Short Term
Interest Rate Benchmarks

LIBOR Trade Association Working Party

Tim Bowler

IBA, President

May 2019

LIBOR End-Users Survey Results

ICE LIBOR USER SURVEY

OVERVIEW

ICE Benchmark Administration (IBA) launched the survey on the use of LIBOR on December 4, 2018, in order to identify the LIBOR settings that are most widely used. The survey closed on February 15, 2019, and the results are published herein and at https://www.theice.com/iba/ice-benchmark-administration-survey-on-the-use-of-libor.

Using the results of this survey and other outreach work, IBA will work with globally active banks to seek to publish certain LIBOR settings after year-end 2021. IBA expects to issue further press releases regarding this work as it progresses.

The primary goal of IBA's work in seeking to obtain sufficient banking industry support to publish certain LIBOR settings after year-end 2021 is to provide these settings to users with outstanding LIBOR-linked contracts that are impossible or impractical to modify. Any such settings will need to be compliant with relevant regulations and in particular those regarding representativeness.

IBA's work is also designed to facilitate the industry's progress towards an orderly adoption of alternative 'risk-free' reference rates into the financial system, as called for by the Financial Conduct Authority and the central banks.

Notwithstanding the results of the survey and IBA's work, there is no guarantee that any LIBOR settings will continue to be published after year-end 2021. Users of LIBOR should not rely on the continued publication of any LIBOR settings when developing transition or fall back plans.

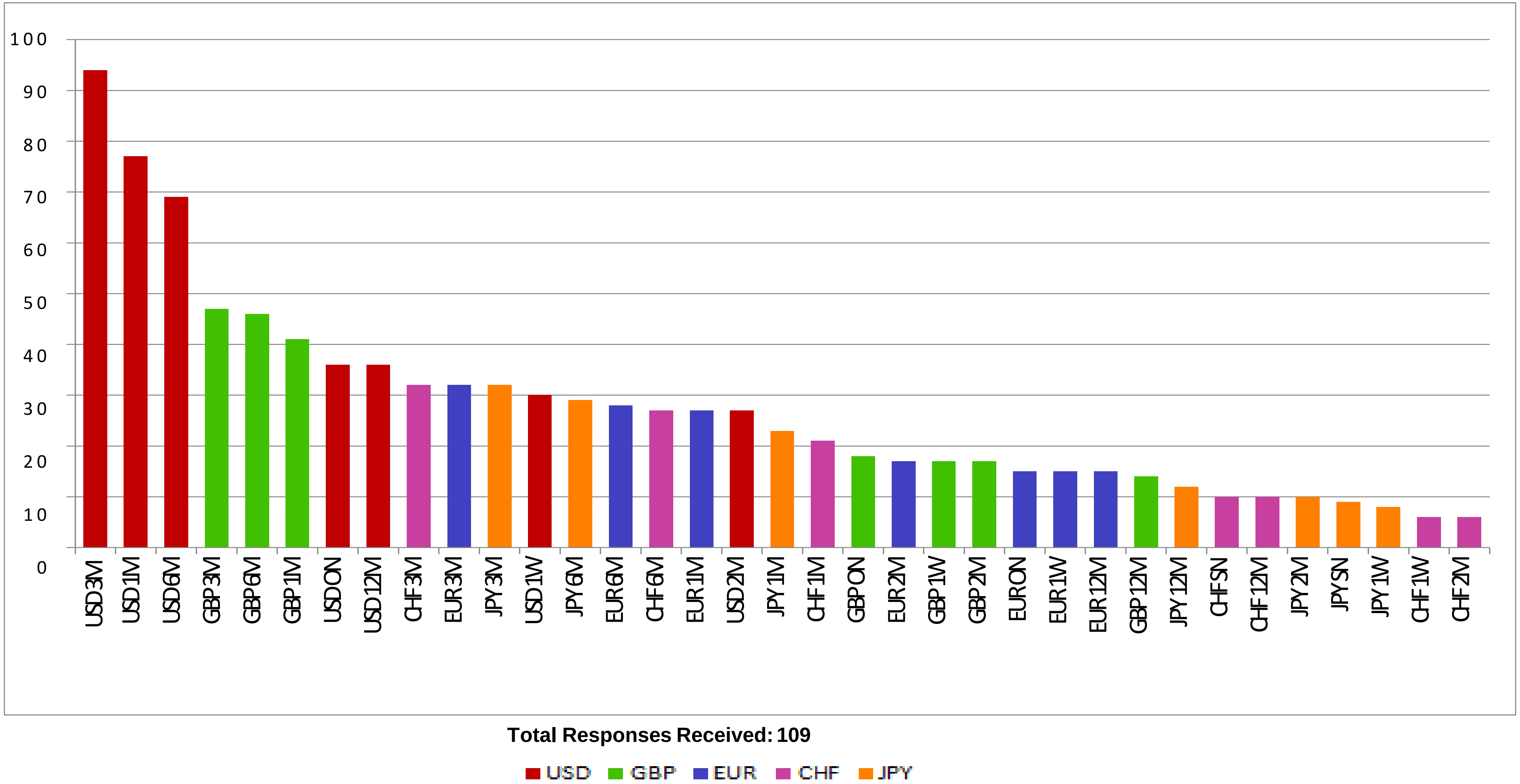
ICE LIBOR USER SURVEY

SURVEY QUESTION 1

“IBA would like to understand which LIBOR currency and tenor pairs you and/or your organisation use the most and for which you would like to see IBA work to seek an agreement with globally active banks to support publication after 2021. Please select up to a maximum of 17 currency and tenor pairs.”

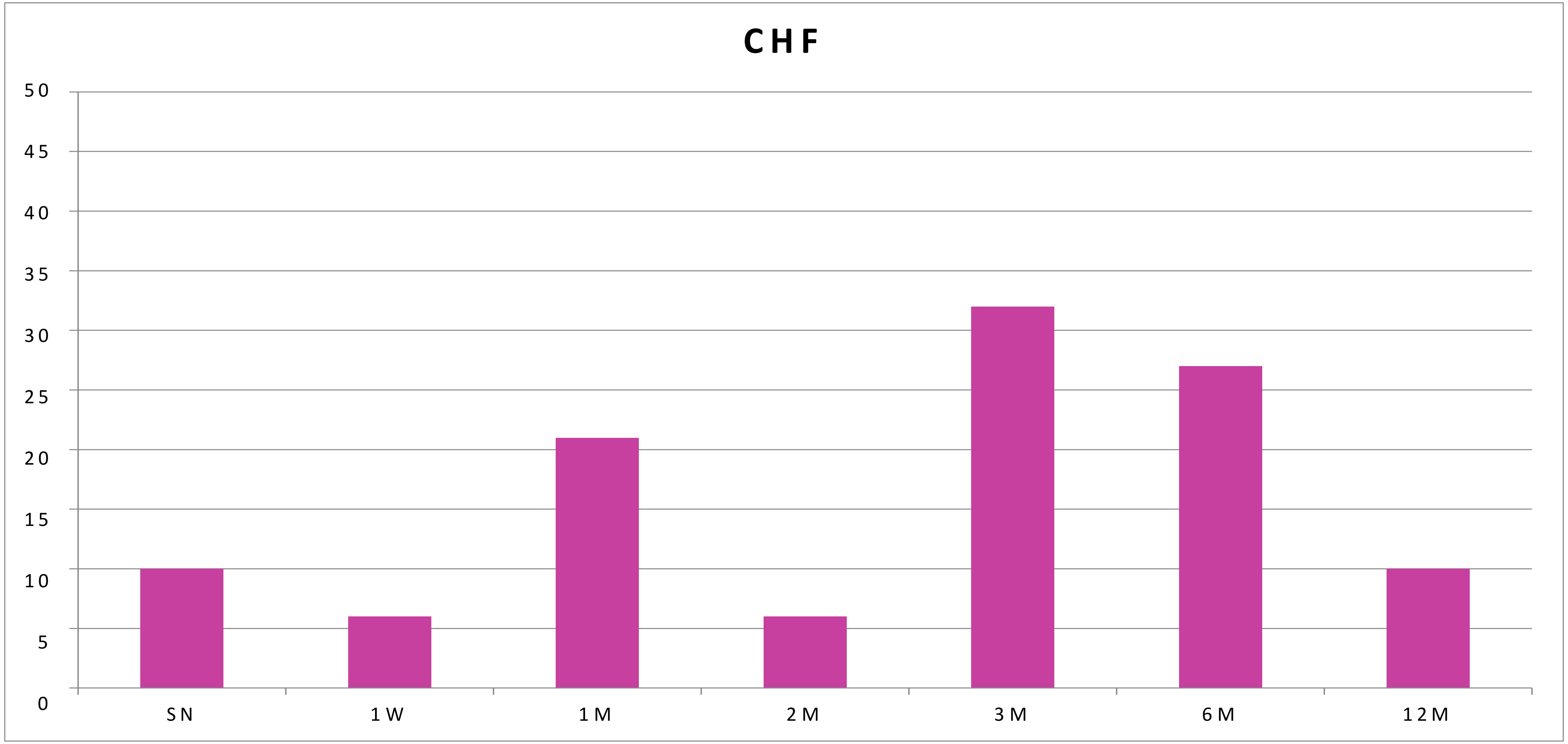
ICE LIBOR USER SURVEY

NUMBER OF RESPONDENTS SELECTING EACH LIBOR CURRENCY AND TENOR PAIR



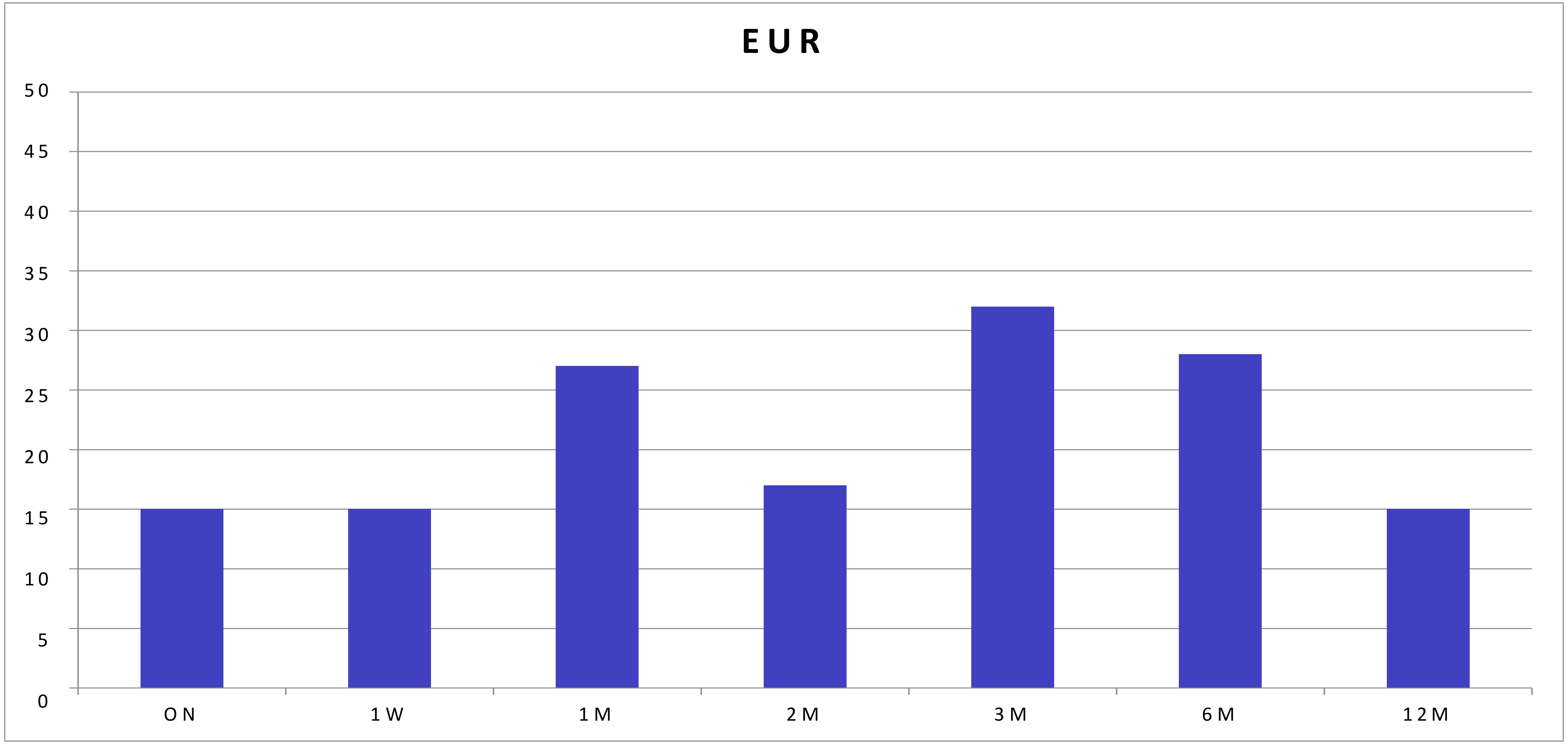
ICE LIBOR USER SURVEY

NUMBER OF RESPONDENTS SELECTING LIBOR CURRENCY AND TENOR PAIRS : CHF



ICE LIBOR USER SURVEY

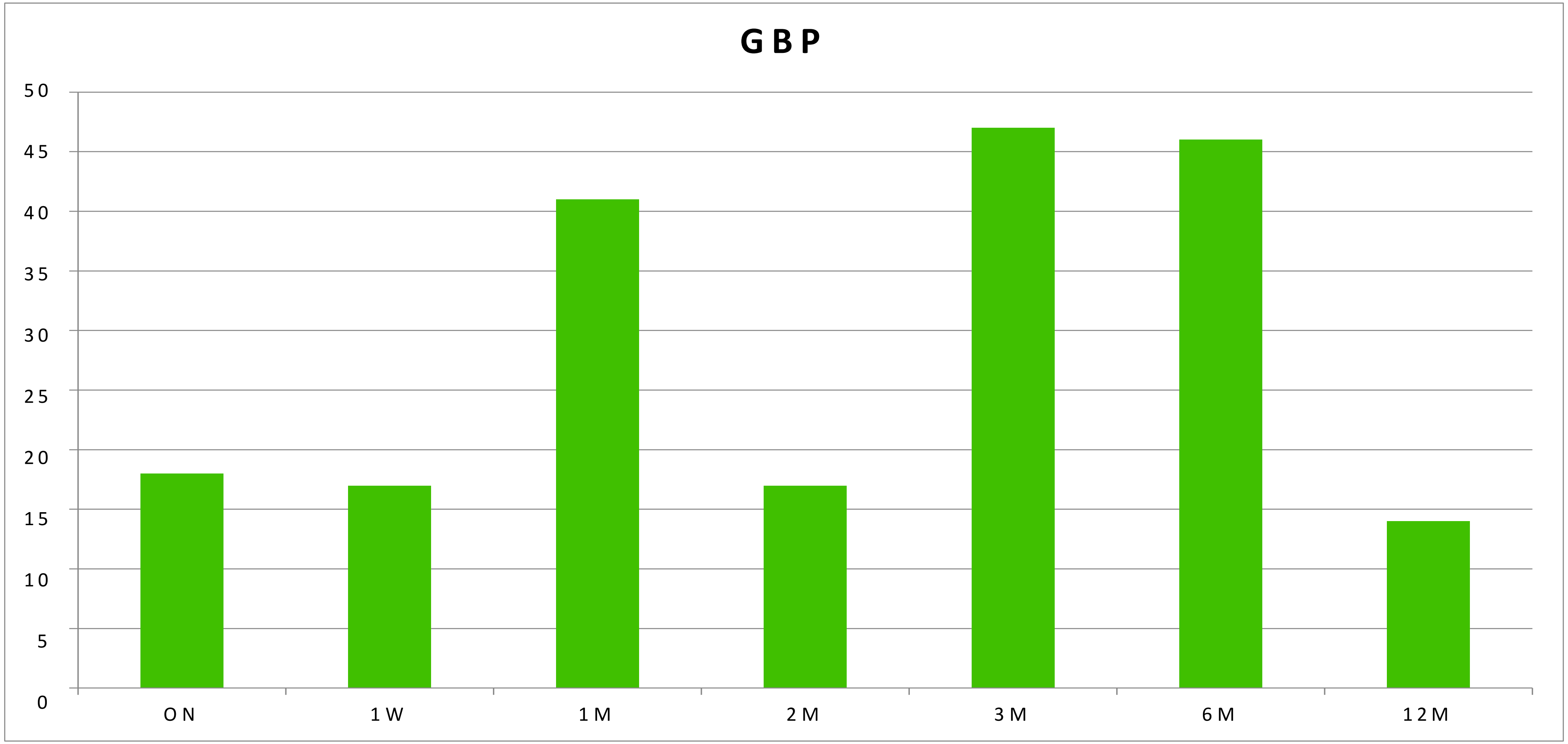
NUMBER OF RESPONDENTS SELECTING LIBOR CURRENCY AND TENOR PAIRS : EUR[1]



[1] The survey noted that it related to EUR LIBOR as administered by IBA and not EURIBOR as administered by the European Money Markets Institute (EMMI)

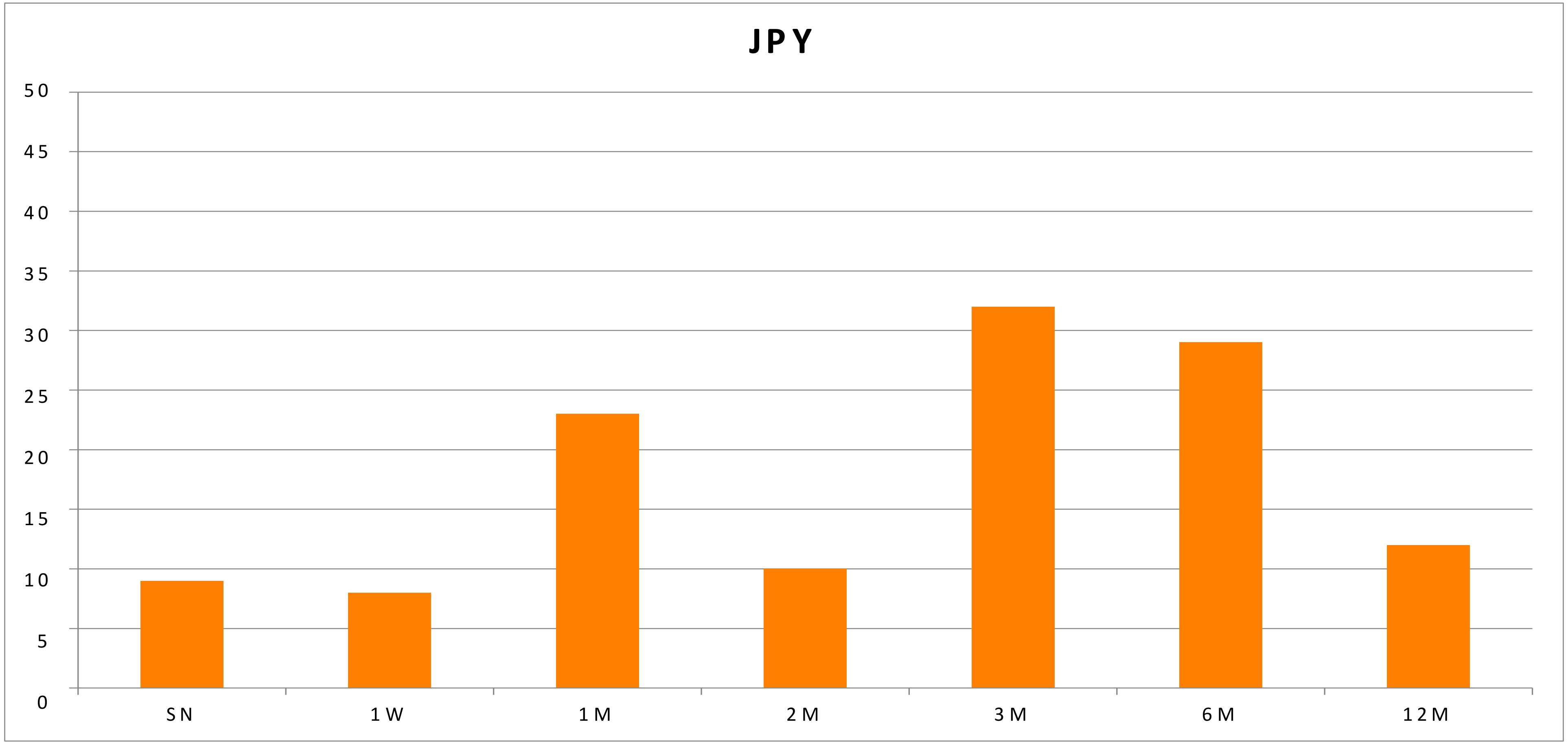
ICE LIBOR USER SURVEY

NUMBER OF RESPONDENTS SELECTING LIBOR CURRENCY AND TENOR PAIRS : GBP



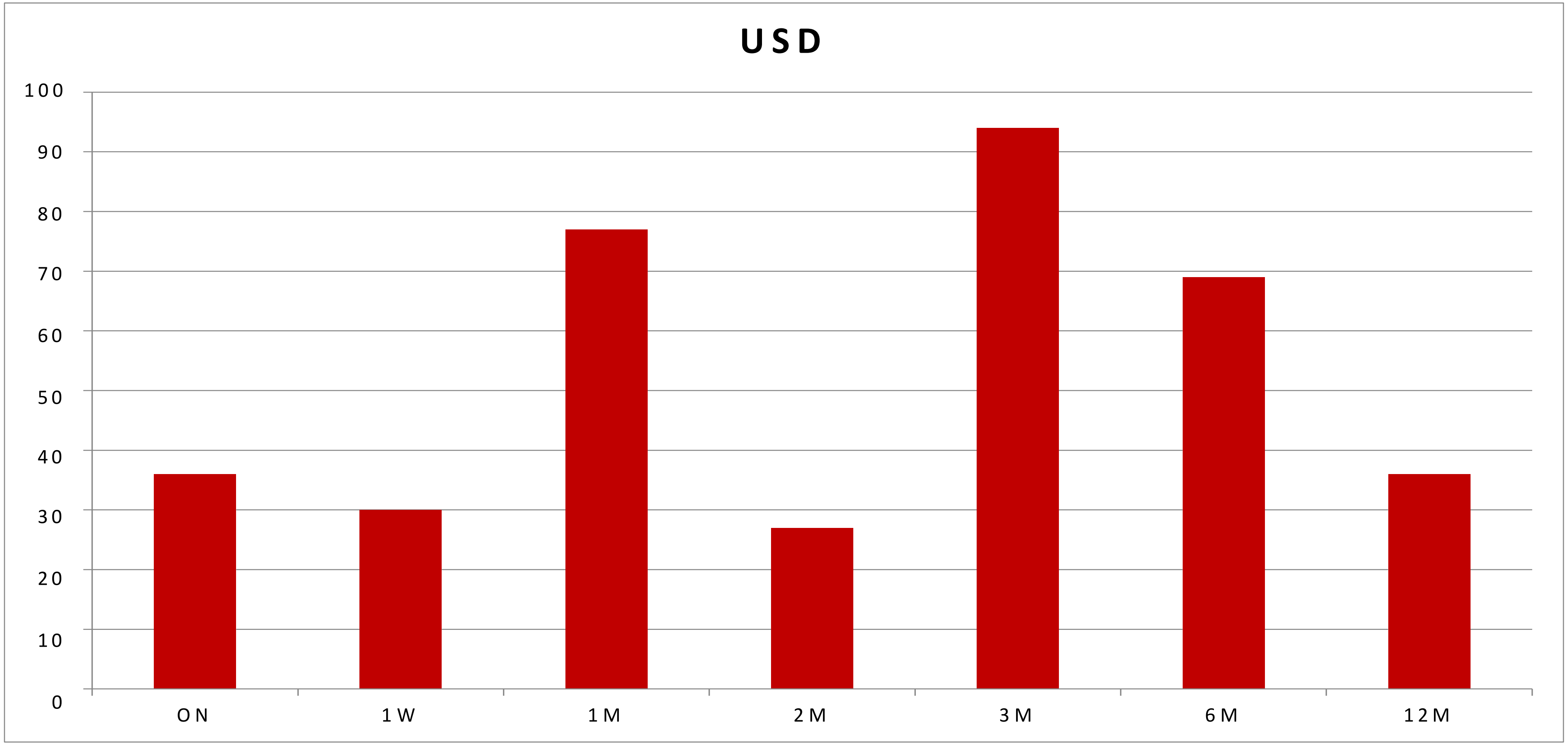
ICE LIBOR USER SURVEY

NUMBER OF RESPONDENTS SELECTING LIBOR CURRENCY AND TENOR PAIRS : JPY



ICE LIBOR USER SURVEY

NUMBER OF RESPONDENTS SELECTING LIBOR CURRENCY AND TENOR PAIRS : USD



ICE LIBOR USER SURVEY

SURVEY QUESTION 2

“Please set out the main uses of the currency and tenor pairs you use the most.

Where possible, please also provide an estimated notional amount (US$ equivalent) for your outstanding contracts referencing LIBOR today.”

ICE LIBOR USER SURVEY

USAGE TYPE/OUTSTANDING NOTIONAL AMOUNT RESPONSES FOR EACH SELECTED LIBOR CURRENCY AND TENOR COMBINATION[1]

	<$10mm	$10mm-$50mm	$50mm-$100mm	$100mm-$500mm	$500mm-$1bn	$1bn-$10bn	$10bn-$50bn	>$50bn	N/A	Total
Capital/perpetual securities			4	3	1					8
Cash flow discount rates	3	10	4	2	1			1		21
Cleared OTC derivatives	6	2	2	2	2	9	8	16	16	63
Corporate lending and leasing (including syndicated loans)	47	40	24	83	21	46	16	7	69	353
Exchange traded derivatives	36	1	7	3		1		1		49
Floating rate notes	2	4	3	9	5	16	2	4		45
Inter/intra-company loans	1		1	2	1	2				7
Internal risk management	29									29
Market analysis (e.g. valuations, internal transfer pricing)	4				3	2	2			11
Multiple uses (e.g. corporate lending and cleared OTC derivatives)	4			4	3	9	6	59	50	135
Other (Please specify in 'Additional Information' box)				3		4		1	26	34
Retail products (e.g. consumer loans, credit cards, mortgages, investment products)	5	1	5	5	1	5	2	1		25
Securities lending	3		1	1						5
Securitization structures (e.g. Mortgage Backed Securities, Asset Backed Securities)	7	2	10	9	5	15		1		49
Uncleared OTC derivatives	20	20	7	18	5	33	7	1	8	119
All Currency/Tenors Total	**167**	**80**	**68**	**144**	**48**	**142**	**43**	**92**	**169**	**953**

[1] Survey respondents were asked to provide the main use and estimated outstanding notional amount for each currency and tenor combination they selected in question one. Therefore, multiple uses/notional amounts may have been selected by each respondent.

Risk Free Rates (GBP)

ICE Term RFR Portal

- Launched: October 10th, 2018
  - https://www.theice.com/marketdata/reports/244
  - Published daily (approx. 11:55am and 14:15pm GMT)
  - 3,720 unique PC / terminal views to date

- Overnight Risk Free Rates (RFR) for select currencies as published: GBP, USD, JPY and EUR (TBD)

- Realised interest rates over a one, three and six month time period:
  - Simple Average, and
  - Compounded Average using a methodology that mirrors the formula in 2006 ISDADefinitions

- Preliminary indicative forward-looking term settings:
  - GBP at this time
  - Futures Derived only (SONIA 1M Settlement Price)
  - Indication of a desire to produce swap-based forward-looking SONIA rates

- White Paper
  - www.theice.com/publicdocs/IBA_ICE_Term_Risk_Free_Rates_October_2018.pdf

ICE Term RFR Portal – GBP (04 MAR 2019)

Report Date

04-Mar-2019

Submit

ICE Term Risk Free Rates (RFR) Portal

Export to Excel Show Methodology

04-Mar-2019

Currency	RFR Benchmark	Last Setting (%)	Publication Date	Publication Time (London Time)
GBP	SONIA	0.7057	04-MAR-19	09:00
USD	SOFR	2.3800	04-MAR-19	13:00
JPY	TONA	-0.0490	04-MAR-19	01:00
EUR	ESTER	-	-	-

GBP

	ICE RFR - Forward Looking		ICE RFR - Realised	
	Futures Derived (%)	Swaps Derived (%)	Average (%)	Compounded in Arrears (%)
1 Month	0.7106	-	0.7063	0.7065
3 Months	0.7145	-	0.7048	0.7054
6 Months	0.7328	-	0.7030	0.7042
Last Published (London Time)	04-MAR-19 11:56	-	04-MAR-19 11:56	04-MAR-19 11:56

ICE Term RFR Portal – GBP (04 MAR 2019, **TEST PAGE**)

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EUR	ESTER	-	-	-

GBP

	ICE RFR - Forward Looking		ICE RFR - Realised		
	Futures Derived (%)	Swaps Derived (%)	Average (%)	Compounded in Arrears (%)	Compounded in Arrears (%) with 5 business days lag*
1 Month	0.7106	-	0.7063	0.7065	0.7057
3 Months	0.7145	-	0.7048	0.7054	0.7050
6 Months	0.7328	-	0.7030	0.7042	0.7041
Last Published (London Time)	04-MAR-19 11:56	-	04-MAR-19 11:56	04-MAR-19 11:56	04-MAR-19 11:56

Sterling Risk Free Rates - Benchmarks

Realised SONIA Rates

- IBA expects to make available realised SONIA settings for *contractual use* on an on-going basis from 01 July 2019:
  - One, three and six month settings
  - Simple average and compounded, rounded to four decimal places
  - UK business days
  - Spot and with a five business day lag

- IBA will use the identical publication and distribution technology currently used for GBP LIBOR rates:
  - Direct to end users through a FTP
  - Data provided to all major data redistributors

- Publication time to be determined. Either:
  - Shortly after the Bank of England publishes SONIA rates, or
  - Concurrent with GBP LIBOR's publication

Sterling Risk Free Rates - Benchmarks

Forward-Looking Term SONIA Rates

- IBA is committed to the development of a Forward Looking SONIA Reference Rate in accordance with:
  - Principles laid out by the FSB / OSSG,
  - Goals put forth by the Sterling Risk Free Rates Working Group, and
  - The BMR (the European Union benchmarks regulation)

- IBA is working in coordination with the Sterling Risk Free Rates Working Group and the relevant Sub-groups

- IBA will leverage existing infrastructure (e.g. ICE Term RFR Portal) and available benchmark methodologies (e.g. ICE Swap Rate) to be able to produce term settings that are robust and have sufficient redundancies to ensure daily publication

Sterling Risk Free Rates - Benchmarks

Suggested Forward-Looking Term SONIA Rates Methodology

Step 1 : SONIA OIS - Firm Quotes		
Instrument	**Methodology**	**Input Data**
SONIA Overnight Indexed Swaps	Similar to ICE Swap Rate	Firm Bid and Offer quotes from CLOB of Regulated MTFs

Fall-backs:

Step 2 - If Step 1 Not Possible : SONIA Futures - Firm Quotes		
Instrument	**Methodology**	**Input Data**
SONIA Futures	Collect futures and SONIA input data and apply step function model[1]	Firm Bid and Offer quotes from Regulated Futures Exchanges
Step 3 - If Step 2 Not Possible : SONIA Futures - Settlement Price		
Instrument	**Methodology**	**Input Data**
SONIA Futures	Collect settlement futures prices and SONIA input data and apply step function model	Previous day settlement price from Regulated Futures Exchanges and SONIA overnight rates
If Steps 1 to 3 do not produce a rate, IBA will republish the previous day's rate(s)		

US Dollar
ICE Bank Yield Index

Credit Sensitive Interest Rate Benchmarks

Options under consideration for lending contracts

1. Secured Overnight Funding Rate (SOFR) *plus* a spread adjustment that would become applicable during “periods of stress”:
   - Either SOFR on a stand alone basis or an implied term SOFR rate, *plus* a conditional
   - Spread adjustment to be determined by either a market protocol or bi-lateral negotiation between borrowers and lenders

2. The Bank Yield Index:
   - Proposed interest rate benchmark that measures unsecured credit yields of global banks in the tenors most widely used in lending contracts (i.e. one, three and six months)
   - Calculated daily based upon transactional data referencing unsecured bank obligations

1. Hybrid methodology:
   - Implied term SOFR settings for the tenors most widely used in lending contracts, *plus* a
   - Credit spread determined daily based upon transactional “spread” data referencing unsecured bank obligations

SOFR Plus a Spread Adjustment

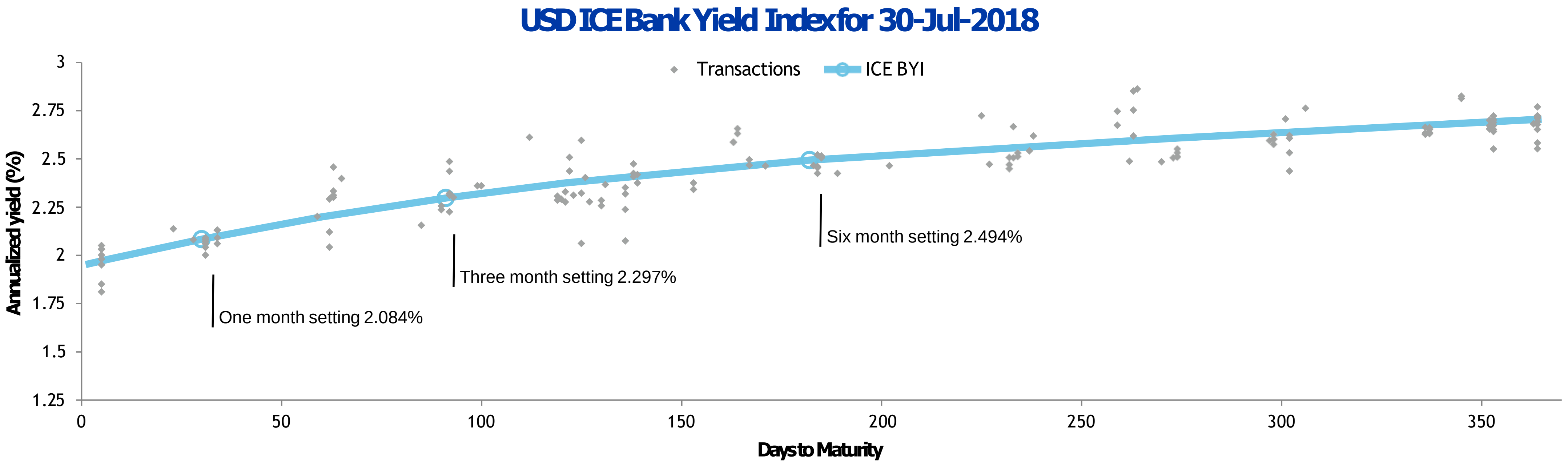
- Lending contracts would incorporate a two tier pricing framework:
    - In periods of economic and/or market stability loan pricing would be:
        - SOFR (the overnight rate or an implied term rate, if available), *plus* a
        - Credit spread, specific to the borrower
    - In periods of economic and/or market “stress” loan pricing would be:
        - SOFR, *plus* a
        - Credit spread, specific to the borrower, *plus* an
        - Adjustment Spread to account for increased bank funding cost
- The trigger event for the inclusion of an Adjustment Spread could either be:
    - Market standard protocol, and/or
    - Bilaterally negotiated at the inception of a lending agreement

US Dollar ICE Bank Yield Index

- The Bank Yield Index was developed to measure average unsecured bank yields in the money markets for the term settings (one, three and six months) most widely used in lending contracts
- The Index is calculated using eligible transactional input data representing short-term wholesale, U.S. dollar unsecured investment yields in respect of large banks:
  - Primary market funding transactions (e.g. eligible bank deposits, CP, CDs)
  - Secondary market bond transactions (e.g. trading of eligible short-dated bank bonds)
- IBA believes the Index has the potential to be an attractive replacement rate for USD LIBOR in funded and un-funded (e.g. revolvers) lending obligations:
  - Unsecured pricing index referencing a diverse set of banks
  - Forward-looking term settings
- To date the Bank Yield Index has shown a close correlation with other benchmarks that seek to incorporate the short-term, unsecured credit risk associated with financial institutions

Constructing the Bank Yield Index

Example calculations

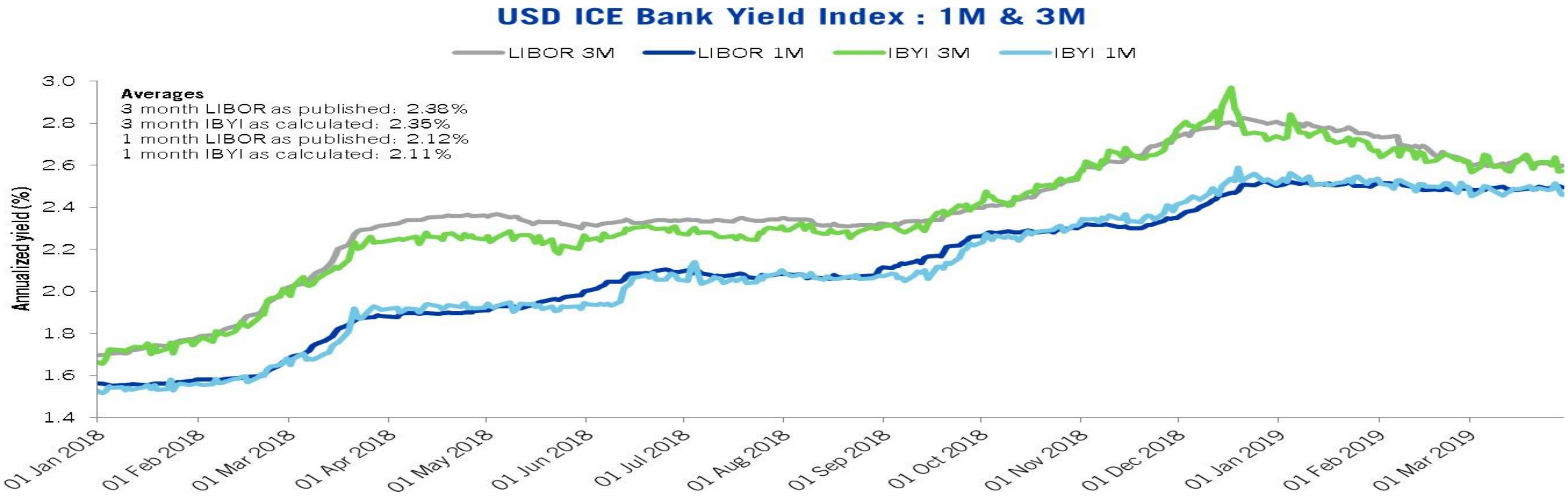


- Primary and secondary market transaction data points are collected daily in order to construct a credit-sensitive yield curve, using a third order polynomial regression[1]
- One month, three months and six months Index settings are then determined from the yield curve at designated maturity points[2]

1 Regression method and outlier treatment are subject to refinement following stakeholder feedback

2 Where fewer data points than a defined target threshold are available on a given day for a publication tenor (i.e. one, three, or six months), data points from previous days (maximum of five days) will be incorporated into the curve. If there are still insufficient data points (using up to five days' data points), a contingency rate will be published based on the last rate derived using transaction data points and the standard methodology, adjusted for movements in risk free reference rates (e.g. OIS swaps, US Treasury yields, term SOFR [if available]).

US Dollar Bank Yield Index – Testing Data

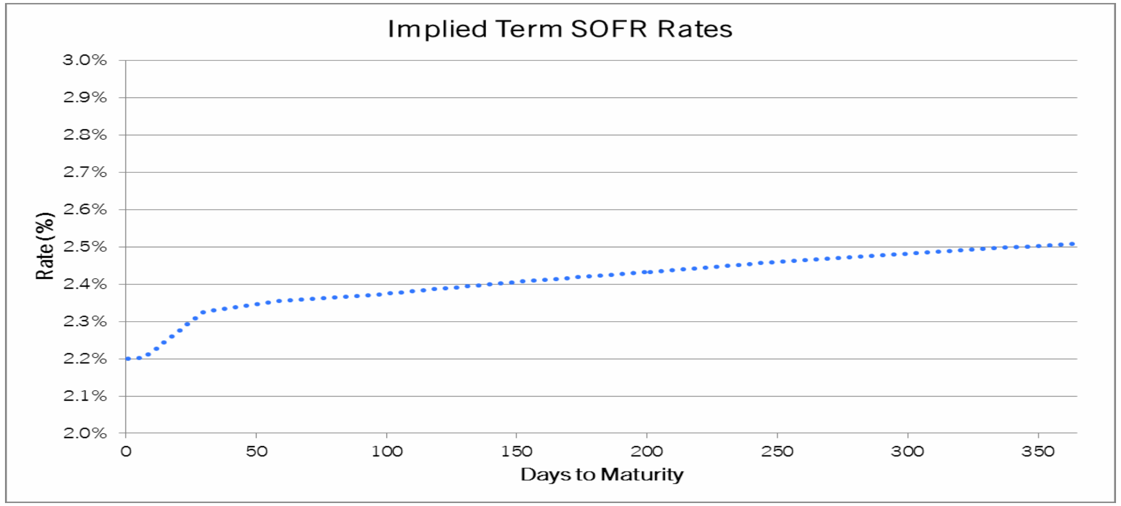


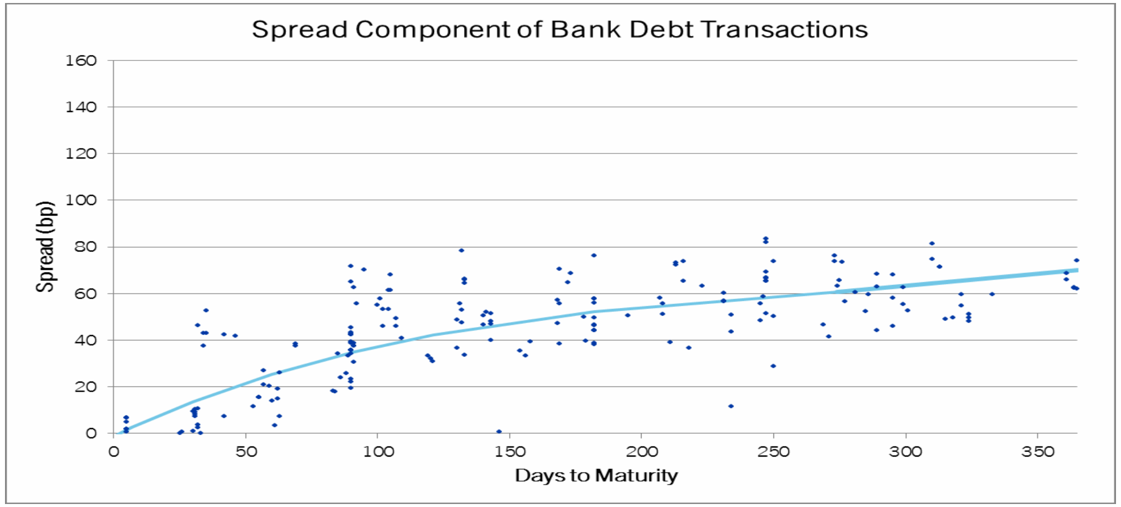
- Preliminary testing results do not exclude any “outlier” data (i.e. there is no trimming of data points far from the average results)
- IBA is seeking feedback from market participants[1] on how to approach “outlier” data

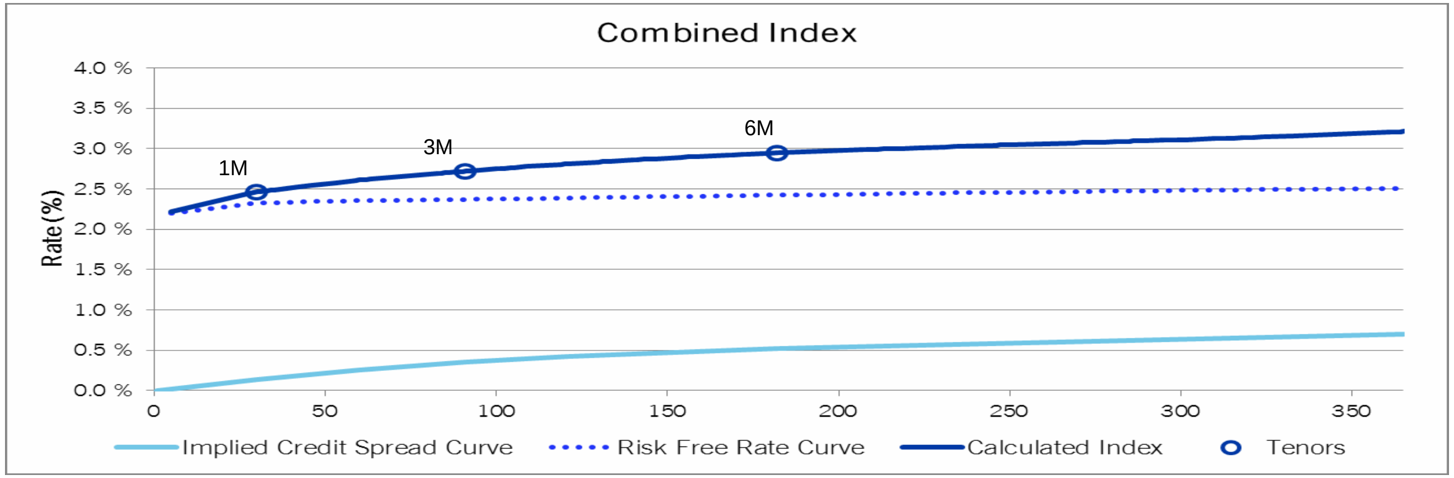
[1] *IBA published a white paper introducing the Bank Yield Index on January 24, 2019. See feedback questions in the white paper.*

Hybrid Methodology

Leveraging implied term SOFR rates and credit spread data to produce an index







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