BANK FOR INTERNATIONAL SETTLEMENTS

The BIS Triennial Central Bank Survey

Andreas Schrimpf

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Introduction

- FX and interest rate derivatives are some of the world's largest and most active financial markets …
  - OTC market with bank **dealers** as liquidity providers
  - Trading is fragmented and relatively opaque

  → Crucial markets, yet difficult to get data!

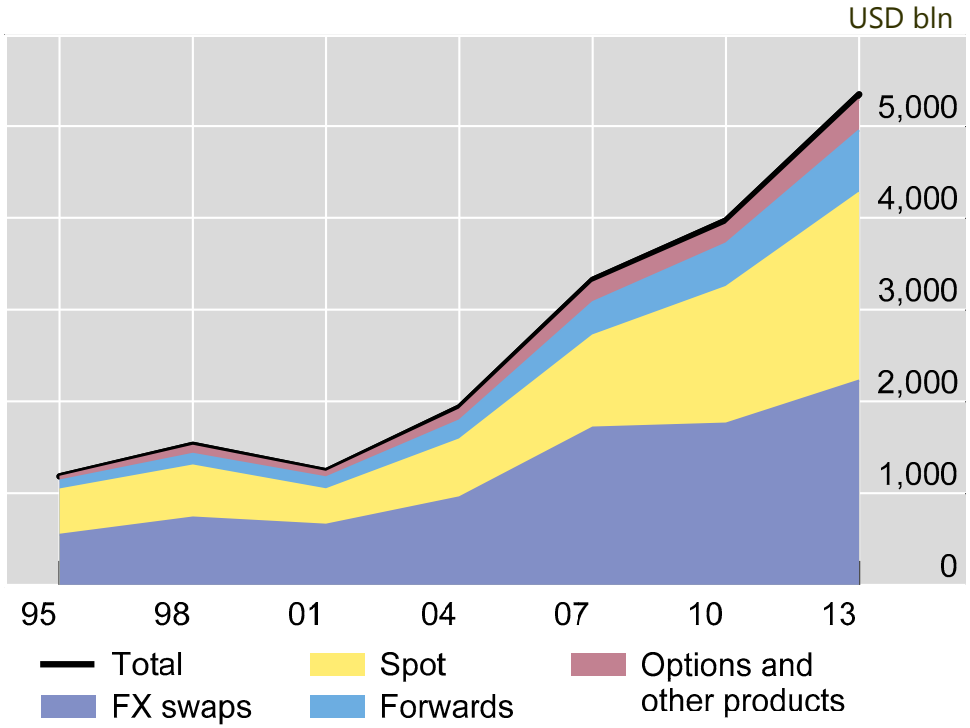
- In April 2016, BIS coordinated the Triennial Central Bank Survey, known as the **"Triennial"**
  - Survey conducted every *three* years since April 1986 → 11th edition

    → provides the most comprehensive and internationally consistent information on size and structure of global OTC trading in FX and interest rate derivatives markets

Introduction

- Focus is usually on the **FX part** of the survey
- For instance, the 2013 Triennial showed that **global trading volume** in FX markets reached **$5.3 trillion** (per day) …

Global FX turnover: by instrument ("net-net")



- Headline FX turnover figures widely reported and publicised …
- But, underlying data remain largely unexplored by researchers … ☹
- **Expected release of the 2016 figures: early-Sept this year**

Outline

1. Data description
   - What is the survey about?
   - How is the survey conducted?
2. Overview of key features of the data
3. Strengths and weaknesses
4. Access to the data

Data description

For more details, see King M. and C. Mallo (2010): «A user's guide to the triennial central bank survey of foreign exchange market activity», *BIS Quarterly Review*, December 2010

Triennial Central Bank Survey of FX market activity

The Triennial collects data on:

i. Foreign exchange and interest rate derivatives ***turnover*** measured in notional amounts (April)

ii. Notional amounts ***outstanding*** and gross market values of foreign exchange instruments and other OTC derivatives (end of June)

Turnover is defined as the aggregate gross notional amount of all transactions struck in April (regardless of whether delivery or settlement was made during that month)

- Daily average turnover is computed by dividing aggregate monthly turnover by number of trading days in April for each country
- All figures reported in USD equivalents. Non-USD amounts converted into USD using the exchange rate prevailing on the date of the trade

→ Focus in this presentation is on FX turnover

How is the survey conducted?

In April this year, 52 central banks surveyed 1,283 reporting dealers

NY Fed, for instance, surveyed 24 banks

- FRBNY reports aggregate results to BIS, who coordinates the survey
- BIS does not see data for individual banks

BIS adjusts the data for **inter-dealer double counting**

- For inter-dealer transactions, dealers specify whether the trade is "local" or "cross-border"

1) Local trades between dealers are halved ("Net-Gross" basis)
2) Cross-border trades between dealers are halved ("Net-Net" basis)

Gross-Gross (raw data) → **Net-Gross** (location) → **Net-Net** (global)

What is reported in the Triennial? – FX part

Dealers report trades, broken down by instruments:

1. Spot
2. FX swaps
   - Only forward leg of the swap is reported
3. Outright forwards
   - Also includes non-deliverable forwards (NDFs)
4. Currency options
5. Cross-currency swaps
6. Other products

Dealers report trades, broken down by currencies and currency pairs:

- 38 currencies and 47 individual crosses

What is reported in the Triennial? – FX part

Dealers report trades, broken down by counterparties:

- **Dealers**

Large banks and securities houses that participate in foreign exchange markets as market makers and have active business with end customers

→ captures inter-dealer trading

- **Other financial institutions**
  - o/w Non-reporting banks
  - o/w Institutional investors
  - o/w Hedge funds and prop. trading firms
  - o/w Official sector financial institutions
- **Non-financial customers**

E.g. corporates, governments and retail customers

What is reported in the Triennial? – IR part

Dealers report trades, broken down by instruments:

1. Forward rate agreements
2. Swaps
3. Options and other products

Dealers report trades, broken down by counterparties:

1. Dealers
2. Other financial institutions
3. Non-financial customers

Dealers report trades, broken down by 38 currencies

Additional features

- In 2007, survey questions on trade **execution methods** were introduced (further refined 2013/2016)
  - Electronic vs. Voice
  - Direct (Bilateral) vs. Indirect (Brokered)
  - Different types of platforms (e.g. SBP, MBP, dark pools)

- In 2013 additional o/w items were introduced
  - **Retail-driven** transactions (e.g. retail aggregators)
  - **Prime-brokerage** (e.g. hedge funds or PTFs trading in the PB's name with other wholesale market participants)
  - **Non-deliverable forwards (NDFs)**

- In 2016, a complementary survey question was introduced to gauge **internalization** ratios

Overview of some key data features

For more details, see Rime D. and A. Schrimpf (2013): «The Anatomy of the global FX market through the lens of the 2013 triennial survey», *BIS Quarterly Review*, December 2013.

Dissecting the drivers of FX turnover growth

Global FX market turnover, by counterparty and by instrument[1]

Table 1

	Turnover in 2013[2] (USD bn)	Absolute change from 2010[2] (USD bn)	Growth since 2010 (%)	Contribution to FX market growth[3] (%)
Global FX market	**5,345**	**1,373**	**35**	**100**
By counterparty				
Reporting dealers	2,070	526	34	38
Other financial institutions	**2,809**	**914**	**48**	**67**
Non-financial customers	465	–66	–12	–5
By instrument				
Spot	2,046	558	38	**41**
Outright forwards	680	205	**43**	15
FX swaps	2,228	469	27	**34**
FX options	337	130	**63**	9
Currency swaps	54	11	26	1

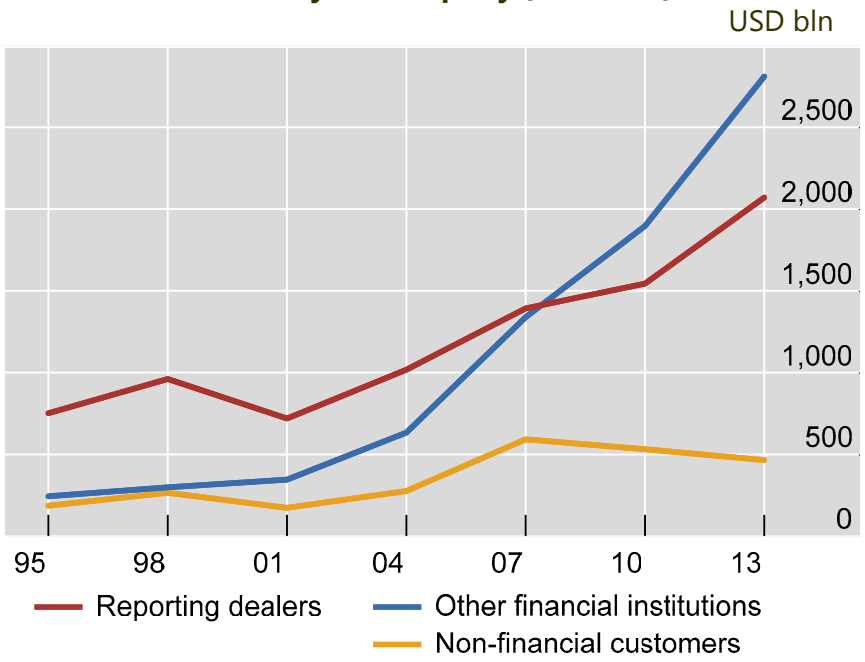
[1] Adjusted for local and cross border inter-dealer double-counting, ie "net-net" basis; daily averages in April. [2] In billions of US dollars. [3] Percentage contribution to the total increase of $1,373 billion from 2010 to 2013.

Source: 2013 Triennial Central Bank Survey.

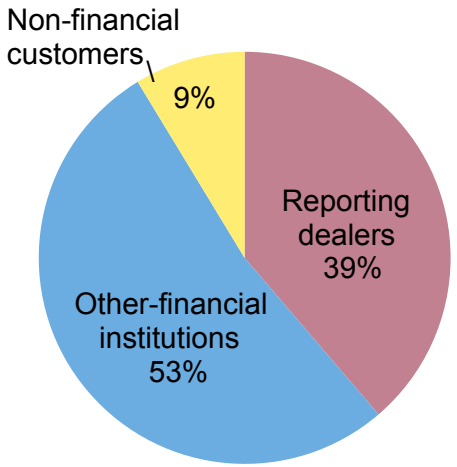
Financial institutions (other than dealers) are the main source of FX turnover growth …

- Turnover with **other financial institutions (OFIs)** rose by $0.9 to $2.8 trillion, a 48% increase
- Continues the trend of the past three surveys

Global FX turnover by counterparty ("net-net")



FX turnover 2013: counterparty shares



Top 10 currency distribution in April 2013

FX market turnover for selected currencies ("net-net")

	2013		2010		2007		2004	
	Share[1]	Rank	Share[1]	Rank	Share[1]	Rank	Share[1]	Rank
Total	**200.0**		200.0		200.0		200.0	
By currency								
USD	**87.0**	**1**	84.9	1	85.6	1	88.0	1
EUR	**33.4**	**2**	39.1	2	37.0	2	37.4	2
JPY	**23.0**	**3**	19.0	3	17.2	3	20.8	3
GBP	**11.8**	**4**	12.9	4	14.9	4	16.5	4
AUD	**8.6**	**5**	7.6	5	6.6	6	6.0	6
CHF	**5.2**	**6**	6.3	6	6.8	5	6.0	5
CAD	**4.6**	**7**	5.3	7	4.3	7	4.2	7
MXN[2]	**2.5**	**8**	1.3	14	1.3	12	1.1	12
CNY[2]	**2.2**	**9**	0.9	17	0.5	20	0.1	29
NZD[2]	**2.0**	**10**	1.6	10	1.9	11	1.1	13
Others	**19.7**		21.1		23.9		18.8	

[1] Because two currencies are involved in each transaction, the sum of the percentage shares of individual currencies totals 200% instead of 100%. [2] Turnover for years prior to 2013 may be underestimated owing to incomplete reporting of offshore trading in previous surveys. Methodological changes in the 2013 survey ensured more complete coverage of activity in emerging market and other currencies.

Source: Triennial Central Bank Survey.

Strengths/weaknesses, alternative sources and access

Strengths of the data

- Holistic global perspective and very comprehensive dataset
  → accurate **«snapshot»** of the market at a given point in time

- Sheds light on darker niches in the market
  - Bilateratal voice trades vs electronic trades on lit platforms
  - Emerging market currencies

- Can gauge extent of **«on-shore»** (involving a local dealer as counterparty on at least one side of the trade) vs **«off-shore»** trading and currency internationalization …

- Rich **cross-sectional** information (currencies and trading centres)

- Information on execution methods based on actual trading records

Weaknesses of the data

- **Frequency** of the data - only conducted every three years ☹
  - Also a few changes in reporting population, breakdowns etc.
  - Time-series / panel data analysis not so easy
  - Difficulty to disentangle structural vs cyclical factors

- Perspective by currency, not by country
  - Not possible to construct «flows» between countries
  - Difficult to get a sense of net long/short exposures

- **Dealer-centric** survey design + focus on wholesale segment

Alternative data sources

- Semi-annual surveys by regional FX Committees (London, NY, Tokyo etc.)
- Research with microstructure focus:
  - Data from inter-dealer platforms such as Reuters/EBS (e.g. Chaboud et al 2014, Rime et al 2010)
  - Trading data from dealers (e.g. Menkhoff et al 2016)
- Additional data available by Swift (trade confirmation messages) and CLS Bank (settlement volumes)
- Looking forward, data collected via trade repositories (TRs) may prove useful, especially for interest rate derivatives

Access to the data

- Results of the 2016 survey will be published here: **http://www.bis.org/publ/rpfx16.htm**
- The data can be accessed via the BIS Statistic Explorer
- You can also send an email to our statistics department for further inquiries: **statistics@bis.org**

Summary

- Very comprehensive and rich dataset (main downside low frequency)
- Unique data to study evolution and structure of global OTC markets, expecially in foreign exchange
- Thus far, mostly used for research targeted towards policy publications
- Not much academic-style research (yet) …

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- Supplementary Material -

How are FX trades executed?

- Dominance of electronic trading across all counterparty segments
- No distinct inter-dealer trading venue anymore
- Non-dealer financials display a more dispersed trading pattern

Execution method by counterparty in 2013 (percentage shares)[1]

Net-net basis, daily averages in April 2013 — Table 3

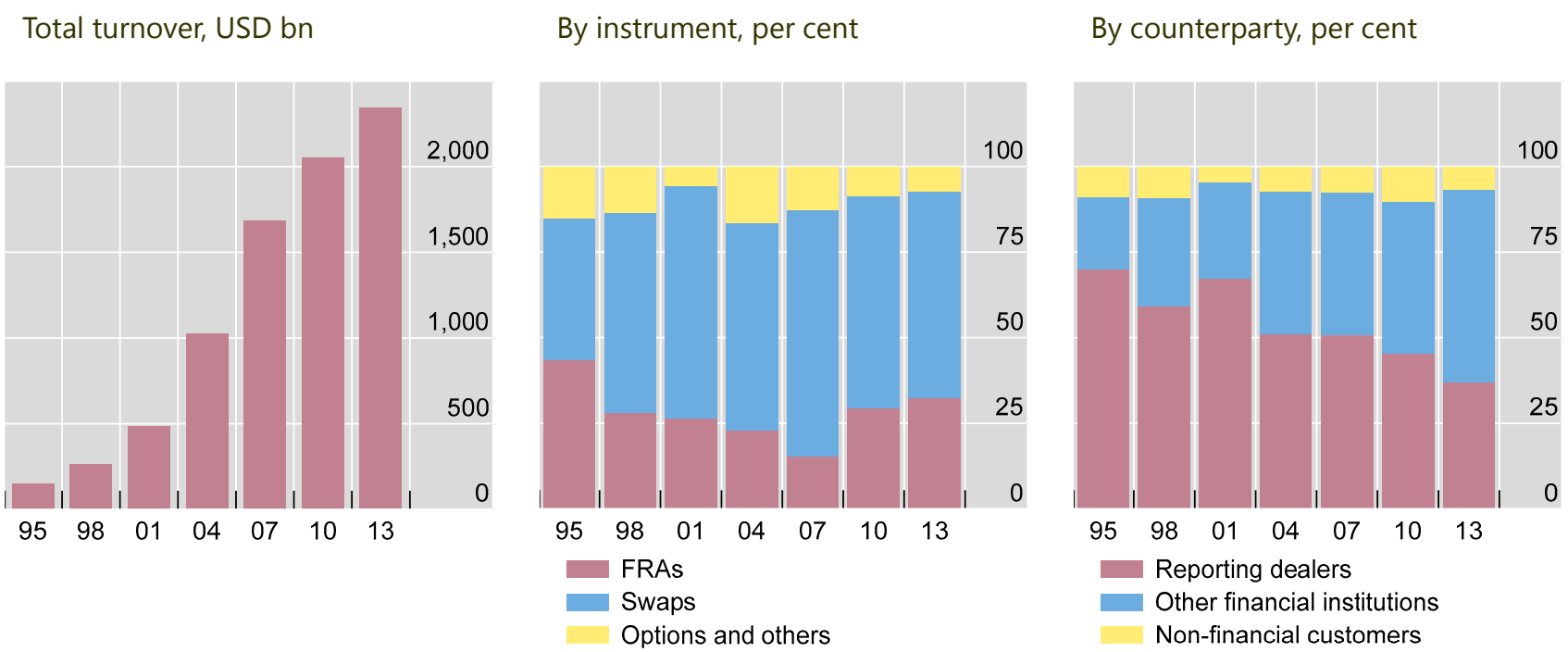
	Voice			Electronic							
	Direct	Indirect	**Total**	Direct[2]			Indirect[3]				**Total**
				Single-bank platforms[4]	Other[5]	Total	Reuters/ EBS	Other ECNs[6]	Other	Total	
Reporting dealers	22	19	**41**	14	15	29	16	9	3	27	**56**
Other financials	30	14	**43**	10	20	31	14	9	2	25	**55**
Non-financials	37	4	**42**	18	10	28	3	9	12	24	**52**

[1] Percentage shares of total FX volumes for each counterparty segment; totals do not sum to 100 due to incomplete reporting; adjusted for local and cross-border inter-dealer double-counting, ie "net-net" basis. [2] Refers to trades which are not matched via a third party. [3] Refers to deals matched via a third party – either a voice broker or an electronic broker. [4] Single-bank trading systems operated by a single dealer, eg BARX (Barclays), Autobahn (Deutsche Bank), Velocity (Citigroup). [5] Other electronic direct, eg Bloomberg Tradebook, Reuters Conversational or direct electronic price streams. [6] Electronic communication networks, eg Currenex, FXall, Hotspot.

Source: Triennial Central Bank Survey.

OTC interest rate derivatives turnover

Net-net basis,[1] daily averages in April



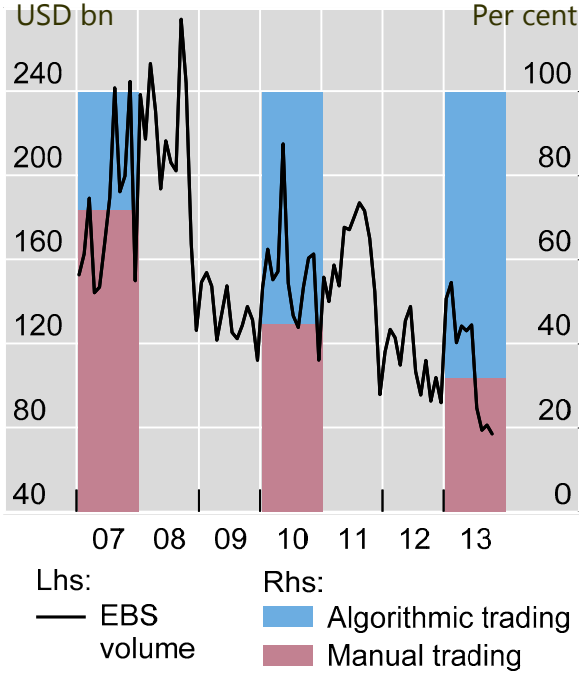
[1] Adjusted for local and cross-border inter-dealer double counting.

Source: Triennial Central Bank Survey

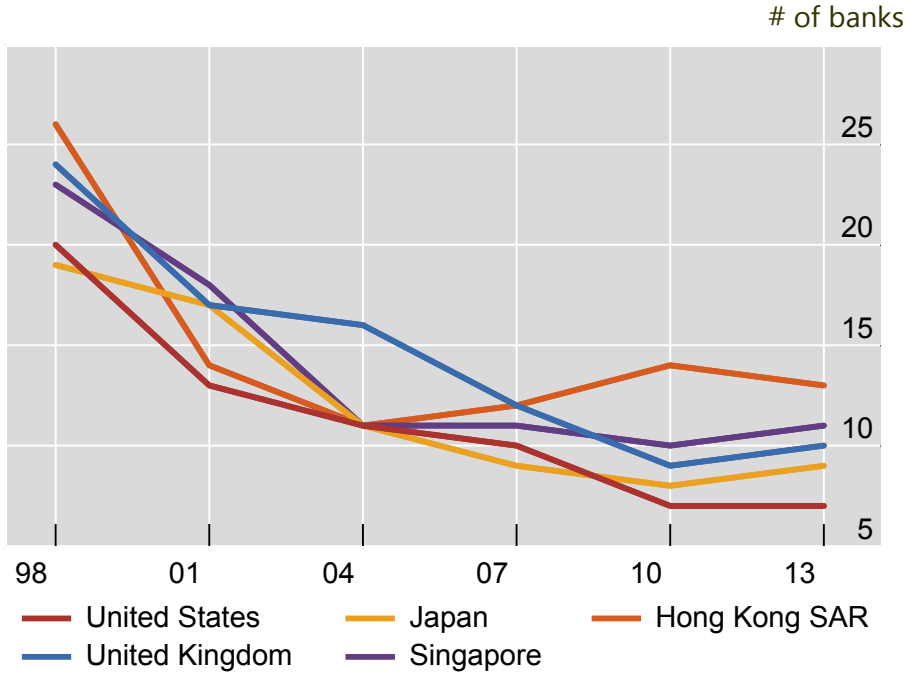
Inter-dealer trading, concentration and flow internalisation

- Trend towards flow internalisation at top tier banks
- Reduced need to manage inventory imbalances via traditional inter-dealer venues

EBS trading volume, manual vs algorithmic



Number of banks accounting for 75% of FX turnover[1]



[1] Relates to spot, outright forwards and FX swaps.
Source: Triennial Bank Survey; EBS.

Top 11-20 currency distribution in April 2013

FX market turnover for selected currencies ("net-net")

	2013		2010		2007		2004	
	Share	Rank	Share	Rank	Share	Rank	Share	Rank
By currency								
SEK	**1.8**	**11**	2.2	9	2.7	9	2.2	8
RUB[1]	**1.6**	**12**	0.9	16	0.7	18	0.6	17
HKD[1]	**1.4**	**13**	2.4	8	2.7	8	1.8	9
NOK[1]	**1.4**	**14**	1.3	13	2.1	10	1.4	10
SGD[1]	**1.4**	**15**	1.4	12	1.2	13	0.9	14
TRY[1]	**1.3**	**16**	0.7	19	0.2	26	0.1	28
KRW[1]	**1.2**	**17**	1.5	11	1.2	14	1.1	11
ZAR[1]	**1.1**	**18**	0.7	20	0.9	15	0.7	16
BRL[1]	**1.1**	**19**	0.7	21	0.4	21	0.3	21
INR[1]	**1.0**	**20**	1.0	15	0.7	19	0.3	20

[1] Turnover for years prior to 2013 may be underestimated owing to incomplete reporting of offshore trading in previous surveys. Methodological changes in the 2013 survey ensured more complete coverage of activity in emerging market and other currencies.

Source: Triennial Central Bank Survey.

Overview of Triennial surveys from 1989 to 2016

Year of survey	Average daily FX turnover at Constant April 2013 rates (USD billions)[2]	Number of countries participating (and reporting dealers)	Key changes in methodology and coverage
1989[1]	N/A	21 (1,089)	Country reports were not fully homogeneous.
1992	N/A	26 (2,496)	Greater granularity for counterparty types and locations to eliminate double-counting. More currencies covered.
1995	1,157	26 (2,414)	Survey expanded to collect data on turnover of currency swaps and options, and amounts outstanding for OTC derivatives.
1998	1,718	43 (3,100)	Dropped coverage of exchange-traded products. Amounts outstanding reported on worldwide consolidated basis.
2001	1,500	48 (2,530)	Increased coverage of emerging market currencies.
2004	2,036	52 (1,200)	Clarified the concept of reporting dealers. Location based on sales desk. Reporting threshold increased, reducing number of reporting dealers.
2007	3,376	54 (1,260)	Simplified template for execution method to allow adjustment for double-counting of inter-dealer activity.
2010	3,969	53 (1,309)	Dropped the distinction between "traditional foreign exchange markets" and other FX instruments.
2013	5,345	53 (1,300)	List of currencies expanded. More detailed counterparty breakdown for other financial institutions. Survey expanded to collect data on deals conducted via prime brokerage relationships, retail-driven transactions, non-deliverable forwards, and algorithmic and high frequency trading in spot FX and OTC derivatives transactions. More currencies covered. Execution methods clarified.
2016	N/A	N/A	Survey expanded to collect more detailed data on execution methods along with data on trade internalisation.

[1] While the Triennial formally began in 1986, Canada, Japan, the United Kingdom and United States collected and reported data on turnover in 1986. These data made limited adjustment for double-counting, but were highlighted in the discussion of the 1989 Triennial. [2] Data for 1989 and 1992 were collected on another basis so are not directly comparable with 1995-2013.

Key dimensions of the FX part of the Triennial survey

Dimension	Turnover	Amounts outstanding
Data collected	Turnover in gross notional amounts during April.	Gross notional amounts and gross market values outstanding at end-June.
Instruments	Spot, outright forwards, FX swaps, currency options, currency swaps and other foreign exchange products.	Outright forwards, FX swaps, currency options, currency swaps and other foreign exchange products.
Counterparties	1. Reporting dealers: financial institutions that are active in foreign exchange markets and participate in the Triennial survey. 2. Other financial institutions: banks not classified as reporting dealers, mutual funds, pension funds, hedge funds, insurance companies, central counterparties, central banks or online retail platforms. 3. Non-financial customers: corporations and governments.	1. Reporting dealers: financial institutions that are active in foreign exchange markets and participate in the Triennial survey. 2. Other financial institutions: financial institutions not classified as “reporting dealers”, including banks, central counterparties, funds and non-bank financial institutions. 3. Non-financial customers: corporations and governments.
Reporting basis	Locational basis: each reporting dealer reports on its activity to the local monetary authority. As of 2004, based on the sales desk.	Consolidated basis: each bank reports in the country where it is headquartered, aggregates across all its branches and (majority-owned) subsidiaries worldwide and nets out deals between affiliates.

Key dimensions of the FX part of the Triennial survey

Dimension	Turnover	Amounts outstanding
Currencies	Broken down by 38 individual currencies and 42 bilateral currency pairs.	Broken down by 7 individual currencies (not bilateral currency pairs).
Maturities	Transactions in outright forwards and FX swaps are broken down by original maturity: seven days or less; over seven days and up to one year; over one year.	Amounts outstanding in outright forwards, FX swaps, OTC options sold and bought broken down by remaining maturity: one year or less; over one year and up to five years; over five years.
Execution methods	Broken down for the following categories: 1. Voice-direct 2. Voice-indirect 3. Electronic-direct a. Single-bank b. Other 4. Electronic-indirect a. Reuters Matching/EBS b. Dark pools (introduced 2016) c. Other	Not applicable
Additional information	Reporting central banks are asked to provide: 1. The number of participating institutions 2. The estimated percentage coverage of their survey for local FX market activity 3. The number of institutions accounting for 75% of the reported totals	

Reporting by currencies in 2016 Triennial survey

	Domestic currency versus	USD versus	EUR versus	JPY versus	Residual[1]
G8 currencies	AUD, CAD, CHF, EUR, GBP, JPY, SEK, USD	AUD, CAD, CHF, EUR, GBP, JPY, SEK	AUD, CAD, CHF, GBP, JPY, SEK	AUD, CAD	
Non-G8 currencies		BRL, CNY, HKD, INR, KRW, MXN, NOK, NZD, PLN, RUB, SGD, TRY, TWD, ZAR	CNY, DKK, HUF, NOK, PLN, TRY	BRL, NZD, TRY, ZAR	
Other	Other[2]	Other[2]	Other[2]	Other[2]	

1 Transactions that do not involve the domestic currency, USD, EUR or JPY in one leg. 2 Currencies not explicitly listed in the table include ARS, AUD, BGN, BHD, BRL, CAD, CHF, CLP, CNY, COP, CZK, DKK, GBP, HKD, HUF, IDR, ILS, INR, KRM, MXN, MYR, NOK, NZD, PEN, PHP, PLN, RON, RUB, SAR, SEK, SGD, THB, TRY, TWD, ZAR.

Source: Triennial Central Bank Survey

Comparison of Triennial with regional foreign exchange surveys

	Triennial	London	New York[1]	Tokyo	Singapore	Australia	Canada
Frequency	Every 3 years	Semiannual	Semiannual	Annual	Semiannual	Monthly	Semiannual
Reporting month	April	April, October	April, October	April	April, October	Monthly	April, October
Reporting currency	USD	USD	USD	USD	USD	USD	USD
Basis of reporting	Sales desk	Trading desk	Trading desk	Sales desk[2]	Trading desk	Sales desk	Trading desk
Treatment of related party trades	Intragroup included; back-to-back excluded	Intragroup included; back-to-back excluded	Excluded	Intragroup included; back-to-back excluded	Intragroup included; back-to-back excluded	Collected as memo item	Intragroup included; back-to-back excluded
Distinguish local and cross-border trades?	Yes	Yes	No	Yes	Yes	Yes	No
Adjust for double-counting (local and cross-border)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of instruments	6	6	4	4	5	5	5
Currency pairs	42	54	13	>5	>16	30	>4
Counterparty types	7	4	4	3	2	3	4
Execution method categories	7	Same as Triennial	5	6 (different from Triennial)	Not collected	Not collected	5

[1] North America, including Canada and Mexico. [2] From 2010, the Tokyo Foreign Exchange Market Committee changed the reporting basis from the trading desk to the sales desk.