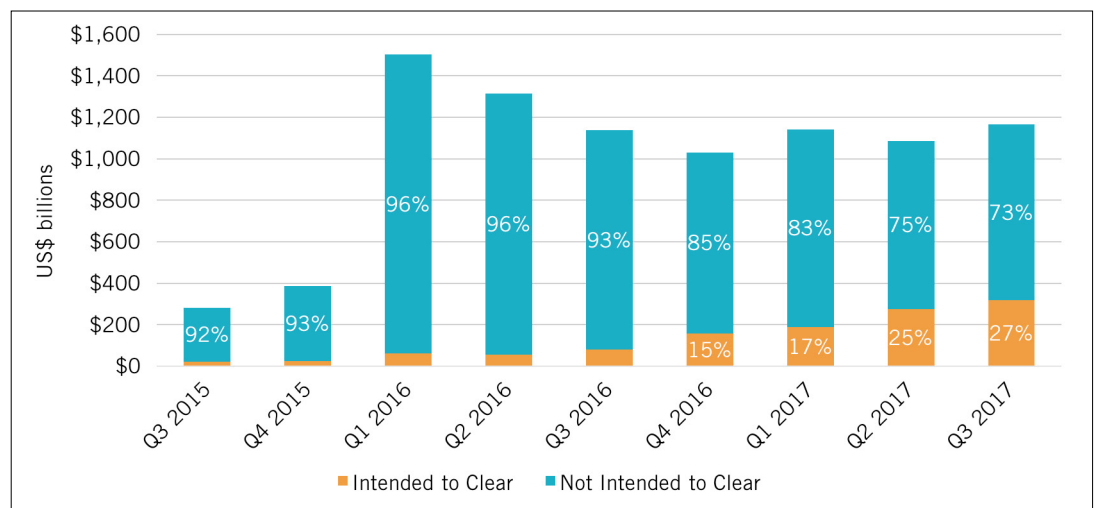
Non-Deliverable Forwards Outstanding Positions



Source: ISDA analysis based on HKTR data

Notional outstanding of NDFs intended to clear remains relatively low compared with notional outstanding not intended to clear. As of the end of the third quarter of 2017, notional outstanding intended to clear totaled \$317.6 billion and represented 27% of notional outstanding.

Notional Outstanding by Intention to Clear



Source: ISDA analysis based on HKTR data

NDFs with a residual maturity of less than six months represented the majority of the notional outstanding²³. At the end of the third quarter of 2017, the notional outstanding with a residual maturity of between zero and three months and between six and nine months totaled \$883.9 billion and \$158.8 billion, respectively, representing 76% and 14% of the total notional outstanding.

²³ HKTR defines residual maturity of a trade as the length of the period calculated from the day of the report to the scheduled maturity of the trade. The calculation is carried out in a calendar-month basis

SINGAPORE

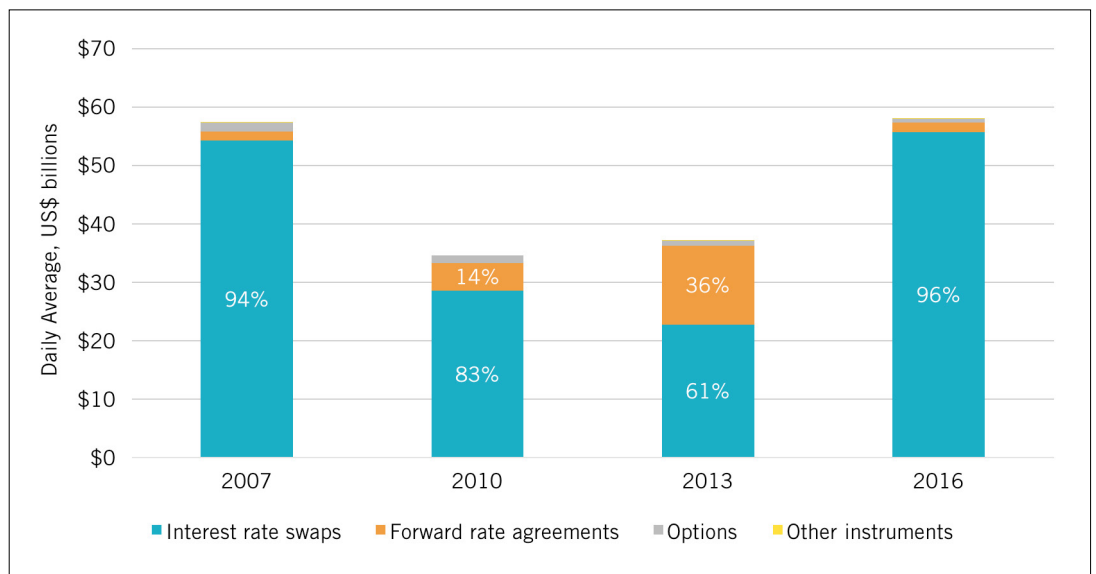
In April 2016, Singapore was the largest FX market and the second largest IRD market in Asia-Pacific based on daily average turnover

Based on daily average turnover data in April 2016, Singapore was the third largest FX market in the world and the largest market in Asia-Pacific on a net-gross basis. It was also the second largest IRD market in Asia-Pacific and the fifth largest in the world. However, Singapore global FX market share was only 7.9% and its global IRD market share was 1.9% in 2016.

Daily Average IRD Turnover

In April 2016, IRD trading activity returned to the 2007 level, following lower trading levels in 2010 and 2013. Daily average IRD turnover by product was \$58 billion in April 2016, up 56% from \$37.1 billion in April 2013. The growth was driven by interest rate swaps, which represented about 96% of daily average IRD turnover in April 2016.

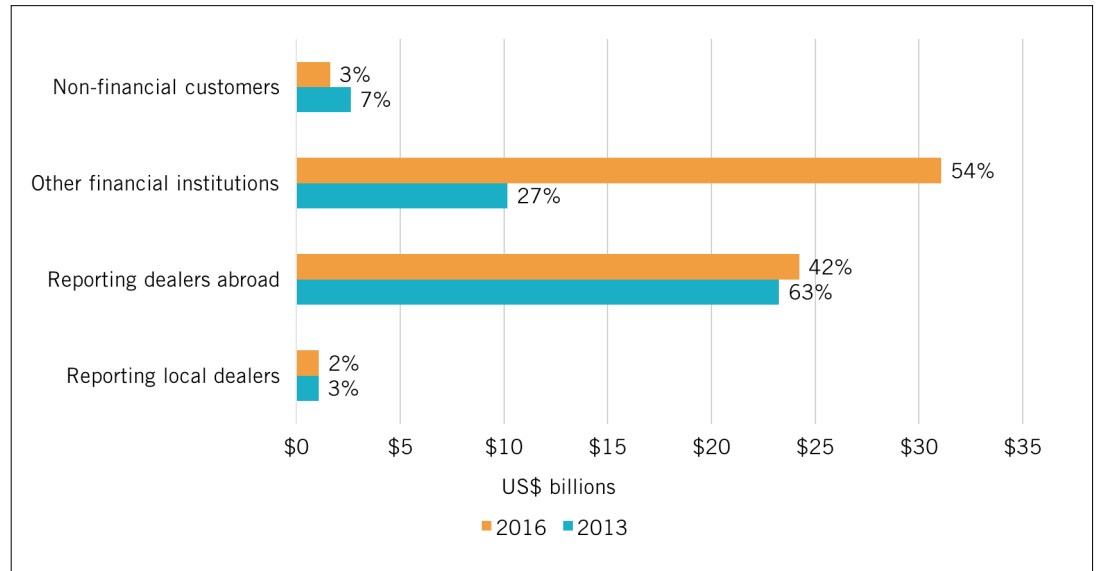
Singapore IRD Turnover by Product



Source: ISDA analysis based on BIS data

Daily IRD trading with other financial institutions significantly increased to \$31.1 billion in April 2016 from \$10.2 billion in April 2013, while average daily trading with reporting dealers abroad increased only slightly to \$24.2 billion from \$23.3 billion over the same period. The share of IRD trading by other financial institutions doubled to 54% in April 2016 compared with 27% in April 2013, while the share of trading with reporting dealers abroad declined to 42% from 63% over the same period. The share of trading with reporting local dealers and non-financial customers was extremely small.

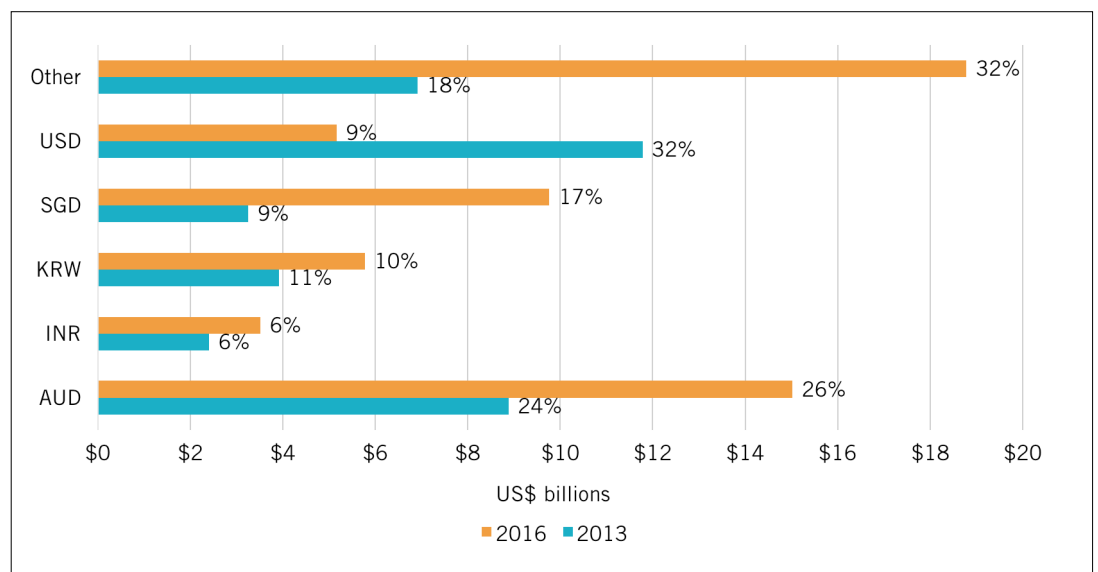
Singapore IRD Turnover by Counterparty



Source: ISDA analysis based on BIS data

Daily average IRD trading in Australian dollars jumped to \$15 billion in April 2016 from \$8.9 billion in April 2013, and the share of IRD turnover in Australian dollars increased to 26% from 24% over the same period. Daily average IRD trading in US dollars declined to \$5.2 billion in April 2016 from \$11.8 billion in April 2013, and the share of IRD turnover in US dollars significantly declined from 32% in April 2013 to 9%. The share of contracts denominated in Singapore dollars, New Zealand dollars and other currencies increased in 2016 compared with 2015. In April 2016, IRD contracts denominated in Singapore dollars totaled \$9.8 billion and accounted for 17% of all average daily IRD traded notional in Singapore.

Singapore IRD Turnover by Currency

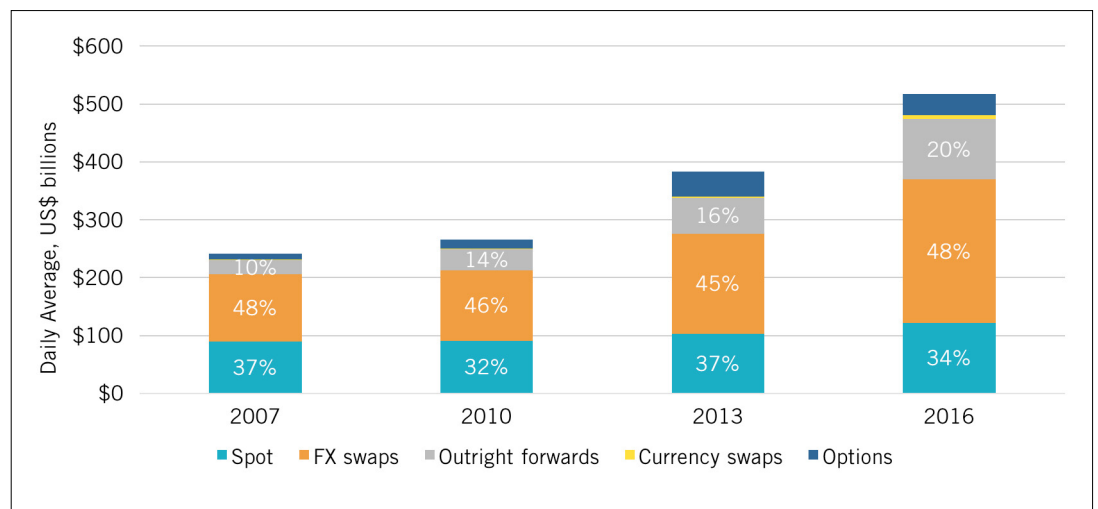


Source: ISDA analysis based on BIS data

Daily Average FX Turnover

FX trading has been consistently growing, averaging \$517.2 billion per day in April 2016 compared with \$383.1 billion in April 2013. Most of the growth was driven by daily average FX swaps turnover, which increased to \$248 billion and accounted for 48% of FX products in April 2016, compared with \$172.8 billion and 45% share in April 2013. Spot transactions totaled \$121.6 billion and outright forwards comprised \$104.7 billion in April 2016.

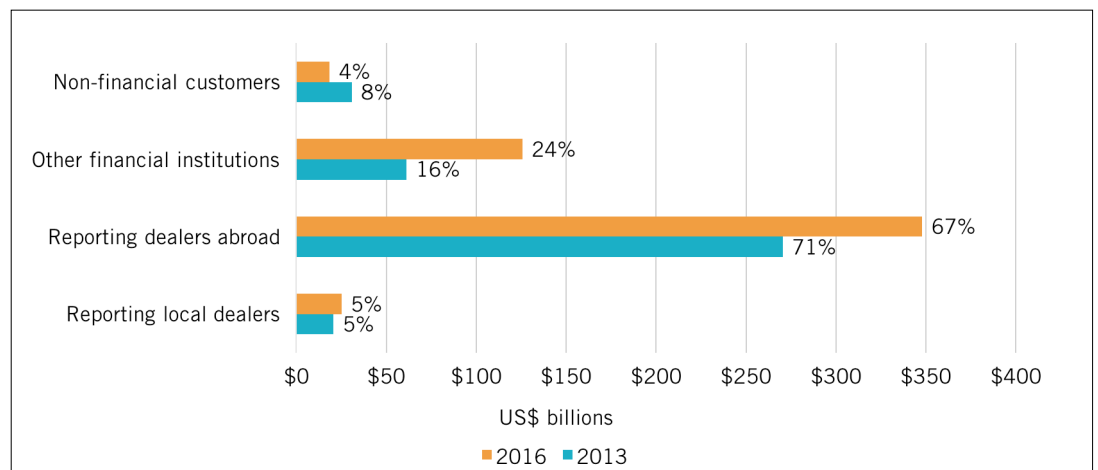
Singapore FX Turnover by Product



Source: ISDA analysis based on BIS data

FX trading with reporting dealers abroad increased to \$347.9 billion in April 2016 from \$270.4 billion in April 2013 on a net-gross basis, but the share of trading with reporting dealers abroad declined to 67% from 71% over the same period. FX trading with other financial institutions grew to \$125.6 billion from \$61.3 billion, and the share of trading with other financial institutions increased to 24% from 16%. The share of trading with reporting local dealers and non-financial customers totaled 5% and 4%, respectively, in April 2016.

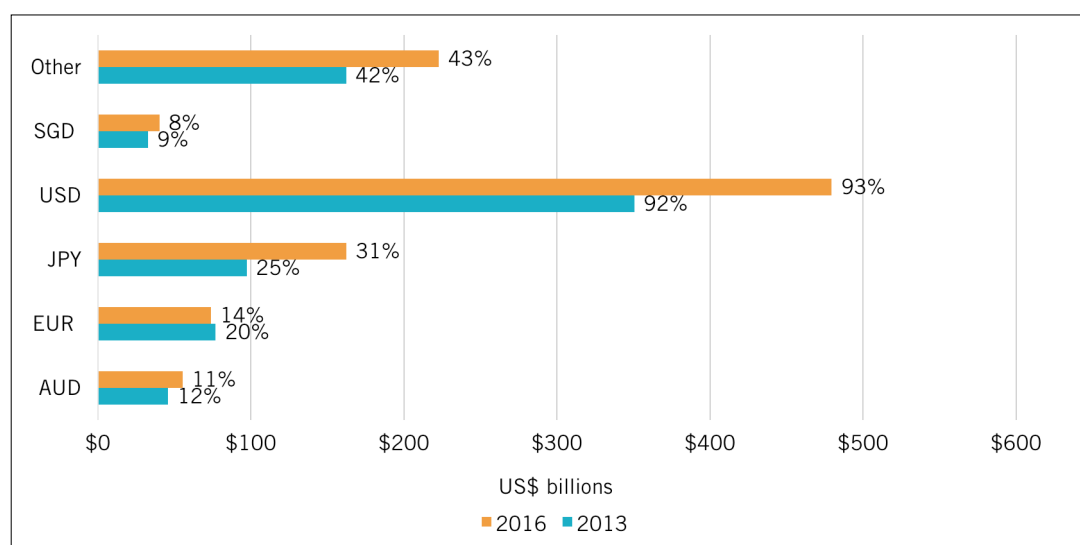
Singapore FX Turnover by Counterparty



Source: ISDA analysis based on BIS data

In 2016, US dollars formed one side of 93% of all trades. Daily average FX trading in US dollars increased to \$480 billion in April 2016 from \$350.6 billion in April 2013. Yen-denominated transactions increased to \$162.6 billion from \$97.3 billion over the same period. The share of yen-denominated FX transactions increased to 31% in 2016 from 25% in 2013, while the share of euro transactions declined to 14% from 20% over the same period. In 2016, contracts denominated in Singapore dollars accounted for only 8% of all FX trades in Singapore²⁴.

Singapore FX Turnover by Currency



Source: ISDA analysis based on BIS data

OTC Derivatives Notional Outstanding

Based on the data from DTCC Data Repository (Singapore) Pte. Ltd. (DDRS)²⁵, OTC derivatives notional outstanding totaled \$37.4 trillion as of June 30, 2017. IRD accounted for about 72% of total notional, while FX accounted for 27% of notional outstanding and credit derivatives only 1%.

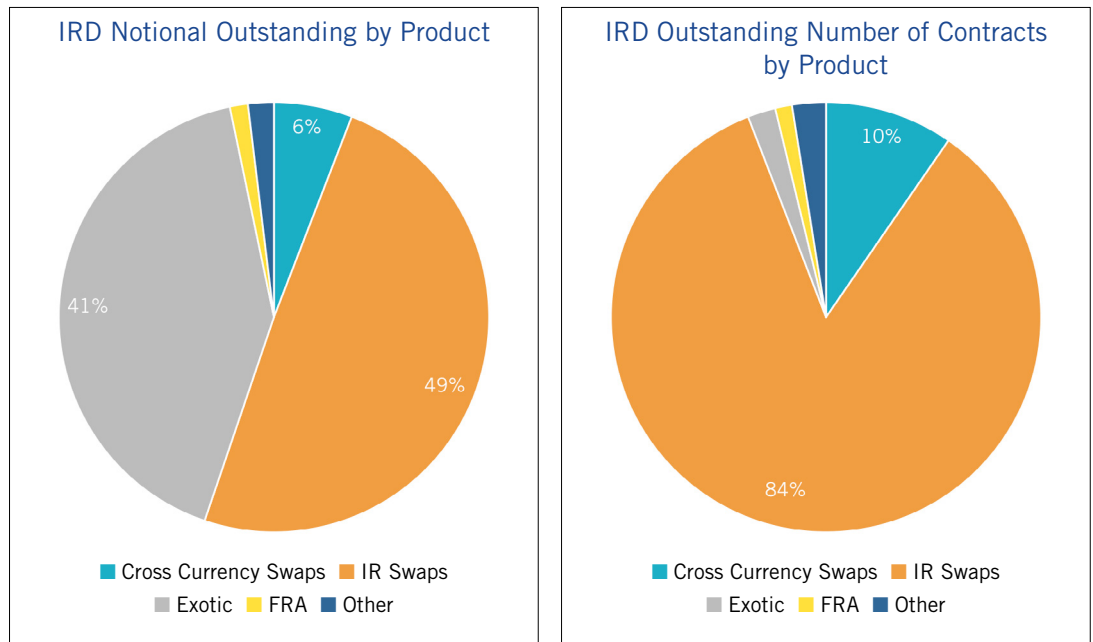
IRD

As of June 30, 2017, IRD notional outstanding totaled \$27.1 trillion and the number of outstanding contracts was about 311,000. Interest rate swaps accounted for about half of IRD notional outstanding and 84% of total outstanding contracts. Exotic trades totaled \$11.2 trillion and represented 41% of notional outstanding and only 2% of outstanding number of contracts.

Interest rate swaps notional outstanding totaled \$13.4 trillion, including \$10.7 trillion of fixed versus floating swaps, \$1.6 trillion of OIS and \$1.1 trillion of basis swaps. Cross-currency swaps notional outstanding totaled \$1.6 trillion, \$1.3 trillion of which was basis swaps.

²⁴ As each transaction involves two currencies, the sum of shares in individual currencies totals 200%

²⁵ DTCC Global Trade Repository (GTR) provides trade reporting services in Singapore via its legal entity, DTCC Data Repository (Singapore) Pte. Ltd. (DDRS), which is regulated and licensed by MAS



Source: ISDA analysis based on DDRS data

As of June 30, 2017, \$1.3 trillion of IRD was traded on an execution venue, representing 5% of IRD notional outstanding and 7% of outstanding number of contracts. Execution style varied by product. About \$903.3 billion and \$248.8 billion of interest rate swaps and cross-currency swaps notional, respectively, were traded on execution venues, while almost all exotic trades were traded bilaterally.

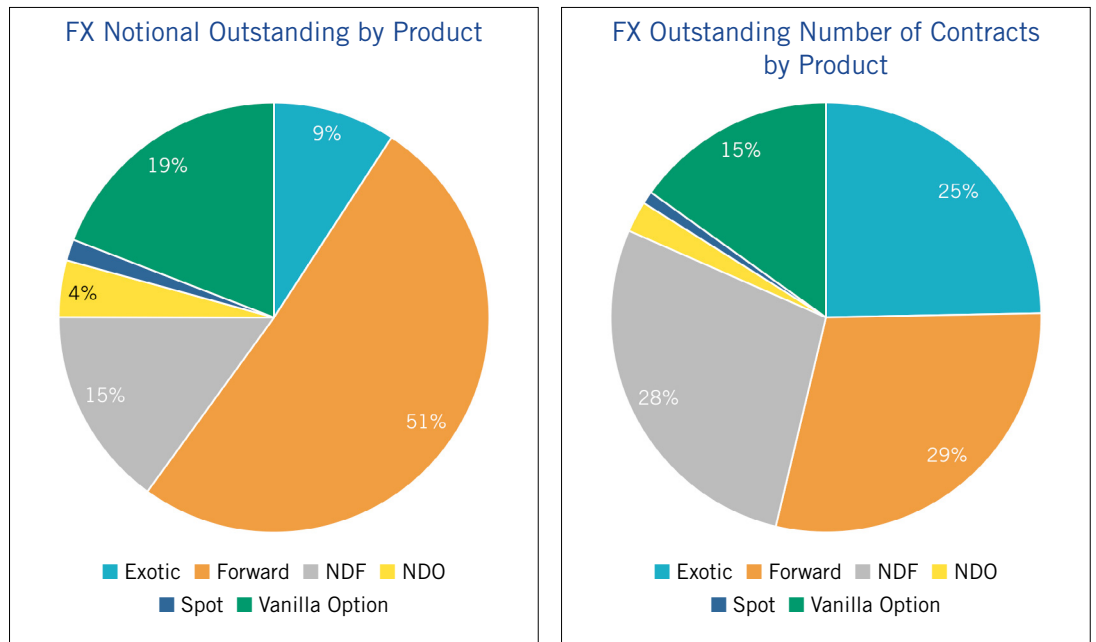
As of June 30, 2017, \$8 trillion of IRD notional was cleared compared with \$19.1 trillion that was non-cleared. By product, 58% of interest rate swaps and 70% of FRAs was cleared, contributing \$7.7 trillion and \$256.8 billion, respectively, to cleared notional.

As of June 30, 2017, \$16.9 trillion of notional outstanding had a tenor between one and five years, including \$6 trillion of interest rate swaps and \$9.6 trillion of exotic trades. IRD with a tenor of less than one year totaled \$4.8 trillion, \$4 trillion of which were interest rate swaps. IRD with a tenor of more than five years mainly included \$3.3 trillion of interest rate swaps and \$1.6 trillion of exotic trades.

FX

As of June 30, 2017, FX notional outstanding notional totaled \$10.1 trillion and the number of outstanding contracts was about 712,000²⁶. Forwards accounted for 51% of notional outstanding and 29% of outstanding contracts, while NDFs represented 15% of notional outstanding and 28% of outstanding contracts.

²⁶ FX includes FX derivatives (exotic, forwards, NDFs, NDOs, vanilla options) and spot transactions



Source: ISDA analysis based on DDRS data

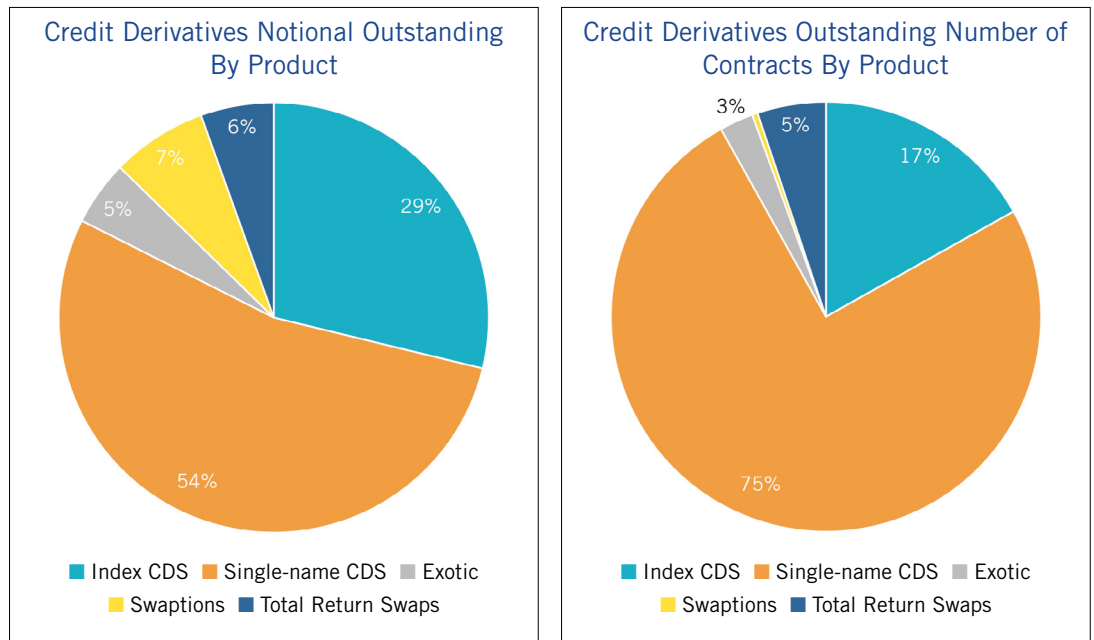
As of June 30, 2017, only 9% of FX notional outstanding (\$897.1 billion) and 13% of outstanding contracts were traded on execution venues. The rest was executed bilaterally. Execution style varied by product. About \$403.5 billion of forwards, \$346.7 billion of vanilla options and \$71 billion of NDFs were traded on execution venues, while the amounts of other products traded on execution venues were less than \$50 billion.

Only \$286.3 billion – 3% of FX notional outstanding and 5% by number of contracts – was cleared as of June 30, 2017. NDFs represented the majority of the cleared notional.

As of June 30, 2017, \$7.7 trillion of notional outstanding had a tenor of less than one year, including \$4.4 trillion of forwards, \$1.3 trillion of vanilla options and \$1.3 trillion of NDFs. FX with a tenor of between one and five years totaled \$2.3 trillion, while the notional of products with a tenor of more than five years was only \$69.6 billion.

Credit Derivatives

As of June 30, 2017, credit derivatives notional outstanding totaled \$190.5 billion and the number of outstanding contracts was about 13,000, significantly smaller than the notional outstanding and number of contracts for IRD and FX. Single-name CDS totaled \$102.2 billion and accounted for 54% of credit derivatives notional outstanding and 75% of outstanding contracts. Index CDS totaled \$54.9 billion and represented about 29% of total notional outstanding.



Source: ISDA analysis based on DDRS data

As of June 30, 2017, almost 100% of credit derivatives were not traded on execution venues. \$35.4 billion – about 19% of credit derivatives notional outstanding – was cleared, including \$20 billion of index CDS and \$14.9 billion of single-name CDS. 91% of credit derivatives notional outstanding had a tenor of more than one year, including \$80.7 billion of notional with a tenor of between one and five years and \$93 billion of notional with a tenor of more than five years.

AUSTRALIA

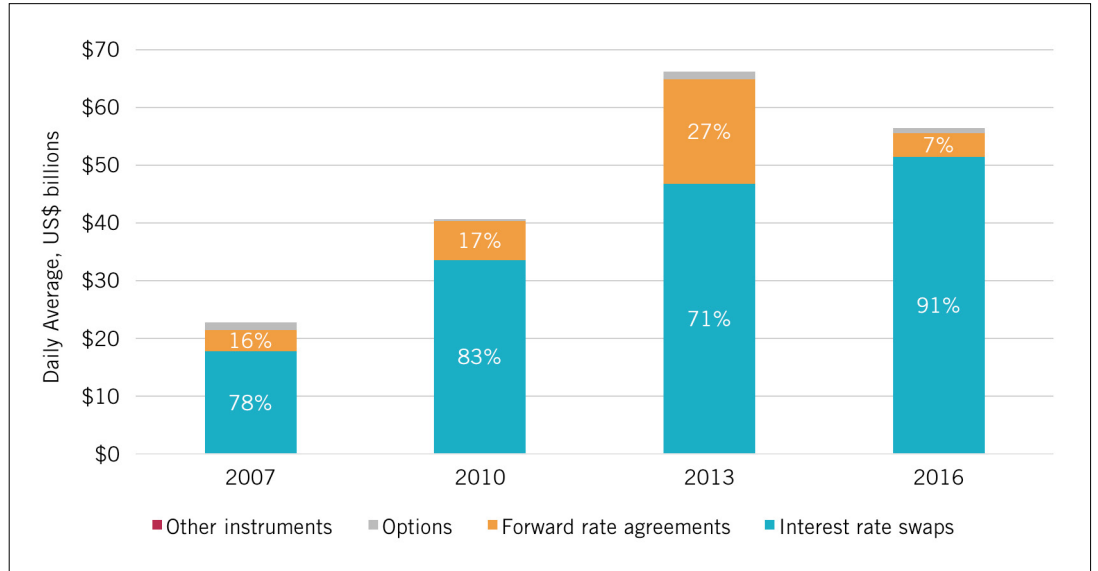
Australia was the third largest market by daily average IRD turnover and the fourth largest market by daily average FX turnover in Asia-Pacific in April 2016

Based on daily average turnover, Australia was the third largest market by daily average IRD turnover and the fourth largest market by daily average FX turnover in Asia-Pacific on a net-gross basis in April 2016. However, FX trading in Australia is significantly smaller compared to Singapore, Hong Kong and Japan. Australia's global FX market share was 1.9% in April 2016, the same as its global IRD market share.

Daily Average IRD Turnover

In April 2016, IRD trading activity declined by 14.8% and daily average turnover totaled \$56.4 billion compared with \$66.2 billion in April 2013. While interest rate swaps turnover increased by 10%, FRAs and options turnover declined by about 74%. In April 2016, interest rate swaps represented about 91% of daily average IRD turnover. FRAs accounted for 27% of daily average turnover in 2013, but declined to 7% in 2016.

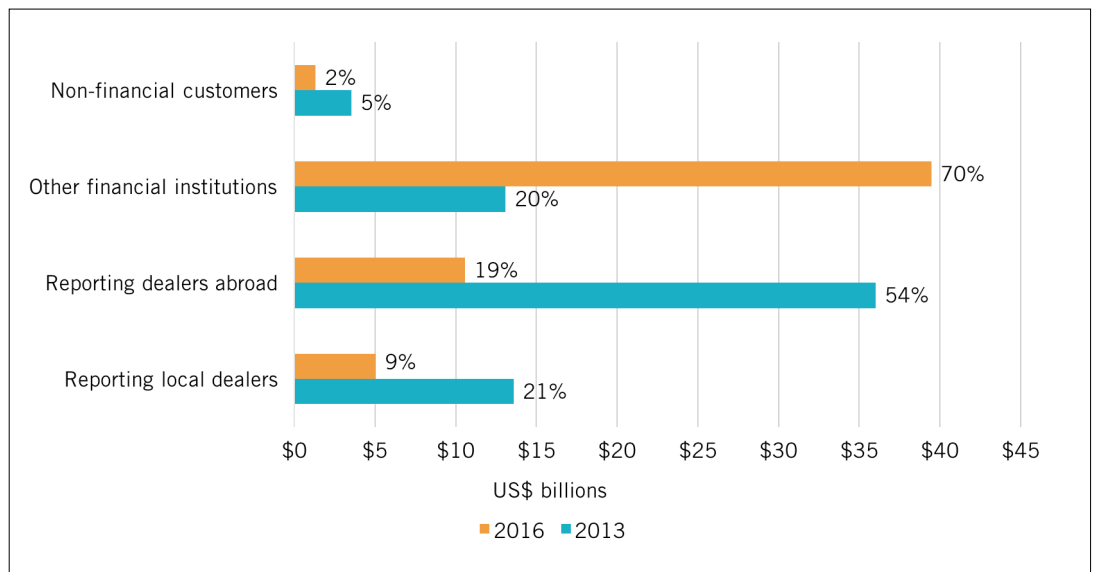
Australia IRD Turnover by Product



Source: ISDA analysis based on BIS data

IRD trading with other financial institutions significantly increased to \$39.5 billion in April 2016 from \$13.1 billion in April 2013, while trading with reporting dealers abroad declined to \$10.6 billion from \$36 billion over the same period. The share of IRD trading by other financial institutions jumped to 70% in April 2016 compared with 20% in April 2013, while the share of trading with reporting dealers abroad declined to 19% from 54% over the same period. The share of trading with reporting local dealers totaled 9% and the share of trading with non-financial customers was immaterial.

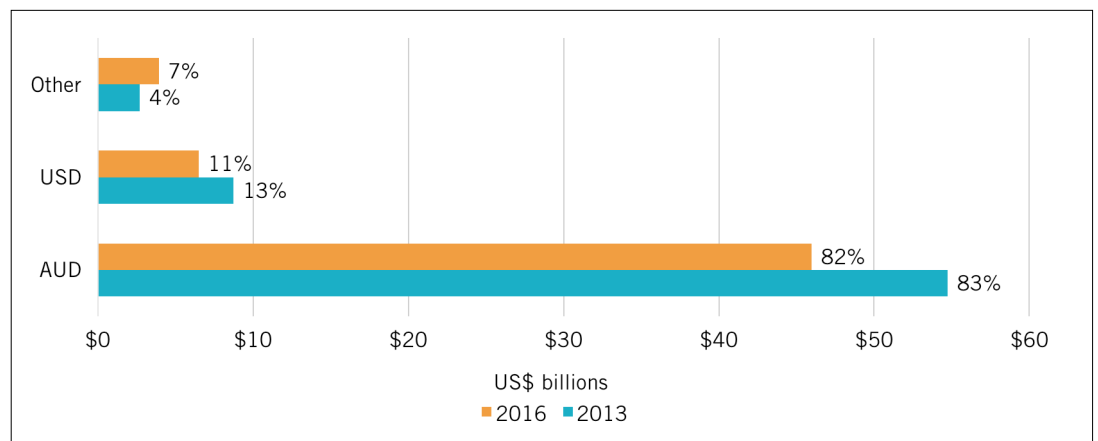
Australia IRD Turnover by Counterparty



Source: ISDA analysis based on BIS data

More than 80% of daily average IRD turnover was denominated in Australian dollars. Daily average IRD trading in Australian dollars declined by 16% to \$46 billion in April 2016 from \$54.7 billion in April 2013, but the share of IRD turnover in Australian dollars decreased only by one percentage point over the same period. Daily average IRD trading in US dollars declined to \$6.5 billion in April 2016 from \$8.7 billion in April 2013, and the share of IRD turnover in US dollars totaled 11%.

Australia IRD Turnover by Currency

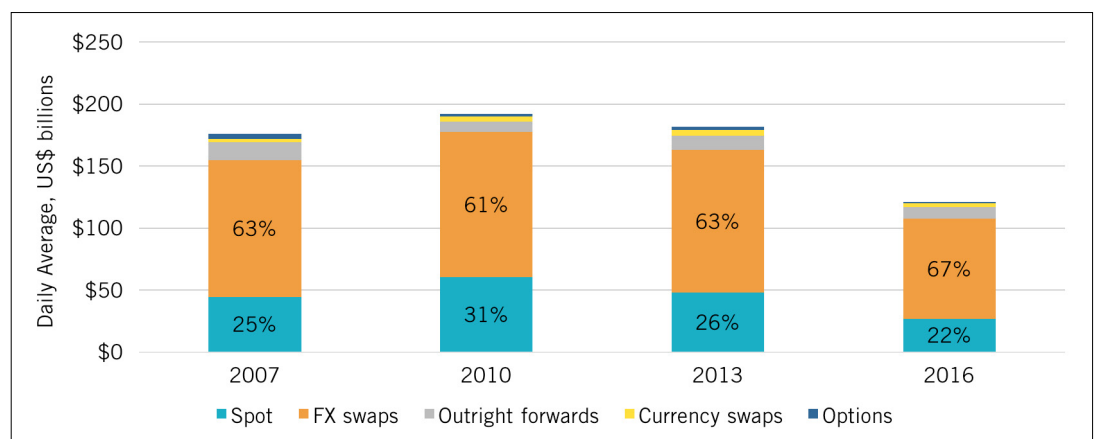


Source: ISDA analysis based on BIS data

Daily Average FX Turnover

FX trading declined by 33% between 2013 and 2016 in Australia, while it increased over the same period in Hong Kong, Japan and Singapore. Daily average FX turnover was \$121.3 billion in April 2016, 33% lower compared with April 2013. The decline was spread across all products as spot fell by 44%, FX swaps by 30% and outright forwards by 17%. Daily average FX swaps turnover decreased to \$80.7 billion from \$115.2 billion, and FX swaps accounted for 67% of FX turnover in April 2016. Spot transactions totaled \$26.8 billion and outright forwards comprised \$9.6 billion in April 2016.

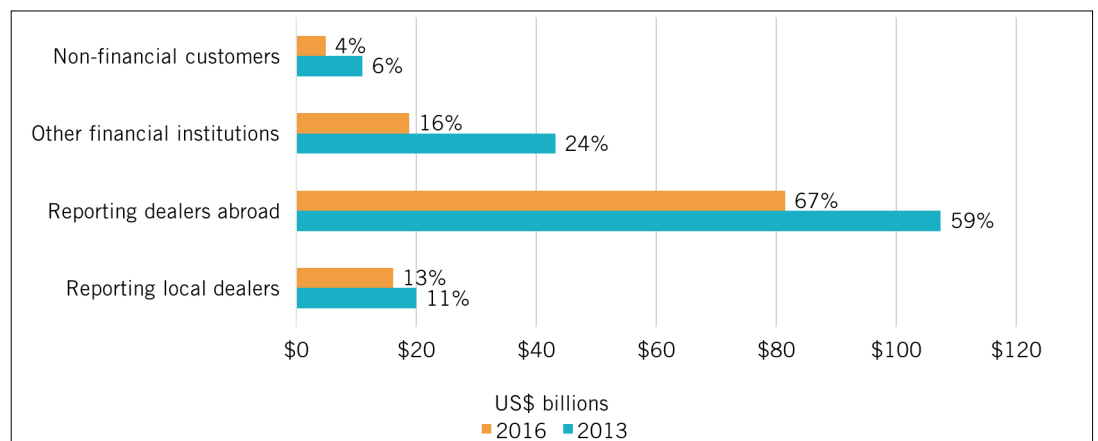
Australia FX Turnover by Product



Source: ISDA analysis based on BIS data

FX trading with reporting dealers abroad declined to \$81.5 billion in April 2016 from \$107.4 billion in April 2013 on a net-gross basis, but the share of trading with reporting dealers abroad increased to 67% from 59% over the same period. FX trading with other financial institutions dropped to \$18.8 billion from \$43.2 billion and the share of trading with other financial institutions decreased to 16% from 24%. The share of trading with reporting local dealers and non-financial customers totaled 13% and 4%, respectively, in April 2016.

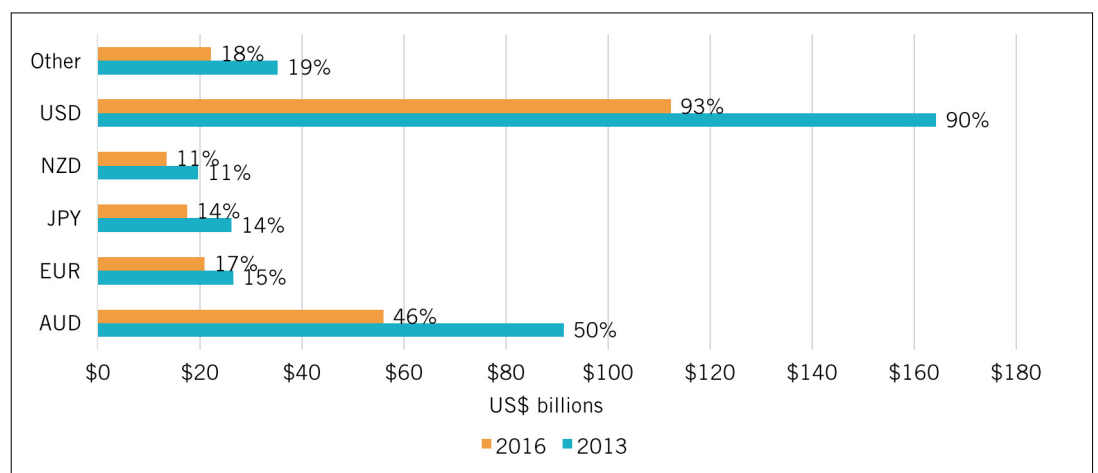
Australia FX Turnover by Counterparty



Source: ISDA analysis based on BIS data

The US dollar was the most widely traded currency for FX trading. In 2016, it was on one side of 93% of all daily trades. Daily average FX trading in US dollars decreased to \$112.3 billion in April 2016 from \$164.3 billion in April 2013, but the share of FX trading in US dollars increased over the same period. Australian dollar-denominated transactions declined to \$56.1 billion from \$91.3 billion, while the share of Australian dollar-denominated FX transactions declined to 46% in 2016 from 50% in 2013. The share of euro and yen transactions accounted for 17% and 14%, respectively, of daily average turnover in April 2016²⁷.

Australia FX Turnover by Currency



Source: ISDA analysis based on BIS data

²⁷ As each transaction involves two currencies, the sum of shares in individual currencies totals 200%

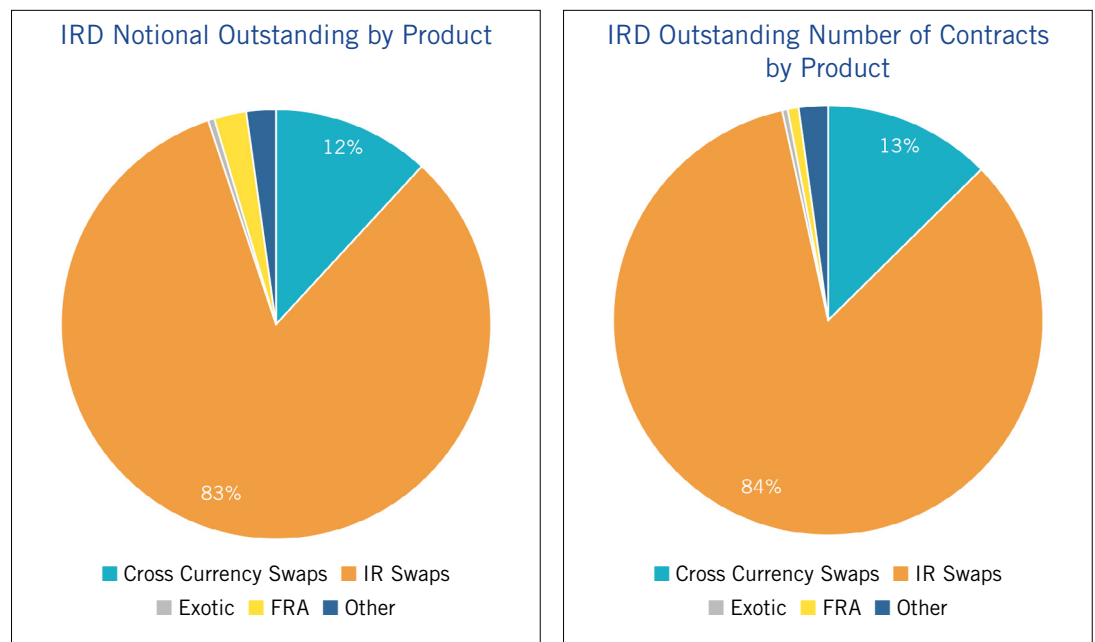
OTC Derivatives Notional Outstanding

Based on the data from DTCC Data Repository (Singapore) Pte. Ltd. (DDRS)²⁸, OTC derivatives notional outstanding in Australia totaled \$42.3 trillion as of June 30, 2017. IRD totaled \$34.7 trillion and accounted for 82% of notional outstanding. FX derivatives comprised \$7.3 trillion (17% of notional outstanding) and credit derivatives totaled only \$264.1 billion.

IRD

As of June 30, 2017, IRD notional outstanding totaled \$34.7 trillion and the number of outstanding contracts was about 402,000. Interest rate swaps totaled \$28.8 trillion and accounted for 83% of IRD notional outstanding and 84% of outstanding contracts. Cross-currency swaps comprised \$4.1 trillion and represented 12% of notional outstanding. The share of other products, including exotics and FRAs, was immaterial.

Fixed versus floating swaps totaled \$19.4 trillion and accounted for 67% of interest rate swaps notional outstanding. OIS and basis swaps totaled \$6.1 trillion and \$3.2 trillion, respectively. Cross-currency swaps included \$3.6 trillion of basis swaps, \$0.5 trillion of fixed floating swaps and \$57.4 billion of fixed swaps.



Source: ISDA analysis based on DDRS data

²⁸ DTCC Global Trade Repository provides trade reporting services in Australia via its legal entity, DTCC Data Repository (Singapore) Pte Ltd (DDRS). DDRS is a holder of the Australian derivative trade repository (ADTR) license, which was awarded by the Australian Securities and Investment Commission (ASIC)

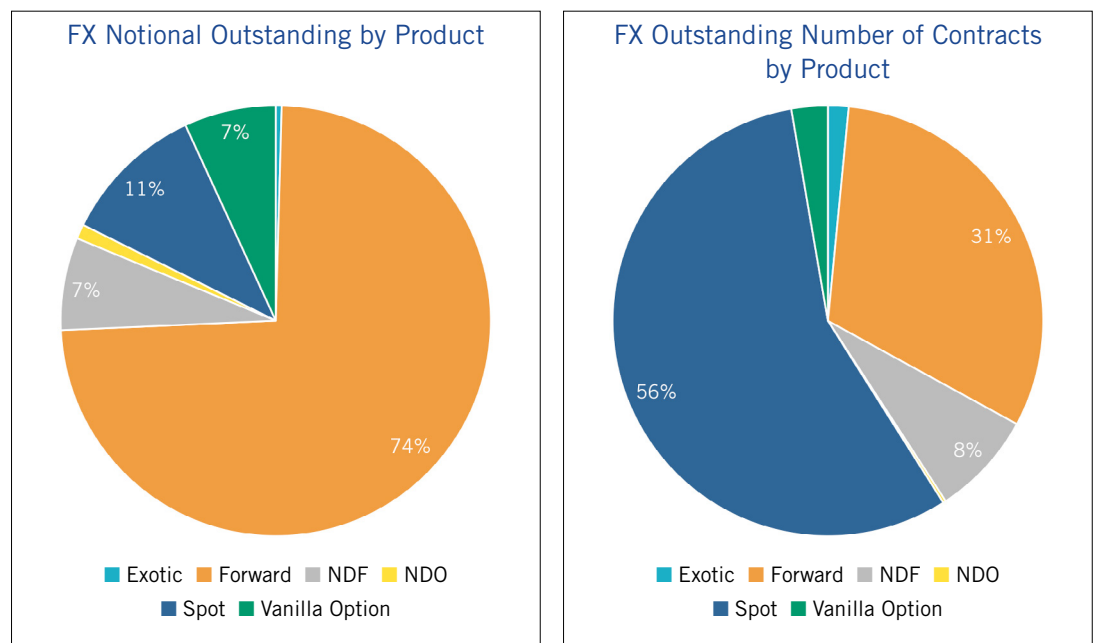
As of June 30, 2017, \$4 trillion of IRD was traded on SEFs, representing 12% of IRD notional outstanding and 10% of outstanding number of contracts. Execution style varied by product. About \$2.6 trillion of interest rate swaps, \$665 billion of cross-currency swaps and \$504.6 billion of FRAs were traded on SEFs, representing 9%, 16% and 60%, respectively, of the products.

As of June 30, 2017, \$15.3 trillion of IRD notional outstanding was cleared compared with \$19.5 trillion that was non-cleared. 50% of interest rate swap and 88% of FRA notional was cleared, contributing \$14.3 trillion and \$736.6 billion, respectively, to cleared notional.

As of June 30, 2017, \$15.1 trillion of outstanding trades had a tenor between one and five years, including \$12.7 trillion of interest rate swaps and \$1.7 trillion of cross-currency swaps. IRD with a tenor of less than one year totaled \$10.2 trillion, \$9.1 trillion of which were interest rate swaps. IRD with a tenor of more than five years mainly included \$7.1 trillion of interest rate swaps and \$2.2 trillion of cross-currency swaps.

FX

As of June 30, 2017, FX notional outstanding totaled \$7.3 trillion and the number of outstanding contracts was about 1.3 million. Forwards totaled \$5.4 trillion and accounted for 74% of notional outstanding and 31% of outstanding contracts. NDFs and vanilla options were \$510.6 and \$507 billion, respectively, each accounting for 7% of notional outstanding. Spot transactions accounted for 11% of notional outstanding and 56% of outstanding contracts.



Source: ISDA analysis based on DDRS data

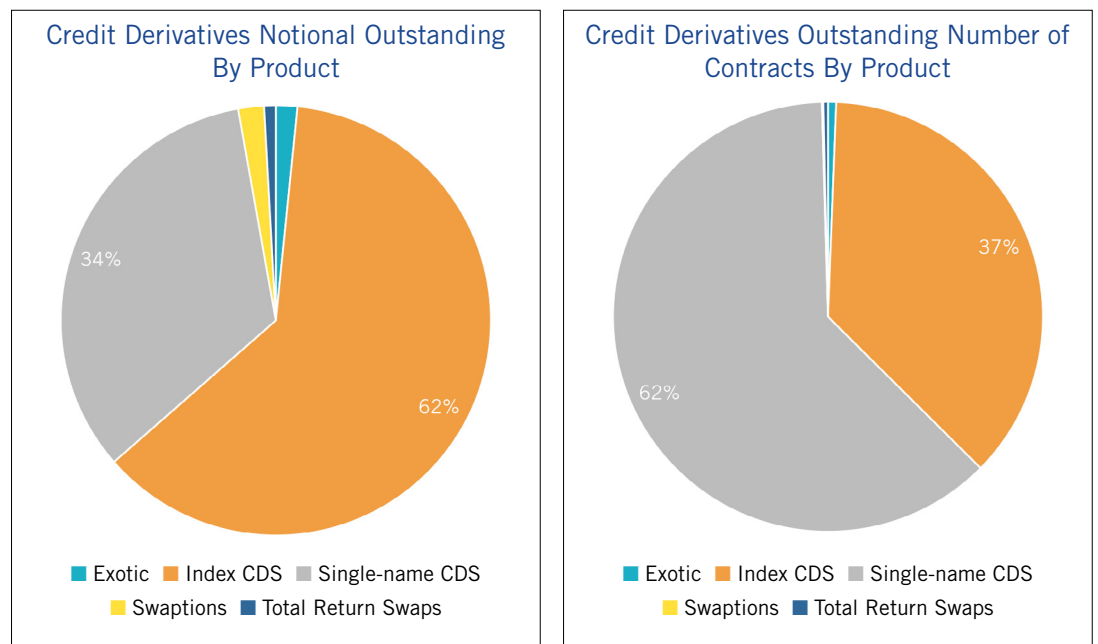
As of June 30, 2017, only 7% of FX notional outstanding (\$540.1 billion) and 5% of outstanding contracts was traded on execution venues. Execution style varied by product. About \$353.5 billion of forwards, \$95 billion of NDFs and \$60 billion of vanilla options were traded on SEFs, representing about 7%, 19% and 12%, respectively, of notional outstanding of the products.

About \$35 billion of notional outstanding was cleared as of June 30, 2017, representing 0.5% of notional outstanding.

As of June 30, 2017, \$6.3 trillion of FX transactions (85% of FX notional outstanding) had a tenor of less than one year, including \$4.6 trillion of forwards, \$745 billion of spot transactions, \$452.6 billion of NDFs and \$343.5 billion of vanilla options. FX transactions with a tenor between one and five years totaled \$1 trillion, while the notional of the trades with a tenor of more than five years was only \$74.6 billion.

Credit Derivatives

As of June 30, 2017, credit derivatives notional outstanding totaled \$264.1 billion and the number of outstanding contracts was about 17,000, significantly smaller than the notional outstanding and number of contracts for IRD and FX. Index CDS totaled \$163.6 billion and represented about 62% of total credit derivatives notional outstanding and 37% of the outstanding contracts. Single-name CDS totaled \$88.8 billion and accounted for 34% of notional outstanding and 62% of outstanding contracts.



Source: ISDA analysis based on DDRS data

As of June 30, 2017, about 2% of credit derivatives notional outstanding was traded on SEFs, most of which was index CDS. \$72.7 billion – about 28% of notional outstanding – was cleared, including \$59.3 billion of index CDS and \$12.7 billion of single-name CDS. 50% of credit derivatives notional outstanding had a tenor between one and five years, and 47% of the notional comprised trades with a tenor of more than five years.

JAPAN

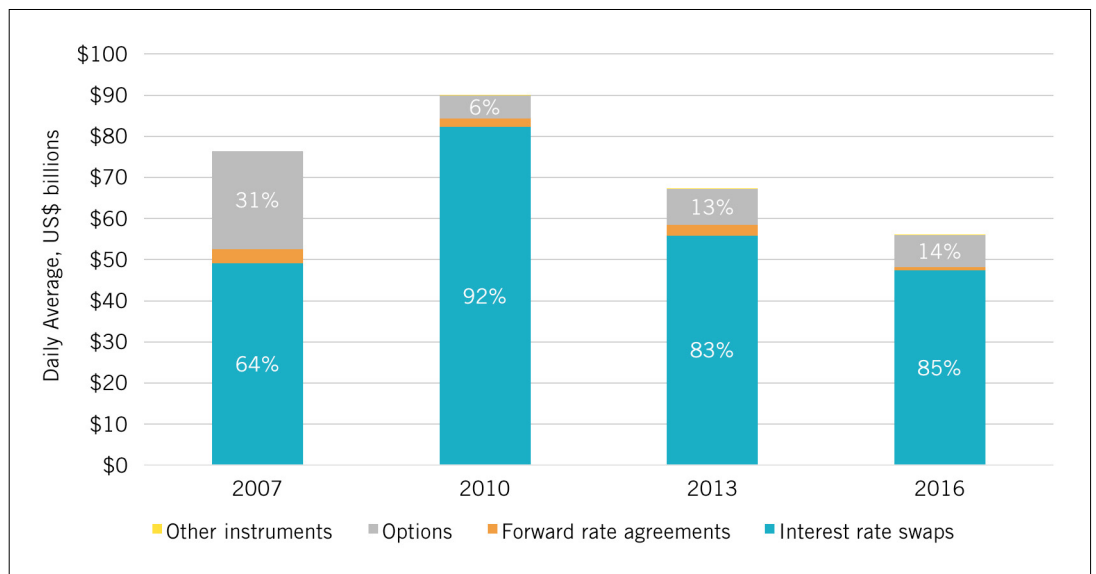
Japan was the fifth largest market by daily average FX turnover in the world and the third largest in Asia-Pacific in April 2016

Based on daily average turnover, Japan was the fifth largest market in the world by daily average FX turnover and the third largest in Asia-Pacific on a net-gross basis in April 2016. However, IRD trading in Japan declined during 2016, bringing it to fourth place in Asia-Pacific after Australia. Japan's global FX market share was 6.1% and its global IRD market share totaled only 1.8% in 2016.

Daily Average IRD Turnover

In April 2016, IRD trading activity declined by 17% and daily average turnover totaled \$55.9 billion compared with \$67.1 billion in April 2013. While interest rate swaps turnover declined by 15%, FRA turnover fell by 69%. In April 2016, interest rate swaps totaled \$47.4 billion and represented 85% of daily average IRD turnover. Options totaled \$7.7 billion and accounted for 14% of daily average turnover.

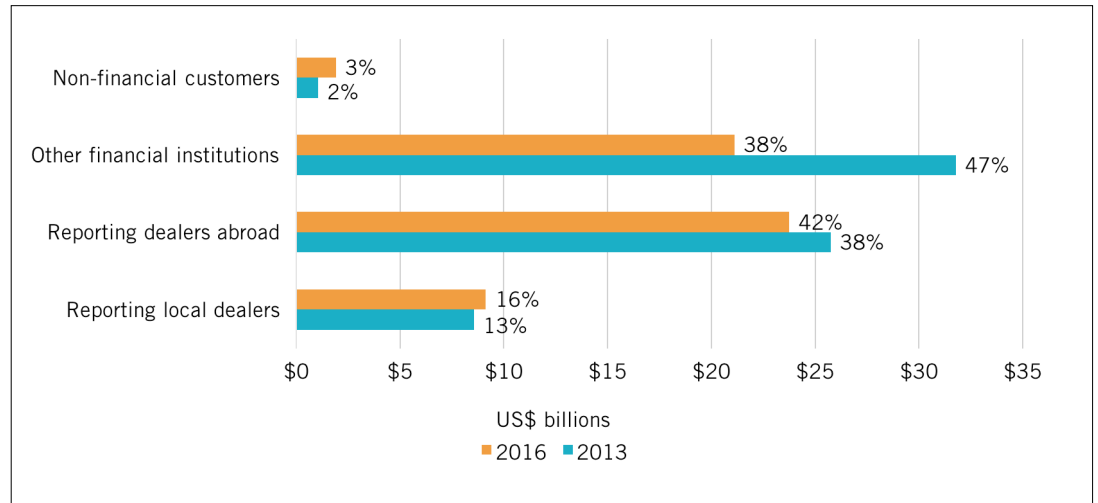
Japan IRD Turnover by Product



Source: ISDA analysis based on BIS data

IRD trading with other financial institutions decreased to \$21.1 billion in April 2016 from \$37.8 billion in April 2013, while trading with reporting dealers abroad declined to \$23.8 billion from \$25.7 billion over the same period. The share of IRD trading by other financial institutions decreased to 38% in April 2016 compared with 47% in April 2013, while the share of trading with reporting dealers abroad increased to 42% from 38% over the same period. The share of trading with reporting local dealers totaled 16% and the share of trading with non-financial customers was 3%.

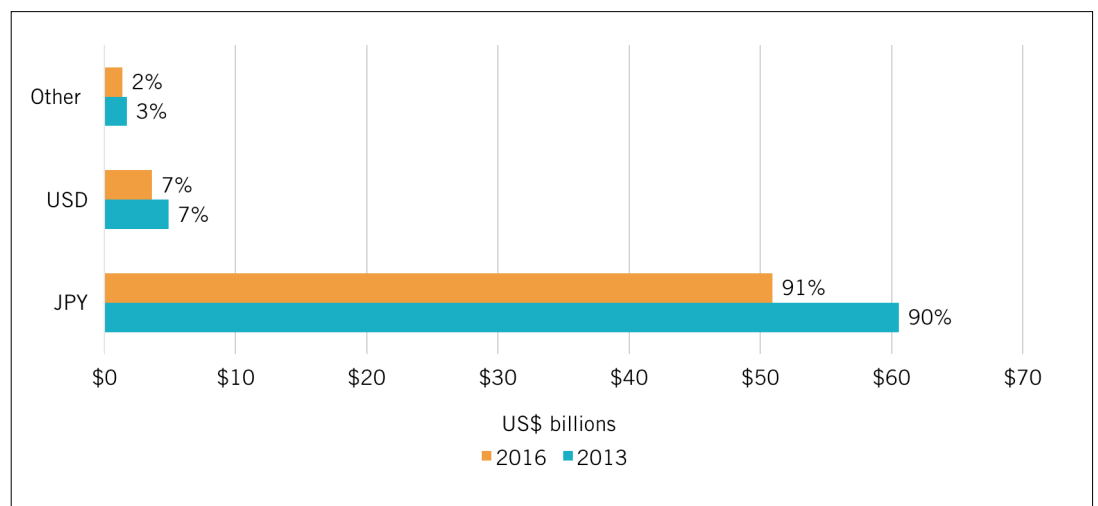
Japan IRD Turnover by Counterparty



Source: ISDA analysis based on BIS data

More than 90% of daily average IRD turnover was denominated in yen. Daily average IRD trading in yen declined by 16% to \$50.9 billion in April 2016 from \$60.6 billion in April 2013, but the share of IRD turnover in yen increased by one percentage point over the same period. Daily average IRD trading in US dollars declined to \$3.6 billion in April 2016 from \$4.9 billion in April 2013, while the share of IRD turnover in US dollars remained at 7%.

Japan IRD Turnover by Currency

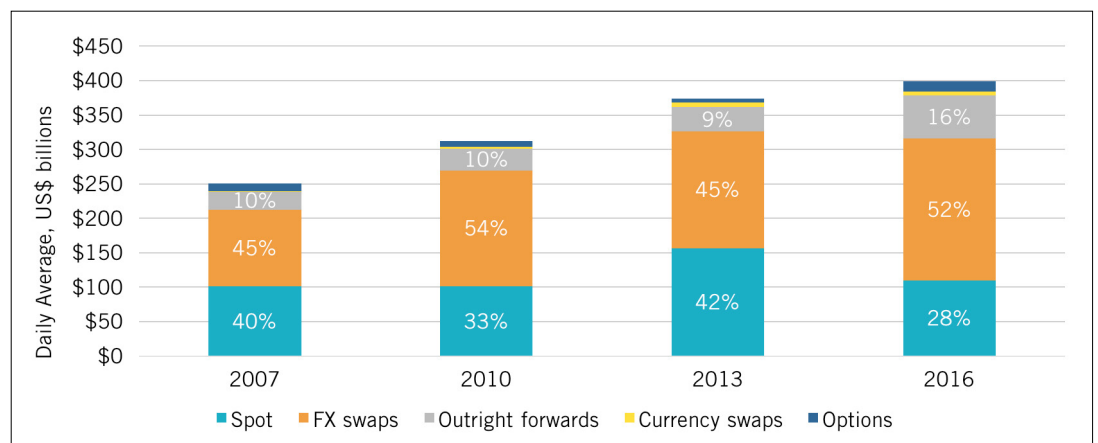


Source: ISDA analysis based on BIS data

Daily Average FX Turnover

FX trading increased by 7% to \$399 billion in April 2016 from \$374.2 billion in April 2013. FX swaps increased by 21% to \$205.7 billion, outright forwards grew by 78% to \$62.7 billion and options were up by 132% to \$14.9 billion. These increases were offset by a 30% decline in spot transactions, which totaled \$109.9 billion in 2016. FX swaps accounted for 52% of daily average FX turnover in April 2016, while spot transactions comprised 28% and outright forwards represented 16%.

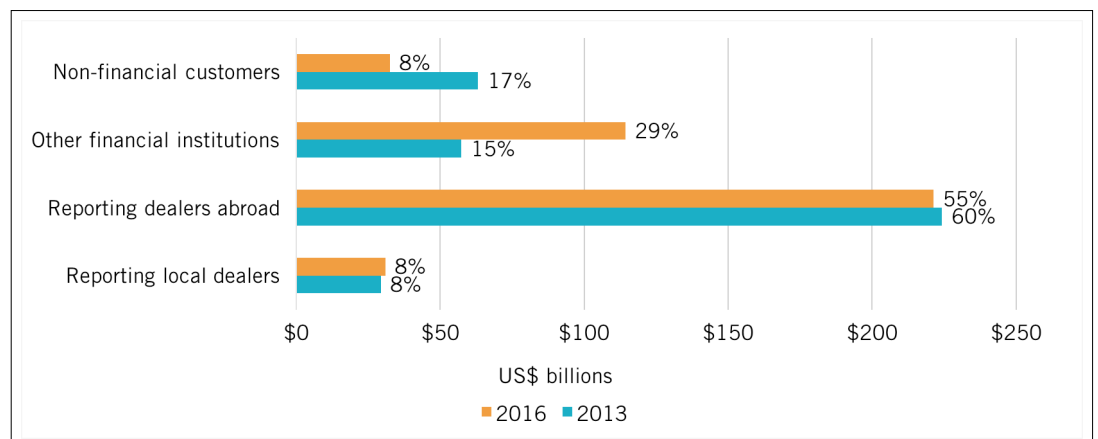
Japan FX Turnover by Product



Source: ISDA analysis based on BIS data

FX trading with reporting dealers abroad declined slightly to \$221.3 billion in April 2016 from \$224.3 billion in April 2013 on a net-gross basis, but the share of trading with reporting dealers abroad decreased to 55% from 60% over the same period. FX trading with other financial institutions jumped to \$114.3 billion from \$57.4 billion, and the share of trading with other financial institutions increased to 29% from 15%. The share of trading with both reporting local dealers and non-financial customers was 8% in April 2016.

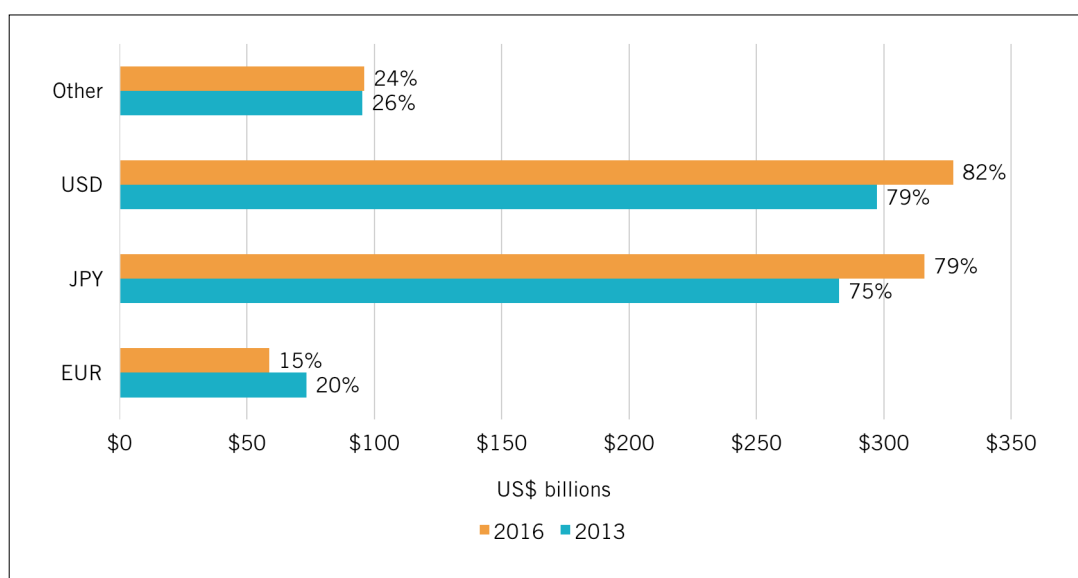
Japan FX Turnover by Counterparty



Source: ISDA analysis based on BIS data

US dollars and yen were the most widely traded currencies in FX. In 2016, the US dollar was on one side of 82% of all daily trades and yen was on one side of 79% of all daily trades. Daily average FX trading in US dollars increased to \$327.3 billion in April 2016 from \$297.3 billion in April 2013, while daily average trading in yen rose to \$316 billion from \$282.5 billion over the same period. The share of euro-denominated transactions totaled \$58.7 billion and accounted for 15% of daily average turnover in April 2016²⁹.

Japan FX Turnover by Currency



Source: ISDA analysis based on BIS data

OTC Derivatives Notional Outstanding

Based on public data published by the Japan Financial Services Agency (JFSA), OTC derivatives notional outstanding totaled \$41.1 trillion as of September 30, 2016³⁰. IRD, including cross-currency transactions, totaled \$39.6 trillion and accounted for 96% of notional outstanding. FX derivatives³¹ comprised \$0.9 trillion (2% of notional outstanding), credit derivatives totaled only \$0.3 trillion and equity derivatives represented \$0.2 trillion.

IRD

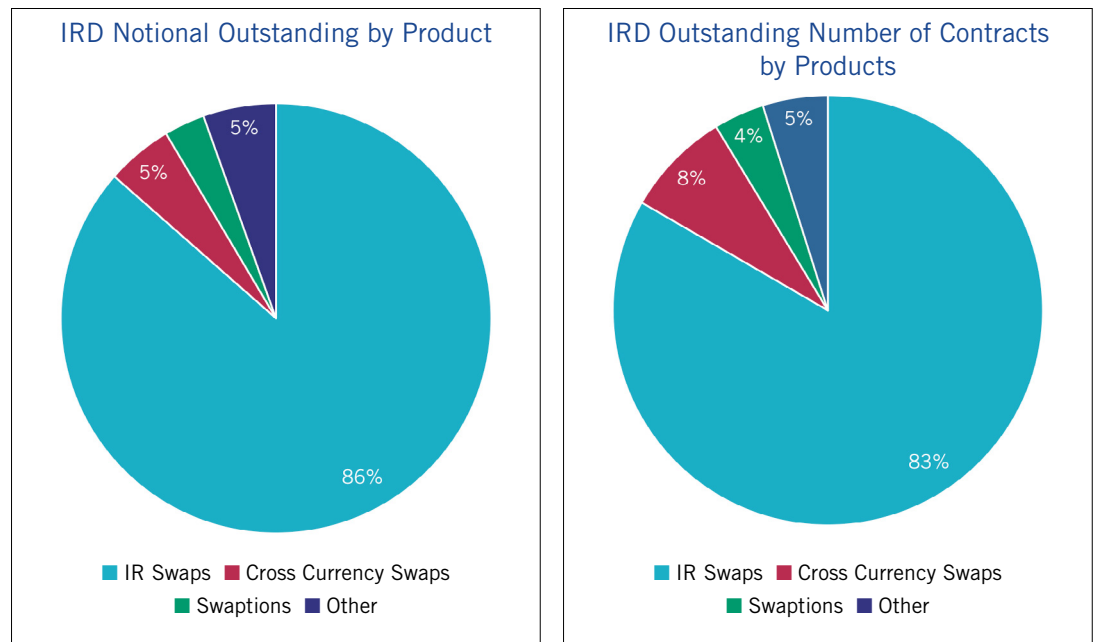
As of September 30, 2016, IRD notional outstanding totaled \$39.6 trillion and the number of outstanding contracts was about 563,000. Interest rate swaps totaled about \$34.3 trillion and represented 86% of notional outstanding. Cross-currency transactions totaled \$2 trillion, swaptions \$1.2 trillion and other products equaled \$2.2 trillion.

²⁹ As each transaction involves two currencies, the sum of shares in individual currencies totals 200%

³⁰ The figures of transactions reported by both entities of banks, Type I financial instruments business operators and insurance companies are aggregated twice. The figures of transactions reported by central counterparties (CCPs) are also aggregated twice

³¹ Under the classification of Japanese transaction reporting in 2016, FX derivatives include exotics, NDF, NDOs and vanilla options (doesn't include forwards)

Fixed versus floating swaps totaled \$28.9 trillion and accounted for 84% of interest rate swaps notional outstanding. Basis swaps and OIS totaled \$4.2 trillion and \$1.1 trillion, respectively. Cross-currency swaps included \$1.3 trillion of basis swaps, \$0.3 trillion of fixed versus floating swaps and \$0.4 billion of fixed swaps.



Source: ISDA analysis based on JFSA data

As of September 30, 2016, \$6 trillion of IRD notional outstanding was reported by banks, including \$5.4 trillion reported by major banks, \$0.3 trillion by regional banks and \$0.4 trillion by foreign bank branches³². Type I financial instruments business operators reported \$4 trillion of notional outstanding and insurance companies reported \$0.1 trillion.

As of September 30, 2016, \$29.6 trillion of IRD notional was cleared, accounting for 75% of total IRD notional outstanding. About 82% of interest rate swaps and 73% of other products were cleared, representing \$28 trillion and \$1.6 trillion of cleared notional outstanding. All cross-currency and swaptions transactions were non-cleared. Total non-cleared IRD notional outstanding was \$10 trillion.

As of September 30, 2016, \$10.6 trillion of outstanding IRD trades had a tenor of up to 12 months, \$15.6 trillion was between one and five years and \$13.4 trillion was more than five years.

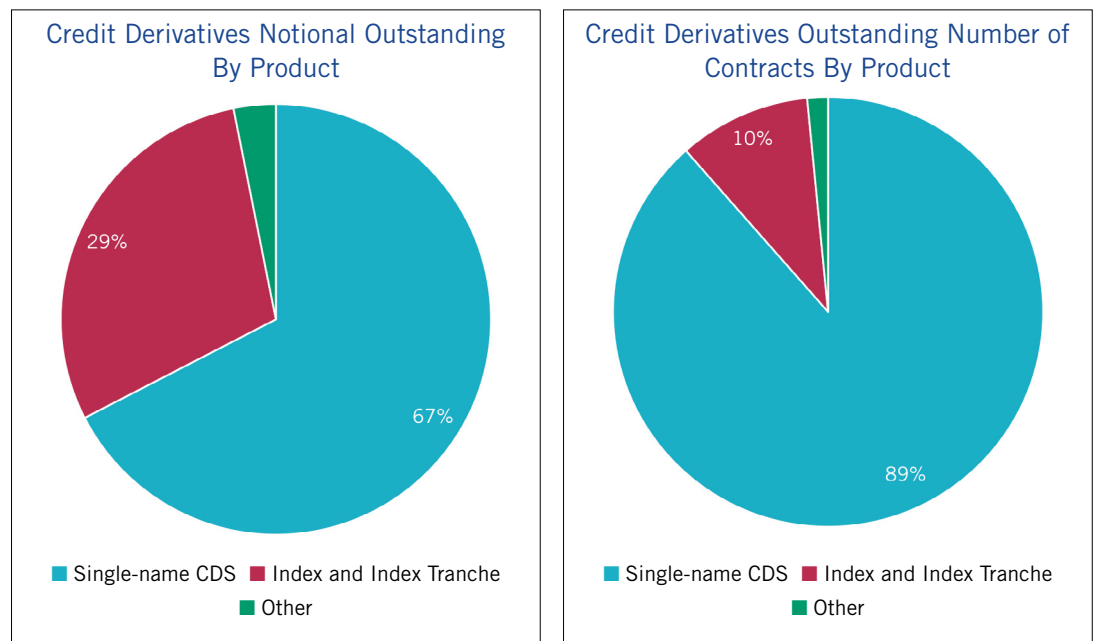
³² Major banks include Shokochukin Bank, Development Bank of Japan, Shinkin Central Bank and Norinchukin Bank

FX

As of September 30, 2016, FX notional outstanding totaled \$0.9 trillion and the number of outstanding contracts was about 724,000. \$0.5 trillion of FX notional outstanding was reported by banks, including \$0.3 trillion reported by major banks and \$0.2 trillion reported by foreign bank branches. Type I financial instruments business operators reported \$0.4 trillion of notional outstanding. None of the FX notional outstanding was cleared.

Credit Derivatives

As of September 30, 2016, credit derivatives notional outstanding totaled \$343.9 billion and the number of outstanding contracts was about 39,000. Single-name CDS totaled \$231.3 billion and represented 67% of total credit derivatives notional outstanding and 89% of the outstanding contracts. Index and index tranche transactions totaled \$100.8 billion and accounted for 29% of notional outstanding and 10% of outstanding contracts.



Source: ISDA analysis based on JFSA data

\$41.5 billion of credit derivatives notional outstanding was reported by banks and \$279.7 billion reported by Type I financial instruments business operators. About \$20.8 billion of notional outstanding was cleared. 73% of credit derivatives notional outstanding had a tenor of between one and five years.



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