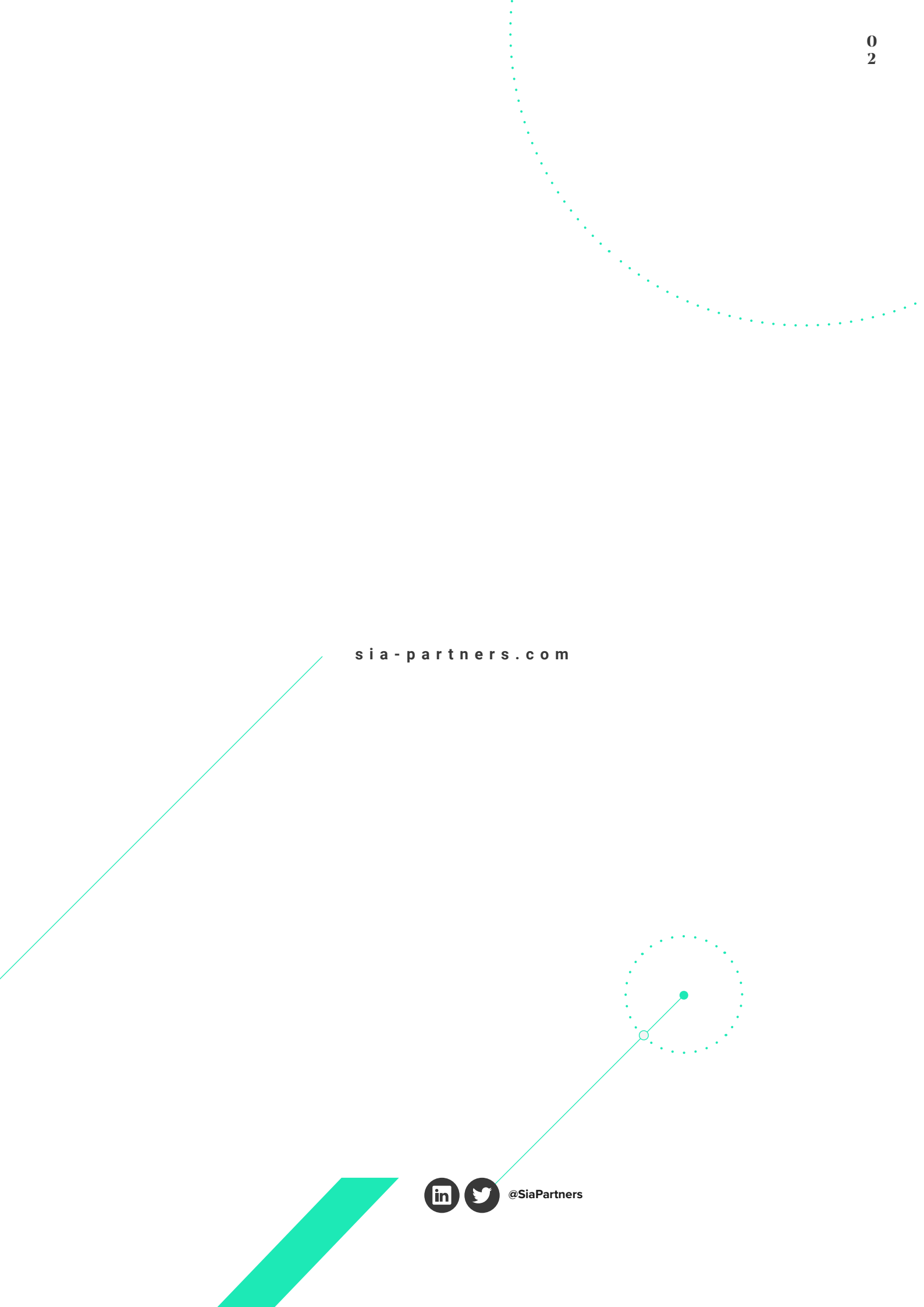


A Year End Update on the LIBOR Transition.

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Project Background and Acknowledgements.

This report is the last in a series of publications Sia Partners have authored throughout 2020 relating to industry progress in meeting the LIBOR Transition deadlines. We are exceptionally appreciative for the assistance and cooperation from almost 100 institutions who have participated in our initiatives globally. This year our documents included a pre-pandemic review of efforts as a follow-up to our 2019 industry report. We also produced a series of short snapshots from the same group of participants and some new joiners plus webcasts, and webinars on this topic. We will continue these studies in 2021 as the industry progresses with their transition investments.

This final effort combines both a policy report on the state of the industry as well as a series of interviews we conducted in December after the release of the draft consultative document. Mark Chorazak, a Partner in Shearman & Sterling's Financial Institutions and Regulatory Reporting Practice joined us in co-authoring portions of this document. Our colleagues at RISKSPAN provided exceptional depth and analysis to the section on Risk Modeling and Validation which we believe will be a looming and expanding area of focus in 2021. Finally, Eigen Technologies provided valuable contributions on the state of the industries embrace of automation and natural language processing in their contract review efforts.

These efforts would not be possible without the contributions of many of our managers and consultants who have worked long hours to support them. My thanks to Mark Cheng, Harrison Suttle, Affan Khan, Virginia Sideleva, Asli Ersozoglu, and Danielle Buttinger for their work throughout the year and to Chris Zachodzki for his continued efforts in providing essential guidance to all of our initiatives. To all our Sia colleagues who've assisted with these projects while working on their engagements full time; thank you for devoting your time and energy to our industry efforts.

Like everyone, Sia Partners has found this a challenging year at best and, as always we hope you continue to review our material in a healthy and safe environment. We have conducted hundreds of conversations virtually, which has mirrored our commitments to clients in our proprietary work in the LIBOR Transition space. We would be remiss in not thanking everyone for their patience and helping us to complete our work successfully.

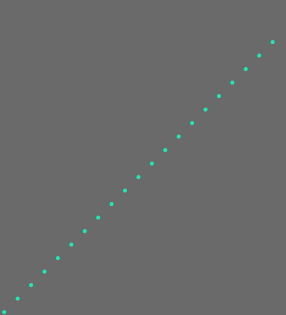




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Document Overview.

Sia Partners' divided its following Year End Update on the LIBOR Transition into two primary sections.

First, we have detailed the industry's reaction to the announcements made on November 30 and December 4 by the official sector. We spoke to 25 of our original participating benchmark firms, which included a balance among foreign banks, G-SIBs, regional banks, and both financial and corporate end users. We asked for their feedback on a variety of questions covering both the consultative announcement and year-end feedback on progress for the transition by their peers and clients. We focused feedback on four related to the impact of the consultative documents: (a) will the timing of the transition be impacted? (b) the role of the official sector in interpreting and implementing the consultative recommendations; (c) the impact on potential delays on the construction of SOFR and other reference rates, and finally, (d) how have these delays impacted client transition progress?

Second, based on a combination of feedback from research, policy announcements from the ARRC, regulators and fall discussions with participants prior to the consultative announcements, highlights industry progress and developments specific to key transition activities. The second section was drafted in conjunction with Shearman & Sterling.

1. Market Reaction to Recent Announcement.

How has the Release of the Consultative Documents Affected Transition Implementation Timing?

Industry regulators continue to emphasize that institutions should not enter new US Dollar LIBOR contracts after end-2021. Subject to the responses to the IBA consultation, which is open for comment until January 25, 2021, legacy contracts referencing certain tenors of US Dollar LIBOR could continue to mature through June 2023. IBA has stated that it intends to publish feedback summarizing responses from the consultation shortly after the consultation deadline and regulators are expected to further consider to what extent they should limit new uses of USD LIBOR.

Recognizing the impact of these announcements, we reached out to a number of our project participants and asked them for their input.

Over the past two weeks, we have had several dozen exchanges on the issues raised in the November 30 and December 4 announcements from the IBA and the official sector. We also requested input on a year-end assessment on the progress on contract review, operational and vendor efforts to close gaps identified earlier in our studies as well as current challenges surrounding client outreach and communications and their transition initia-

tives. Study participants agreed the issues surrounding the actual timing of the transition from LIBOR to SOFR (or other reference rates) and the robustness of the liquidity of those ARR products were foremost on their mind. We summarize those conclusions below.

MIXED REACTIONS

First, participants noted that the announcements have in some meaningful fashion for some, and far less for others, affected the broader thinking relating to the progress of the transition. Institutions noted that the transition was at an “inflection point” with a broad set of issues ranging from clients’ willingness to transition; liquidity growth in SOFR, avoidance of delays in passage of legislation to provide legal certainty on contracts among the topics that needed redress. Others noted that there has been solid progress on operational topics but reiterated the need for more specificity on the SOFR product roll out (term rate for most, credit spread overlay for a smaller group) and most importantly some teeth behind the safety and soundness approaches that banking regulators have identified to encourage transition progress. A significant percentage of the firms we spoke with noted that while they were ready to meet the original transition deadlines, the delay envisioned would be useful. Indeed, our data reflected mid-year a growing number of firms that wanted additional time for varied

operational progress and product enhancements but did not expect that postponement due to the pandemic related issues. Statements from across the official sector (FCA, Federal Reserve, FSB, etc.) reiterated the year end-2021 transition timeline without flexibility. Most of the participants were surprised by the November 30/December 4 announcements, but not disappointed. Here is our thinking why that is the case.

- Postponement would provide some helpful time to implement certain operational/vendor upgrades. Larger firms noted that considerable amount of progress had been made since vendor work was nearing completion;
- Some hesitation on success until elements of SOFR (or another ARR) are finalized that some of those steps likely will be delayed.
- Smaller and mid-size firms whose systems were internally based would potentially lag and drag out the process; Firms separately identified the value of this delay value in the run-off of their agreements and set out their thinking around these theses:
- Unrelated to the percentage of agreements that firms identified were pertinent to their business lines (40% or higher) that would get additional time to run-off; the concept of the heightened time was seen as a positive for the industry.
- For the tougher legacy agreements, additional time was helpful to avoid negotiation with clients;

certain clients or business lines with a higher preponderance of (ABS/CMBS, etc.)

- Easing the negotiations related to “tough legacy” contracts especially as firms articulated the timing associated with the legislation from either the NY State Legislature or Congress to provide legal clarity and hence the longer runoff time was seen as an asset.

IMPACT ON SOFR LIQUIDITY

Not surprisingly, an additional benefit of the extended time from our participants was the build-out of SOFR to ensure a higher level of robustness and potentially other reference rates. We have addressed this issue throughout our papers the past two years and the interest in some alternative approaches has stayed reasonably consistent among the participants in our projects. To be clear, we are not suggesting that this reflects the broader banking or end user universe, but rather our research group across those categories. There has been a select group of respondents from the banking community---mostly US based—who

have been vocal advocates of including a dynamic credit spread to SOFR. As the deadline loomed, the Credit Sensitivity Group, sponsored by the Federal Reserve, considered some alternatives but chose not to recommend any of them specifically during the summer. Separately, some firms have advocated consideration to other approaches including the Bank Yield Index, Ameribor, several under sponsorship by third parties and recommendations put forth by academicians. Individual firms noted that for all the dialogue, the demand for individual reference rates will be market driven and liquidity for both the derivatives, cash and lending markets are months off.

We will address the broader liquidity and product issues below. However, a majority of our participants agreed that the additional timing would allow a broader liquidity pool to be built for SOFR emphasizing this was a critical ingredient for success. Institutions noted that to date, the SOFR liquidity results have been mixed—a pick up after SOFR Discounting but somewhat of a flattening thereafter. A few institutions felt that derivatives growth was rising but most admitted disappointment in

the maturity of product growth. Study participants shared the view that time should provide additional time to build-out growth in cash and derivative instruments and hopefully a ramp up in issuance as product clarity and legal certainty are enhanced in 2021. Study participants agreed the additional time should help those in the market that had yet to invest or stand up a program. This would include those that were:

- Global but had not invested in their US Dollar LIBOR efforts;
- Firms both financials and corporates who were aware of the transition but not yet heavily invested;
- Mid-size & smaller companies who required additional education and persuasion about the necessity for meaningful transition progress.

Institutions noted that the delay would provide additional time for the legal remedies to be passed globally, including legislation which would provide needed clarity that sits before the

- NY State Legislature
- Congress
- UK/EC equivalents

Our initial reaction is that this does not change what we need to accomplish in 2021. We still need to complete our application, model and contract remediation as originally planned. We plan to be ready to meet the dates in the ARRC recommendation that were published in May 2020. U.S. Banking Participant

CONCERNS IDENTIFIED TO DATE

Our participants identified some core concerns about the delay that they felt might not be easily calculable immediately. These included those that invested—spent time—to build up their efforts and now were being penalized by pushing back pieces of the cessation date, and those firms that saw value in their significant organizational approaches for contract review, operations, and product management and did not want to surrender that margin. Second, there was broad concern expressed about the risks of magnifying global fragmentation. Firms noted that this has been a consistent concern given the earlier start in the UK-EC and what both banks and buy side firms believe has been a more rigorous regulatory approach which enhanced progress. Firms noted that this delay could

- Complicate management of multi-currency tenor pairs; and
- Lead to inevitable rolling off separate currencies in '21 vs. '22 and risk managing around that.

Firms also noted a concern about internal progress:

- Loss for client outreach momentum some pauses until we know the impact of the official sector guidelines;
- Loss of budget commitments and risks of re-allocation;
- Management of whether there is a return to “business as usual” and have the central program re-focused;
- Keeping a team afloat for up to 18 more months—funding/resources
- Losing overall management focus—attention to the transition—some referenced seeing this with MiFid and other policy initiatives in the past; and
- Risk of lowering commitment to risk management/model projects and digitizing contracts built off the back of this transition effort at some larger firms.

Our assessment included a group of clients that did not see at least some aspects of this as moving the needle in a meaningful way. Clients noted that

- There is still no new LIBOR post 2021

so broadly no impact;

- Many firms noted that “our planned actions for the transition and timing stay the same”;
- They were expecting some relief and our product enablement, model and technology work is unchanged;
- Accomplishment benchmarks for 2021 remain unchanged for most firms; and
- Some enhanced thought on client engagements and execution times but planning unchanged.

What will be the Impact of the Official Sector in Implementing the Goal of the Consultative Documents?

The second issue that emerged from Sia’s discussions was the role of the “official sector”—regulators—in implementing the consultative approaches. The views varied and often depended upon the intensity of interaction with regulators as part of their LIBOR transition. Some firms had begun those dialogues at least a year ago and were in contact on a formal, quarterly basis with their supervisors. Others had dialogues on an informal basis more often. Other firms identified a far less frequent interaction and did not have a view on the depth of understanding on the transition for those who had oversight. There was some agreement that the announcements were vague in what precisely implementation of enhanced “safety and soundness” efforts would mean although some felt that was transparent and part of the day to day banking regulator approaches. There were some institutions who clearly wanted greater clarity and a stronger approach from the regulatory sector. These firms have generally held similar views throughout our study process and have asked for a sturdier response from U.S. parties.

A number of firms made a separate argument—which was embracing the ARRC Best Practices as part of the “teeth” in the next set of regulatory commentary. Institutions noted that for the past several years firms globally (if not primarily in the U.S.) have been reliant on ARRC direction, wor-

king groups, timing and best practice guidelines. A group of firms vocally raised the concern what would be the outcome of those approaches—would those dates be retained/rescued or lost to the process?

We discussed briefly above the impact of the announcement on the ability to create some global consistency with regard to the transition. Firms generally believed the challenges included:

- a general recognition from the global banks that they have been planning on a cross currency overlay with different implementation dates for a long while. This did not meaningfully change their approach;
- an agreement that UK regulators have been more rigorous in their approach;
- other IBORs are further progressed both for banks and end-users and institutions believe that this would not be altered by the announcements;
- participants questioned the impact of the announcement affecting the timing related to any fixed dates for FCA pre-cessation triggers or spread rate adjustments or other planned clarifications for the industry.

There was extensive dialogue from a group of firms about the ability to align the safety and soundness approaches for banks with a more robust effort for less regulated end-users. Participants identified a series of challenges:

- foremost, the structure for the SEC, CFTC and others that have oversight responsibilities for corporates, financial end users is meaningfully different and efforts to persuade those they have oversight for quicker action could be problematic;
- a view that asset managers and some in the ‘alternative space’ could step in and provide the liquidity for the bank loan and middle market space is quite plausible and needs redress if the goal is to ensure a timely transition away from LIBOR product;
- a requirement for an FSOC or equivalent effort across regulators for uniformity on goals—standing behind the hardwire language (as an example) and ensuring a clear vocal direction for all market participants.

How has the Release of the Consultative Documents Impacted the Development of SOFR and other Alternative Reference Rate Products?

Our third client feedback section focuses on the views of the participants related to the consultative paper's impact on SOFR's maturity as well as the creation of other reference rates. Alike other themes, this topic arose in every topical segment we raised related to the consultative papers role in shaping the transition deadlines (section one) as well as how SOFR's development is linked to the official sectors pressure on regulated entities to commit to the transition in a timely manner.

Our participants throughout our studies the past several years have voiced opinions regarding the value of encouraging the adoption of alternative reference rates to SOFR. Data from our exchanges have consistently suggested that there was limited momentum for any one particular alternative—however crossing a few alternatives—the potential support grew. There was a broad consensus that the additional time would provide support for the growth for a few alternative rates. A smaller but vocal group of firms have, from the outset been support of consideration of a credit overlay. In our most recent discussions, those firms continued to articulate the value of building out that choice but also consider for their middle market clients additional reference options including Ameribor, Bank Yield index and others being developed. Other firms noted that unless there was a meaningful uptick in SOFR post the final release of the consultative paper in late January/early February, then the dialogue surrounding options would build out. And there were strong views relayed by others that they have been trading and issuing in SOFR for a while—they are comfortable with the progress at multiple tenors of the product build.

In the discussions, clients identified a variety of reasons that timing could impact SOFR product maturity in various meaningful ways. First, there

were long-discussed challenges of utilizing SOFR in arrears for a group of banks and some end users. Institutions identified challenges on the cash side (vs. derivatives) for using the multi-step process as well as the timing for amendments for options and picking conventions for which additional time would be useful.

A separate stream of dialogue surrounded the value of giving a dynamic credit solution a chance for fruition. A number of respondents noted that they felt that this option had been more than sufficiently vetted and that any version of either market or operational success was not likely. However, others (as they have throughout our projects) differed. The argument from those firms was built centrally around the market absorbing the risk; taking advantage of the “extended runway” and make additional attempts to build some support for the credit overlay concept. Some firms noted that building a consensus around SOFR supplementations (credit, term curve, etc.) would take time and might end up being prioritized as industry participants choose which aspect is most important to them to launch SOFR. Others commented that the challenges of less centralized conventions and greater underlying data issues made a credit overlay more complex to construct vs. term rates. There was unanimous view on the value of adding a term rate to the SOFR structure. There was a small number of individuals who felt that a credit overlay was of great comparative importance, but the significant majority did not share that view. In no particular order, firms identified a series of reasons that this was valuable:

- a number of firms generally argued that a term structure was a pre-requisite for the success of SOFR by January 2022. The publisher of this structure cannot be synthetic; methodology preferable ICE driven and meet pricing and valuation processes for accrual calculation;
- there needs to be a definition end date for issuing to ensure liquidity in other products;
- the value for specific businesses

(for example trade financing or any business that offers discounting). Throughout our summer-fall discussions, a term structure was seen as significantly desirable. The support for that as we enter 2021 has grown among the firms who did not have strong views earlier and certainly in the strength of that conviction among those firms who have favored term from the beginning.

In summary there was a broad consensus that the growth of SOFR products has been slow and, in many ways, disappointing. Institutions agreed that discounting provided a short, “large boost” but that liquidity was temporary. Firms noted that traders did not believe that the discounting switch did not produce what was hoped for or intended and other mechanisms we have already discussed above need serious consideration. Several institutions re-emphasized that the liquidity issue for SOFR was up to the client demand and their appetite and less about the actual structure of the product itself. This requires the market and the official sector separately delivering a strong message both for derivatives and for syndicated transactions. There is a need for strong fallback language and hardwire requirements as well as strong actions by the official sector that we have discussed previously. Firms agreed that this was a combined collective action to achieve the desired results in building out liquidity in the SOFR product and other alternative reference rates.

How has the Consultative Announcements Impacted Client Transition Progress?

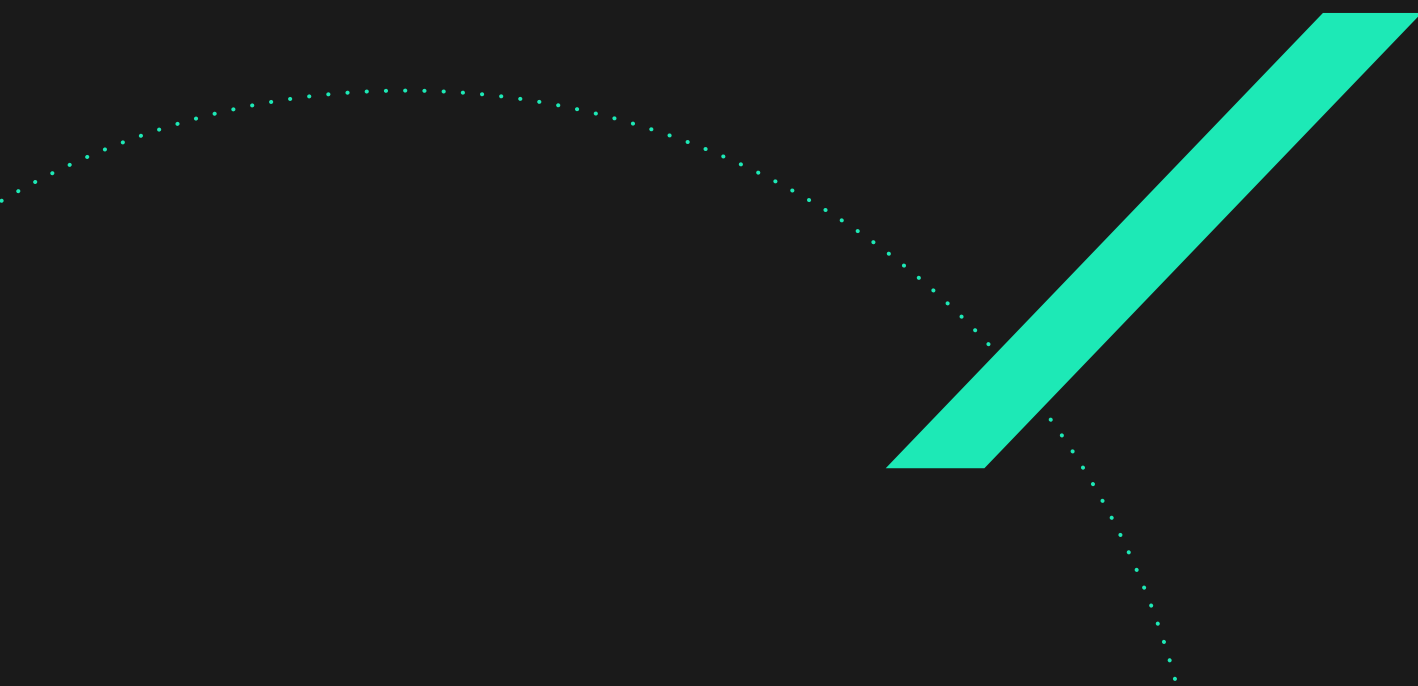
Our last client interview discussant section will briefly focus on the impact on end users and clients from the announcements on November 30th and December 4th. We have in other portions of this document addressed what the banks believe will be the impact on their timeline for implementation, SOFR product development, the role of regulatory bodies in furthering transition progress and numerous operational and contractual related topics. The progress of clients in meeting the transition deadlines is tied to every one of these topics among others. Separately, in our policy section, we address issues related to client communications and outreach. One of the larger providers in the automation and NLP space suggested:

Study respondents identified a few challenges for the end-user community. First, participants believed that the end user market was bifurcated in their commitment to the transition. Larger financial end users and larger corporates appreciate the timeline, have initiated governance and made in many cases substantially larger investments. But smaller-mid-size entities have expressed either disinterest—lack of awareness or focus—or a greater need to focus on clients and businesses that have been damaged

by the pandemic. Second, there is a recognition that simplicity for many of the middle market clients will eventually be determinative. Our study participants believe that at year end their clients are either confused by the consultative papers and what the implications are or curious if this allows a time break for their own efforts. This feedback comports with our own individual client exchanges the past few weeks.

Third, there was a broad consensus that there has been close to no engagement by the official sector with clients. Larger clients confirmed exchanges with some parts of the official sector, but most had not and were not aware of particular forthcoming oversight pressure. Fourth, few buy-side institutions acknowledged what was expressed by their dealer peers about the critical role that end user entities played in the transition. There continued, at year-end 2020 to be a belief that non-dealer entities were going to be “takers” on negotiations with their bank counterparts and with few exceptions, did not see themselves as core to the policy dialogues or negotiations. The potential “educational” or “communication” gap could be at two levels: the acknowledgement of the timing of the transition and the commitment to complete the tasks but also the recognition of the need for the engagement on the macro side—commitment to trade, willingness to partake in risk taking, advance broader policy initiatives and best practices

to be part of a transition good citizenry. Finally, we have seen the pace of client outreach has increased from our earlier pieces in the spring and summer/fall of this year. The implications of the pandemic on corporate entities was meaningful and clearly impacted their progress. Less on financial end users. Client outreach was frozen for the spring for many or limited. That picked up in the late spring and seemingly was a pace through year end until the issuance of the consultative papers. A combination of year end activities and the lack of full clarity from the consultative documents could make further progress difficult until mid-Q1. Global firms could continue to have mixed responses—more vigorous commitments in their European/APAC offices and less convicted on investment in the US until their US Dollar LIBOR approaches are validated by both counterparties and the official sector. Indeed, some financial counterparts in the alternative sector will likely await the final outcome and identify market opportunities that will arise as the transition is finalized which will enable them portfolio enhancements as mismatches occur across currencies and jurisdictional timings are put in place. In sum, there is no monolith on the end user side. We would expect differences in responses across geographies and entity types as the transition progresses through 2021 and beyond.



2. The LIBOR Transition: End of the Year Update on Industry Progress and Recent Developments.

Background on Research

Sia Partners' research comprised a benchmarking study of over 70 market participants on the progress of their transition from LIBOR to alternative overnight risk-free reference rates. Representatives from Sia Partners conducted virtual interviews of subject-matter experts from a variety of functions, including legal, risk management, compliance, operations, finance and information technology, along with those charged with directing LIBOR transition efforts at a wide range of financial institutions and other market participants. This report, completed in conjunction with Shearman & Sterling, builds upon that research and supplemental work completed during the fall and winter focusing on those firms challenges in meeting the requirements for the global IBOR transition.

Contract Review and Remediation
GENERAL OBSERVATIONS

Sia Partners' discussions with financial institutions over the past two years in various studies have highlighted the interlinking steps of contract review and remediation, as well as the use of automation and natural language processing (NLP) to help implement those

critical steps. In its prior report from June 2020, Sia Partners had identified some sluggishness in progress among sections of the industry. While G-SIBs and large non-US financial institutions had made substantial progress across the areas of contract review and extraction and initial remediation, other institutions were at the time, proceeding on a markedly slower pace. Based on Sia Partners' most recent set of discussions with market participants over the course of this fall, a significant uptick among US regional banks and larger financial end-users was identified with respect to their contract review initiatives. Progress entailed a range of steps, from the extraction of key contractual terms to internal dialogues on fallback terms of criticality.

The complexity and depth of legacy contract analysis and remediation remains one, if not the most, challenging activities firms are facing in completing a successful and timely LIBOR transition. The use of artificial intelligence (AI), natural language processing (NLP) and machine learning (ML) can streamline and speed-up the time associated with contract analysis, while increasing efficiency and data quality and reducing resource requirements

and associated costs. Firms with in-house AI/NLP development and delivery teams encountered challenges relating to the size and scope of the effort for LIBOR. For example, the sheer volume of different document types and the variances within required substantial development work, increased model training time and longer lead times to achieve the necessary data and accuracy rates. Discussions with our partner firms and material we separately identify in our accompanying documents highlight both those challenges and how firms have more successfully utilized the technologies. The more recent feedback that Sia Partners gathered on implementation of key provisions on the cash and derivatives side reflects progress in the industry. Many firms have been taking remedial steps that they had not initiated three-to-six months earlier. Those that had initiated their efforts earlier—many of which had used some form of NLP/AI solution to expedite that review and extraction process—have moved on to recognize that a portion of their contracts will not work with conventional fallback language and will need customized remediation. Some portion of those contracts could be beneficia-

ries of the most recent consultative announcement from the official sector. Among the initial challenges that had affected progress on contracts was the need for a firm cessation date as well as a determination of a clearer version of the Secured Overnight Financing Rate (SOFR). Recognition of simple SOFR for some products and more complex SOFR in arrears for others, such as floating rate notes, continue to challenge many including some of the most advanced in the industry. Some specific lending language on CLOs has advanced segments of the market that had been awaiting industry

clarity. And indeed, there are still some that would prefer a different reference rate (outside of SOFR). All these steps impact the core challenges every firm faces: operationalizing the transition, communicating those changes to clients and helping them effectuate the transition, setting up the appropriate risk management tools for new reference rates, and ensuring buy-in from business units to be confident that the transition will be near flawless. We address some of those operational and risk issues separately in this document. Within the cash space, the Alternative Reference Rates Committee

(ARRC) has published recommended fallback language for adjustable rate mortgages, bilateral business loans, floating rate notes, securitizations, syndicated loans and variable rate private student loans. The extent to which any market participant implements or adopts any suggested contract language is completely voluntary. Each market participant will make an independent decision about whether or to what extent any suggested contract language is adopted.

The table below highlights the ARRC's recommended best practices for newly issued loans.

Product	Hardwired Fallbacks Incorporated By	Target For Cessation of New Use of USD LIBOR By	Anticipated Fallback Rates To Be Identified By
Floating Rate Notes	6/30/2020	12/31/2020	6 months prior to reset after LIBOR's end
Business Loans	Syndicated Loans: 9/30/2020 Bilateral Loans: 10/31/2020	6/30/2021	6 months prior to reset after LIBOR's end
Consumer Loans	Mortgages: 6/30/2020 Student Loans: 9/30/2020	Mortgages 9/30/2020	In accordance with relevant consumer regulations
Securitizations	6/30/2020	CLOs: 9/30/2021 Other: 6/30/2021	6 months prior to reset after LIBOR's end
Derivatives	1/25/21	6/30/2021	Bloomberg currently publishing

Notably, ARRC's set of recommended best practices identified June 30, 2021 as the target cessation date for new business loans, derivatives, and non-CLO securitizations. As discussed below, this is six months in advance of the date—December 31, 2021—by which the US banking agencies have encouraged banks to stop entering into new USD LIBOR contracts.

COORDINATED AND CONSEQUENTIAL NOVEMBER ANNOUNCEMENTS

In November, the industry saw highly coordinated and consequential announcements from the ICE Benchmark Administration (IBA) (the administrator of LIBOR) and UK and US banking regulators, which, taken together, provide the clearest, most practical framework to date on the end of LIBOR.

On November 30, 2020, IBA announced a proposal to extend the publication of the most commonly used USD LIBOR settings (overnight and one-, three-, six- and 12-month) until June 30, 2023, with the other settings (one-week and two-month) ceasing after December 31, 2021. IBA's announcement followed an earlier statement in which it announced plans to cease publication of all GBP, EUR, CHF, and

JPY LIBOR setting after December 31, 2021. In connection with IBA's announcement on November 30, the UK Financial Conduct Authority (FCA) and the US Federal Reserve issued statements welcoming IBA's announcement, which the FCA described as "incentivis[ing] swift transition, while allowing time to address a significant proportion of the legacy contracts that reference [USD LIBOR]."¹ Concurrently with IBA's latest announcement, the US banking agencies issued a joint statement encouraging banks to cease entering into new contracts that use USD LIBOR as a reference rate "as soon as practicable and in any event by December 31, 2021." The agencies described this as necessary to facilitate an orderly—and safe and sound—LIBOR transition. In particular, "[g]iven consumer protection, litigation, and reputation risks, the agencies believe entering into new contracts that use USD LIBOR as a reference rate after December 31, 2021, would create safety and soundness risks and will examine bank practices accordingly."²

In a newly issued guide, ARRC has described these recent announcements as being fully aligned with its own work to date. It has also noted that the timelines contained in its recommended best practices (referenced in the chart above) were designed on the basis of what it considered to be practicable. Therefore, the following take-aways should be considered by market participants:

- New contracts and instruments should stop referencing USD LIBOR by December 31, 2021, but earlier if practicable. Otherwise, examiners may determine that a bank is engaging in unsafe and unsound banking practices.
- Legacy contracts (i.e., those that mature beyond December 31, 2021) that reference USD LIBOR may have an additional 18 months—until June 30, 2023—to mature, be refinanced, or otherwise be remediated, including through a legislative fix, if one were to be enacted. For planning purposes, it should be assumed that IBA's proposal is adopted after the consultation

for feedback closes in January 2021.

- New contracts and instruments that reference USD LIBOR should include hardwired fallbacks now.

The recent announcements, which have been received positively by financial and banking trade associations, signify an important shift from what had been viewed as an inflexible deadline of year-end 2021. With the extra time to prepare, market participants should continue taking actionable steps to operationalize remediation processes in a thoughtful and thorough manner.

PROSPECTS FOR A LEGISLATIVE SOLUTION

In March 2020, the ARRC proposed legislation for New York that would, among other things, protect parties that adopt SOFR as a replacement for LIBOR under financial contracts governed by New York law. ARRC's legislation solution, which specifically addresses LIBOR fallback language, was formally introduced in the New York State Senate and is expected to be considered next year. Following the November announcements, the ARRC reiterated its support for it.

The New York legislative solution, together with the November announcements discussed above, are an essential part of an orderly transition from LIBOR. The additional 18-month timeframe during which a substantial portion of LIBOR-linked legacy contracts can run-off will give greater clarity, and perhaps urgency, for legislation to address, what Federal Reserve Vice Chair Randal Quarles recently described as, the "hard tail."

ANNOUNCEMENT OF ISDA PROTOCOL

Finally, a highly positive development for contract remediation occurred earlier this fall. On October 23, 2020, ISDA announced its IBOR Fallback Protocol and IBOR Fallback Supplement (collectively, the "Protocol"). The Protocol, which received widespread support from official sector institutions worldwide, facilitates the transition away from LIBOR by providing deri-

vatives market participants with new fallbacks, respectively, for legacy derivative contracts and for new derivative contracts. As derivatives represent the vast majority of the outstanding LIBOR exposure, ISDA's announcement was much-awaited by the industry. It will be an efficient mechanism to amend derivatives contracts with many counterparties. Broad adherence to the Protocol is, therefore, important for mitigating the financial stability risks associated with LIBOR becoming unusable. According to the ARRC's recommended best practices, market participants are encouraged to adhere to the Protocol before it takes effect on January 25, 2021.

Technology and Operational Readiness

Firms have generally identified several operational hurdles to the LIBOR transition, including system updates and product and model construction, based on Sia Partners' most recent set of interviews. Delays with vendor selection have improved in our most recent discussions with the industry, with the most progress among the larger firms who had begun vendor outreach prior to the pandemic. Smaller and midsize firms have continued some struggles. It is evident that firms are either contemplating vendor implementation or are in the process of testing their own systems against ARRC guidelines, with the achievement of industry milestones expected to occur throughout Q1 and Q2 of 2021.

We believe firms will need to focus on the following technology and operational areas for 2021:

Governance

- Implement centralized project management office (PMO) governance to oversee all LIBOR Transition Office (LTO) project timelines and budgets
- Align PMO timelines to specific LTO vendor solution transition efforts
- Develop work plans for contract review and remediation

Systems

- Ensure technology teams are on

¹ According to recent [comments](#) by an FCA official, the FCA believes it is possible to maintain a representative USD LIBOR until June 30, 2023, and it would not be welcoming and supporting IBA's proposed extension unless it was confident that representativeness thresholds could be maintained in terms of the number of panel banks. Therefore, the FCA regards an extension as effectively eliminating the risk of so-called "zombie LIBOR" in any currency.

² The joint statement clarified that is not to be read as announcing that the LIBOR benchmark has ceased, or will cease, to be provided permanently or indefinitely or that it is not, or no longer will be, representative for the purposes of language adopted by ISDA. For its part, ISDA similarly clarified that it does not view the statements as constituting an "index cessation event" or triggering fallbacks.

board with end-to-end UAT as aligned to ARRC recommendations and end-user requirements

- Parallel-test beta systems while running legacy systems to validate readiness for contract parsing and review across in-scope products
- Approve new vendor solutions as they pass each phase of UAT towards go-live dates per PMO action plan and steering committee

Contracts

- Perform contract repository scope analysis for all in-scope products
- Map gap analysis findings on legacy contracts vs. revised contracts

Both EU and US regulatory bodies have reiterated the importance of additional focus to these areas for several years or more. To assist in bridging the gap between firms' current progress and regulatory expectations, the following actions are recommended:

- As various ARR / LIBOR models affect different trading scenarios, the LTO team must be prepared to implement dynamic rate-sensitive systems that adjust to market making decisions in real time
- Business and technology subject matter experts should consider all cost and process dependencies along the design roadmap, which also includes clear milestones for each change during the transition from requirements gathering, to beta, to go-live
- Business Requirement Documents (BRD), wireframes, and process flows should be drafted and finalized according to the PMO governance model, where approved versions clearly support all regulatory mandates pertaining to LTO operational readiness. Such documentation should be reviewed by IT Audit and Internal Audit and stored in a user accessible central repository

From conversations with vendors of third-party solutions, success is measured by the level of effectiveness in quantifying basis risk and market risk on the portfolio for selected trading dates. Therefore, delays can be experienced by firms gearing up functionality to identify contracts for CLOs,

MBS, corporate bonds, leveraged loans for extraction of qualitative and quantitative information needed for LIBOR evaluation on definitions, fallback provisions, cost of funds, and consent requirements. Furthermore, classifying language for agent determination, arithmetic means and averages tied to tough legacy contracts are also driving streamlined vendor implementation.

Loan accounting systems are presenting some of the most significant challenges, (i.e., a legacy loan accounting platform) and separate pricing/derivative product transition issues. Such long-time technology and infrastructure tools within many impacted organizations continue to create obstacles to a successful transition when updating to new and different ARR functionality. Based on industry feedback, some banks are ahead of the curve in certain upgrades for particular technologies/systems while others have lagged behind the LIBOR transition timeline in terms of legacy system upgrades. The need here is to incorporate current loan accounting calculator modules that can perform simple, term, arrears, compounded, and weighted-average calculations that match to vanilla, to complex, to synthetic IBOR, LIBOR, SOFR loan structures.

While many loan term variants will go-live before the cessation deadline, timelines for upgrades are still not in place from a system implementation perspective. Overall, loan accounting vendors, large and small, are playing catch-up, or are in a "wait and see," modality. The continued regulatory guidance should assist in building out the number of firms that can transition their systems in 2021. In considering the newest upgrades from loan system vendors, some have expressed the view that certain rule requirements are progressing faster than the actual development time needed to install and test new modules. This is a difficult problem for firms to solve, and different sectors have expressed individual concerns related to Capital Markets, Asset Management, Lending, Insurance, and Corporates alike.

Model development has been cited

as critical both for product development and pricing frameworks as well as emerging regulatory requirements from examination guidelines by the SEC and the banking agencies. Model development is more advanced for some Syndicated Loan or Cash products, but less so for Derivatives or complex structured products. Sensitivities in hedging ratios with short-term vs. long-term RFR instruments are an ongoing development challenge.

Model Risk Management and Validation Issues

The Technology and Operational Readiness section above identifies key issues related to execution against established project plans for performing analyses on how the new alternative reference rates will likely impact income, funding, liquidity, and capital levels. The PMO must ensure timelines are met, while also being adaptive to possible changes being communicated from regulators and market activity. And critically, those firms without that governance and infrastructure in place must also diligently implement the essential transition steps.

On November 20, 2020, the Alternative Reference Rates Committee (ARRC) published its findings and recommendations in a memorandum based on the view that the post-LIBOR cessation will cause major sweeping changes to stress forecasting scenarios, PPNR, ALM, CCAR, RWA, FRTB and other applicable treatments to regulatory capital and control. The ARRC noted that if the transition were to lead to unintended increases in capital and liquidity requirements, this would be at cross-purposes with the macroprudential goal of mitigating risk of the financial system as a whole. Prior to the ARRC release, in June 2020, the Basel Committee on Banking Supervision issued its guidance to clarify ES (Expected Shortfall) and IMA (Internal Models Approach) calculations, along with FRTB implementation and Counterparty Credit Risk Exposure Estimation as per international capital and liquidity standards in light of the transitions in different jurisdictions.

From a risk and valuation perspective, several other areas will also require attention of market practitioners. Both VAR (Value-at-Risk) and LCR (Liquidity Coverage Ratio) on the whole are potentially at stake, or become dysfunctional, when there is no historical pricing for legacy contract fallbacks (e.g., SOFR / LIBOR credit spread, SOFR “term” structure, hedged cash / derivatives). Another downside risk will include legacy / fallback assets, which could result in illiquid assets as they become too cumbersome to handle operationally, or if trading all moves over to SOFR based assets. Finally, certain contracts will become non-observable in terms of their pricing structure, specifically, contracts that are locked in legacy LIBOR, interpolated LIBOR, or synthetic LIBOR credit spreads and term.

As of November, daily trading volumes for SOFR futures have now surpassed Fed fund futures and are at about 20% of euro dollar. SOFR interest curves now have the beginning of sufficient data points to bootstrap a forward curve to calculate floating rate coupons and discount factors. Interest rate derivative trading is still in its infancy. Interest rate models used for risk and valuation are calibrated using volatilities from the derivatives market. Lack of SOFR swaption volatility data will prevent analytic systems to calibrate models using SOFR swaptions and use LIBOR swaptions as a proxy. Hedging SOFR backed MBS will remain a challenge until the SOFR swaption market is established.

Agency and corporate bond issuers have yet to settle on a standard method for compounding in arrears for SOFR backed floating rate notes. Analytic and risk systems must provide the flexibility for investors to analyze instruments with varying compounding methodologies. Issuers need similar flexibility to be able to evaluate an optimal approach before issuance. Data vendors need to provide the ability to maintain arrears calculations for SOFR floaters. Investment firms also need daily accruals and the ability to run scenarios to calculate and monitor exposures.

Analytic systems and risk processes that do not support negative rates cannot effectively analyze SOFR backed floaters in mortgage-backed securitizations. Applying a floor of zero to floating rates causes systems to compute a longer duration for such floaters. A proposed GSE transaction included a floating rate bond with a margin of 330 bps and a floor of zero, indicating that even with a negative SOFR rate the bond would receive interest. This bond, if run with SOFR floored to zero, would effectively behave like a fixed rate security from a duration perspective.

A key data vendor in the structured products space has added a feature to allow end users to define fallback approaches for legacy securities. Risk systems would have to maintain a database of fallback methods adapted for each legacy transaction. Inconsistencies across systems and vendors can lead to discrepancies in pricing and affect secondary trading. Banks and other regulated institutions would also have to validate their approach on a deal-by-deal basis for existing holdings and any future acquisitions.

All these factors combined will have material impacts on a variant of regulatory reporting requirements, such as VAR and RWA (Risk-Weighted Assets), FRTB (Fundamental Review of the Trading Book) capital charges due to NMRF (Non-Modellable Risk Factors).

Additionally, as we interacted with the Model Risk Management (MRM) leadership at several participants, the need to review and analyze the changes being implemented to models is on their radar, but still requires focus as we move into 2021. With internal system/model and vendor system/model implementation timelines extending, and a seemingly uncertain LIBOR transition date, MRM teams will be squeezed for time to conduct their risk assessments across a potentially numerous sets of models, depending on the portfolio composition of the institution. As a specific example, if fallback amendments or replacement rate amendments cause future unintended negative capital treatment to

certain instruments then many institutions will also be required to adjust complex frameworks around TLAC (Total Loss-Absorbing Capacity). As SOFR may become an increasingly important factor for these models, performance modelling will be challenging without historical proxy data released by the Fed towards MRM application.

As RiskSpan has noted in a prior blog, there is multi-layered risk with the transition away from LIBOR – market, operational, strategic, reputational, compliance, model risk – which impacts any models that are tasked with mitigating or assessing these risks. Model validators will be focused on testing of model inputs, benchmarking performance relative to the inputs, and assessing the selection process across alternatives. Validators will also need to be keenly aware of fallback language, its interpretation and its application to data and model estimation. Documentation and supporting evidence from the model developers, whether proprietary or vendor created, will be paramount to meeting the typical regulatory and model validation best practices required for production models. Scheduling of model reviews by MRM teams in 2021, if not completed already with providers should become a top priority as we close out 2020 and move into Q1 of 2021.

Client Outreach and Communication

Communication, both internal and external, is integral to a successful LIBOR transition effort. A robust client communication plan requires appropriate diligence and strategy before being properly executed. As contract remediation ramps up, client communication goes hand-in-hand with contract remediation. Pursuant to the ARRC's recommended best practices, for contracts specifying that a party will select a replacement rate at its discretion following a LIBOR transition event, there will need to be disclosures of the planned selection to the counterparty at least six months prior to the date that a replacement rate would become effective.

Sia Partners has had a series of exchanges with industry participants and, based on interviews conducted over the summer and fall, found that nearly half of those financial institutions interviewed had reached out to their work streams, organized internally and started high-level client communications for a single business unit. When asked about the extent of contract remediation conducted, less than a third of that group were actually remediating with client segments. Approximately 20% of the overall G-SIB group had engaged across all workstreams with client segments or had been limited to due diligence and planning only. The follow-up discussions in December of 2020 suggest progress had been made across most banking groups in reaching out to their clients. These efforts included a build-out of their internal communication capabilities to educate their relationship managers and others with client responsibilities. Clearly, the consultative announcements (as we note above) will likely affect some of those efforts while clarity is sought from the official sector in early 2021.

Based on Sia Partners' interviews, the preponderance of participants indicated that efforts through the spring into the summer had focused mostly on internal communications. For external communications, institutions have ge-

nerally found it challenging to engage certain clients on what the LIBOR transition means for them until there was more specific detail on SOFR and other reference rates which are being built out.

Considering the literature from the ARRC, the current regulatory landscape surrounding the transition and what has been learned from Sia Partners' research, several best practices have emerged as markers of progress among the most well-prepared institutions. The first is the development of business and philosophical processes to reach out to clients to demonstrate their commitment to completing the transition. This more specifically includes early reach-outs to targets in individual business units to establish a remediation timeline. The development of these processes is a hugely important first step. As mentioned, institutions are continuing to operate with unanswered questions, which if full outreach efforts were to begin, would be passed onto clients. The biggest advantage institutions can gain now is to ensure that their internal processes are developed and as clear as possible. The establishment of what an institution wants to gain from discussions with a client, what types of clients require what level of education and commitment of time, and how and when these efforts will be implemented across various internal business lines will offer advantages down the line. Many of the largest institutions, both foreign and domestic, have developed those approaches through Q4 of 2020 and are prepared for a more vigorous outreach effort leading to remediation in 2021. When the window of opportunity opens to have more informative and educative discussions with clients, those that have not begun and completed this preparation phase will find themselves having to develop and implement a plan concurrently. This is a theme seen in other aspects of transition efforts.

A second closely related marker of transition-related progress is ongoing internal educational efforts for sales, traders and relationship managers. A common observation is the lack of coherent messaging across an institu-

tion. This is true even at some of the largest firms and global banks. A lack of cohesion among different areas of the business has the potential to sow doubt internally and with clients alike. Consistency and efficiency should be prime goals for institutions. Having clear, concrete answers to common questions will lower the risk of providing employees and clients with incorrect information.

A third significant marker of progress has been where an institution has used client-based focus groups and/or surveys to establish a baseline understanding of where client exposures lie. This has enabled firms to develop more accurate approaches for different types of clients and prevent the unnecessary dedication of resources to clients that do not require further elaboration on a particular facet of the transition. We found additional firms embracing these approaches in late 2020 as part of their transition communication efforts.

These points and others have been discussed by various regulators. For example, the comprehension of client exposures and risks (and the prioritization of certain segments) was discussed by the Financial Stability Board (FSB) in its "Global Transition Map," released last October. The FSB asserted that to remove remaining dependencies on LIBOR come end-2021, firms should fully understand which LIBOR settings they have a continuing reliance on after end-2021 (by currency and tenor) and what fallback arrangements those contracts currently have in place. There is an added layer of complexity here, as there is the reliance on the clients to understand their risks themselves. The lack of a strong pattern in responses among various participant segments is an indication that there are questions as to who internally will lead the charge (relationship managers, internal legal, sales etc.) and how to keep messaging and education consistent across the organization. As noted in the FSB checklist, the biggest concerns are legal, conduct and reputational risks; each of which will need to be mitigated by a particular workstream. With the many unanswered questions that remain for participants, it is clear that the majority of participants have not

progressed to the point of establishing their strategy surrounding what part of the organization will take on the bulk of the effort and what their messaging is. This past summer, the Federal Financial Institutions Examination Council (FFIEC) reiterated the importance of internal education, training client-facing staff about firm plans, and offering accessible information and guidance relating to the transition. Additionally, the FFIEC identified firms' external websites, in addition to direct communication with clients, as a means of providing disclosures about the planned phase-out of LIBOR and its effects for clients. Most firms, particularly G-SIBs,

offer a basic explanation of the transition that would concern their commercial customers. They generally cover things assuming no knowledge on the part of their reader: what is LIBOR, what is SOFR (and other ARR), what are the associated risks, what is the planned timeline, etc. However, this generally appears to serve more as an introduction to the transition rather than to offer specifics on the firm's plans and what steps that have been taken. Additional specificity has emerged with many institutions as they initiated remediation efforts with clients that have more advanced transition efforts.

In light of the significant regulatory and reputational risk that are innate to client communication efforts, we are seeing significant preparation and review of conduct risk related issues to meet eventual regulatory expectations for both retail and non-retail clients and to ensure proper and accurate client outreach and communication. ISDA's protocol on fallback language is a substantial step toward institutions being able to provide certain clients with more concrete answers. This protocol will also provide answers to institutions and help them in managing conduct risk.

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