AFP Nashville

Capital markets update

December 12th, 2019

Chatham
FINANCIAL

Agenda

- Learning objectives
- About Chatham
- Market Update – 4Q19
- Managing interest rate risk
- LIBOR phase-out

Learning objectives

Learning objectives

- Understand how current market conditions are impacting US and foreign monetary policy
- Explore current strategies corporations are utilizing to manage interest rate risk
- Learn about the LIBOR phase-out initiative and how that is impacting US-based corporations

About Chatham

Your success is our mission

Financial risk management solutions that take your organization further

Chatham Financial delivers financial risk management advisory and technology solutions to organizations across industries and around the world — helping companies maximize value in the capital markets.

More than **$6 trillion** hedged notional since 1991

3,000+ clients around the world

190,000 end-of-day valuations run nightly

3,000+ ISDAs reviewed annually

Six global offices

Over **700+** employees

Access unequalled expertise that spans industries

Unlike most financial risk management companies, we offer advisory and technology services across a wide range of industries. This provides us with a broader perspective and allows us to see the marketplace on a macro-scale.

Corporations

Real Estate

Financial Institutions

Private Equity and Infrastructure

Services:

Interest rate, foreign currency, and commodity hedging

Hedging execution and processing

Hedge accounting

Derivative and debt valuation

Derivatives regulatory compliance

ISDA review and negotiation

Defeasance and yield maintenance

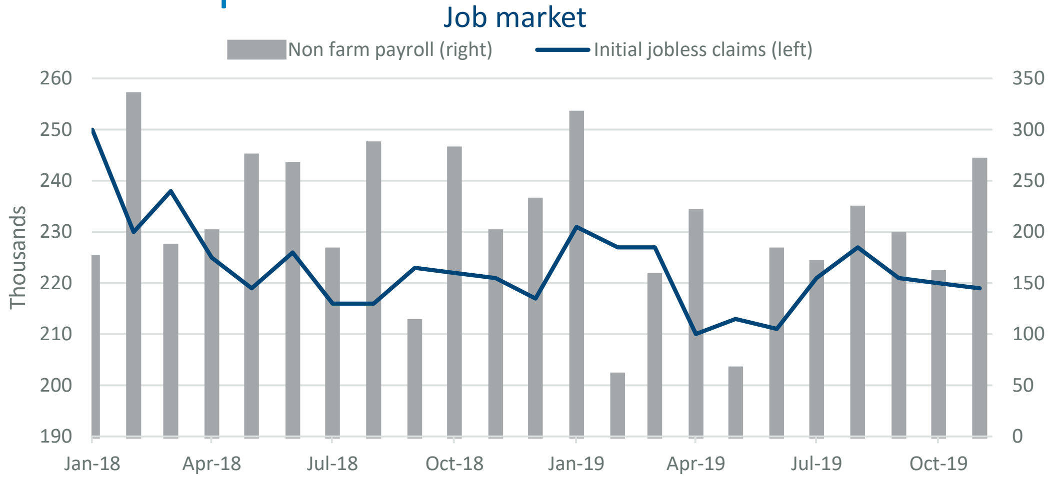
Debt and derivatives analytics

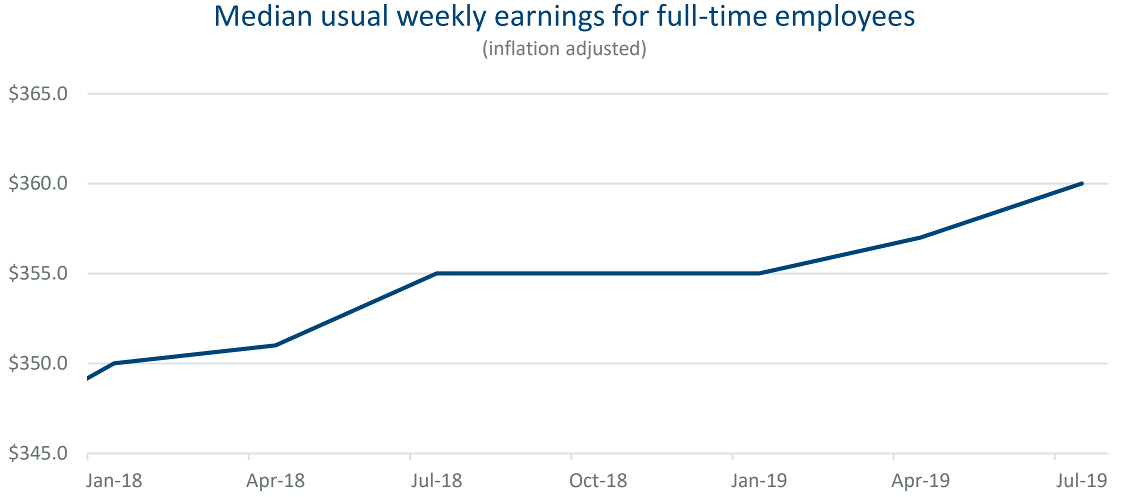
Financial risk management technology

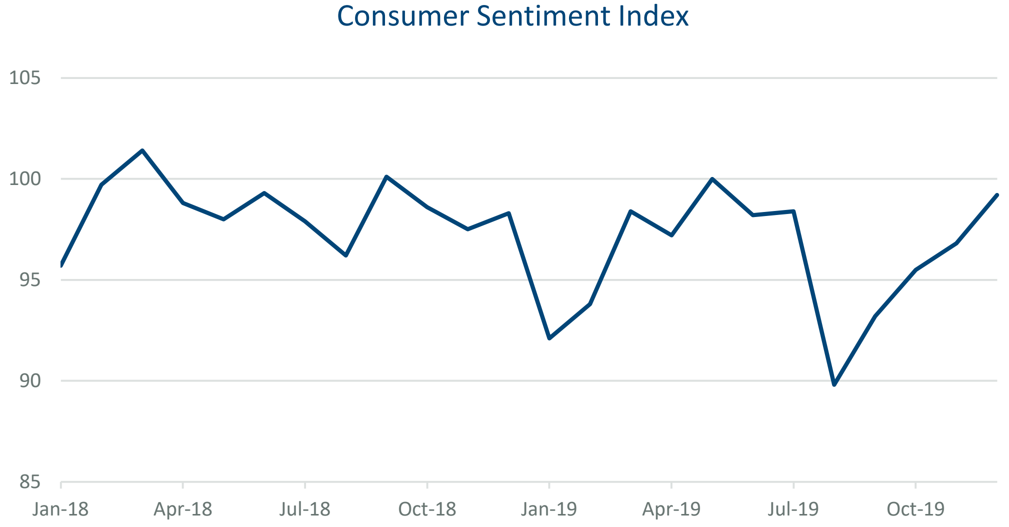
Market update

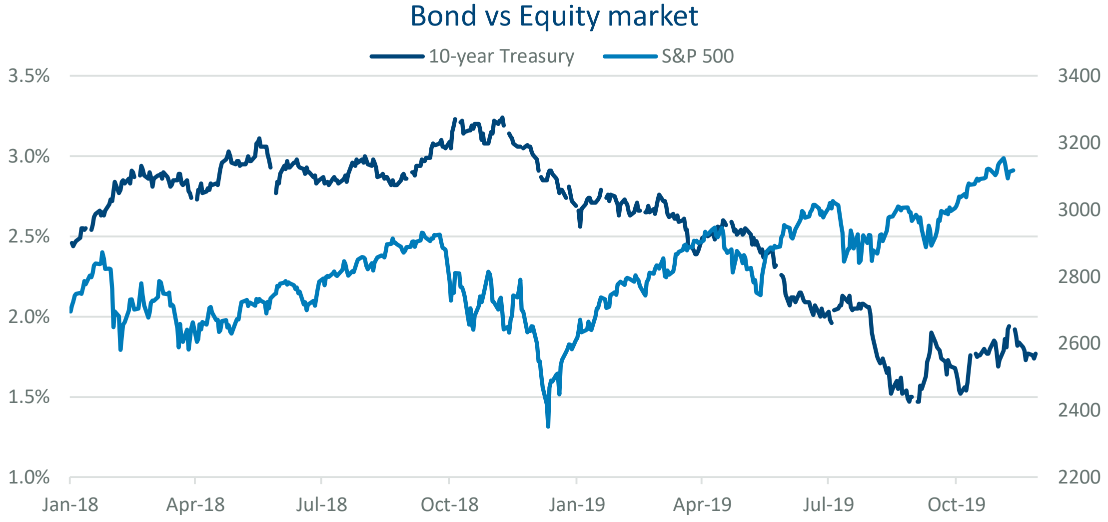
Market update

Domestic performance





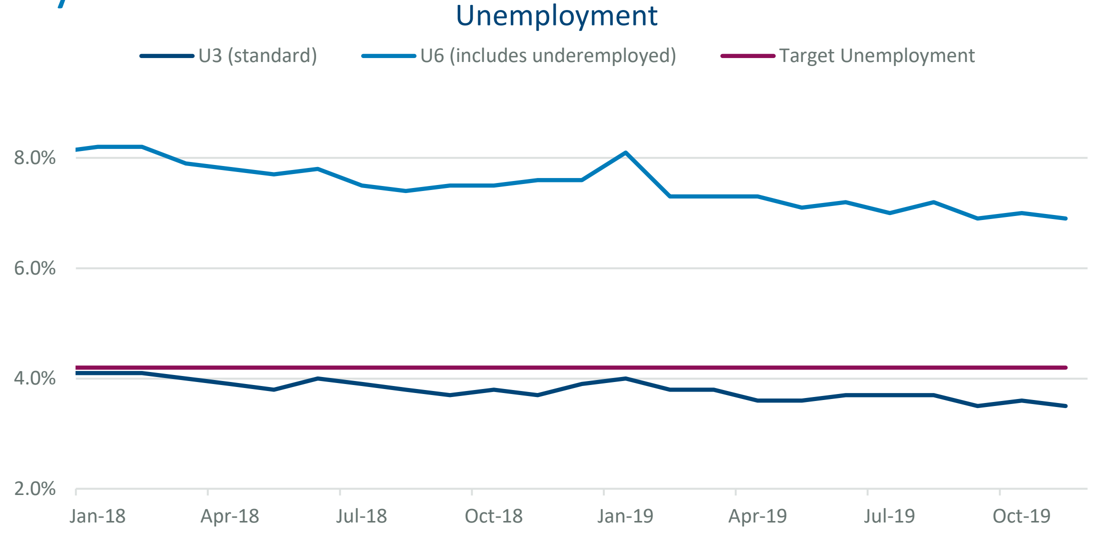


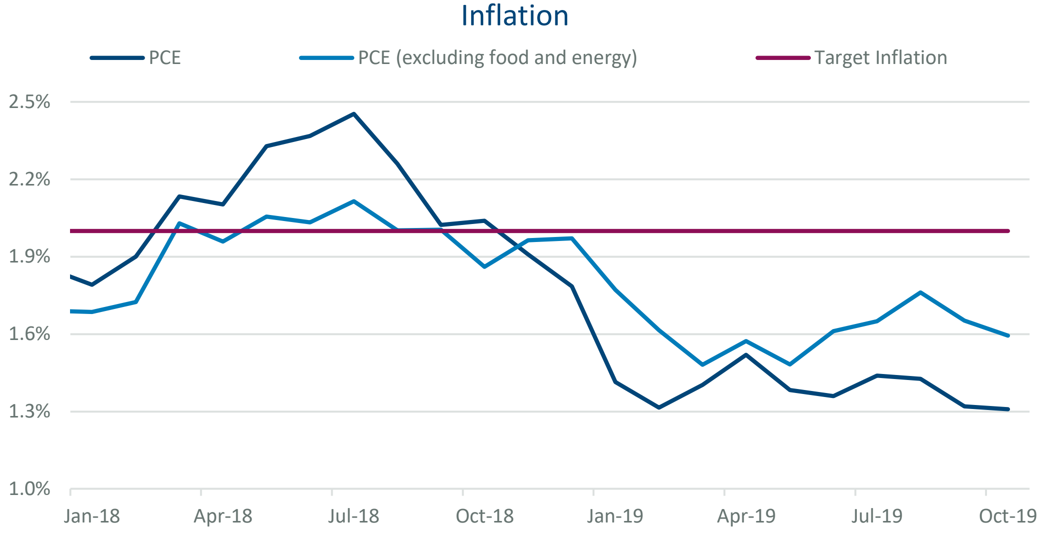


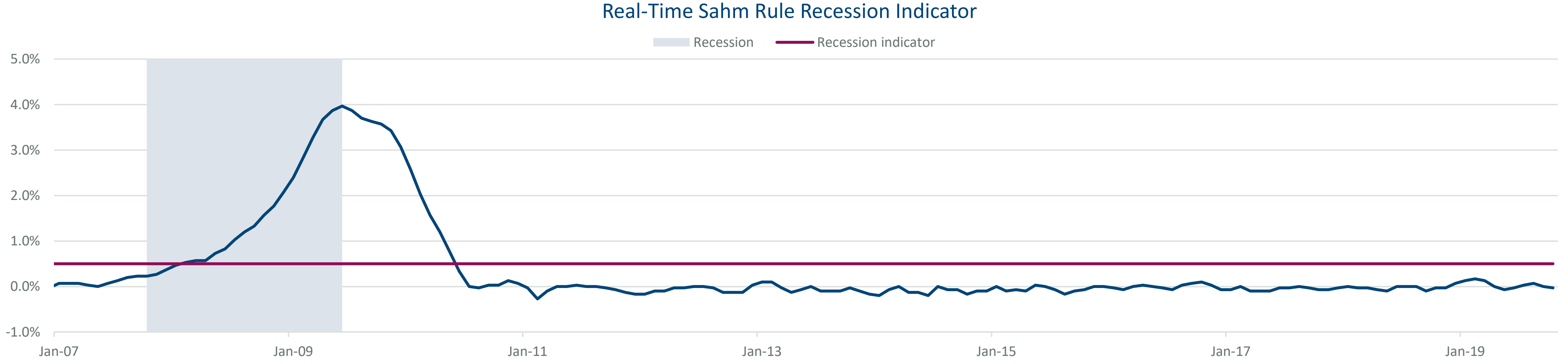
Updated as of 12/9/2019

Market update

Key metrics



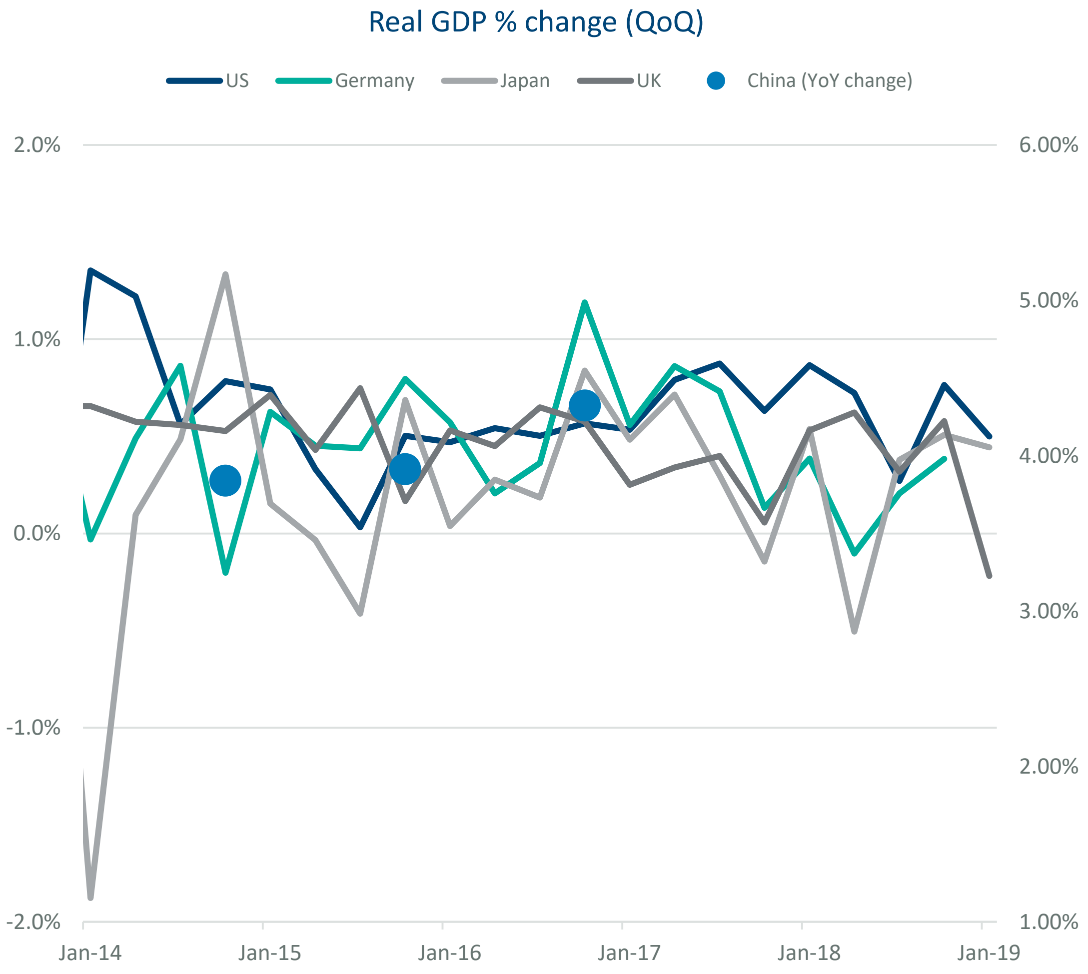


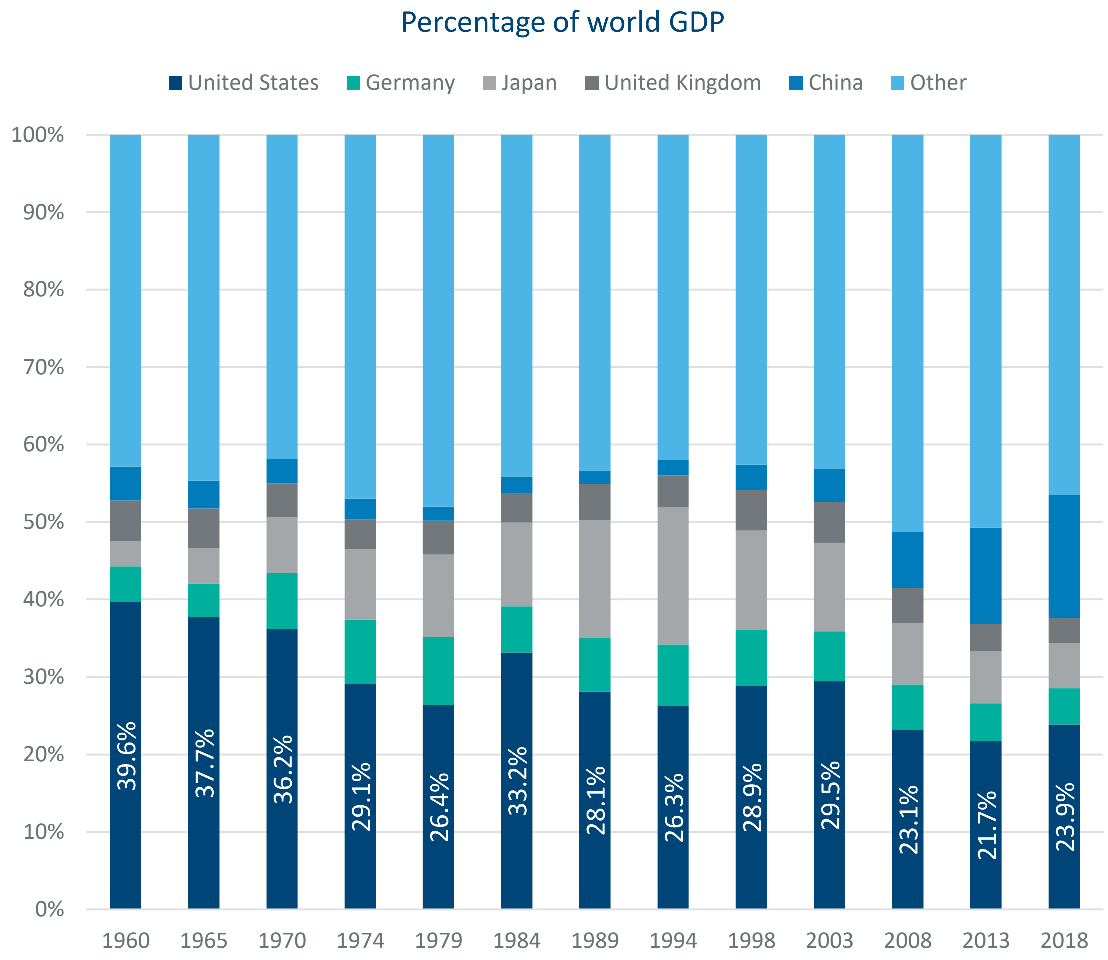


Updated as of 12/9/2019

Market update

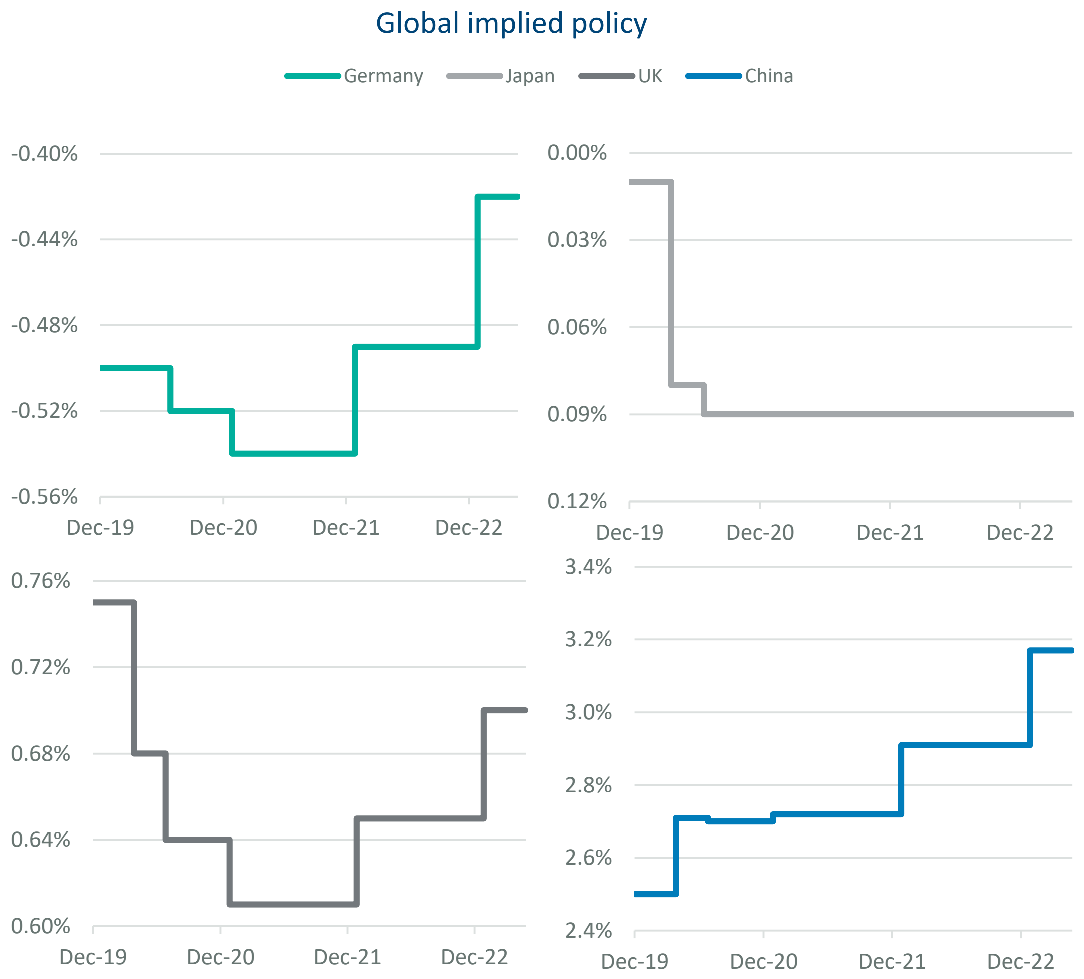
Global growth and market share

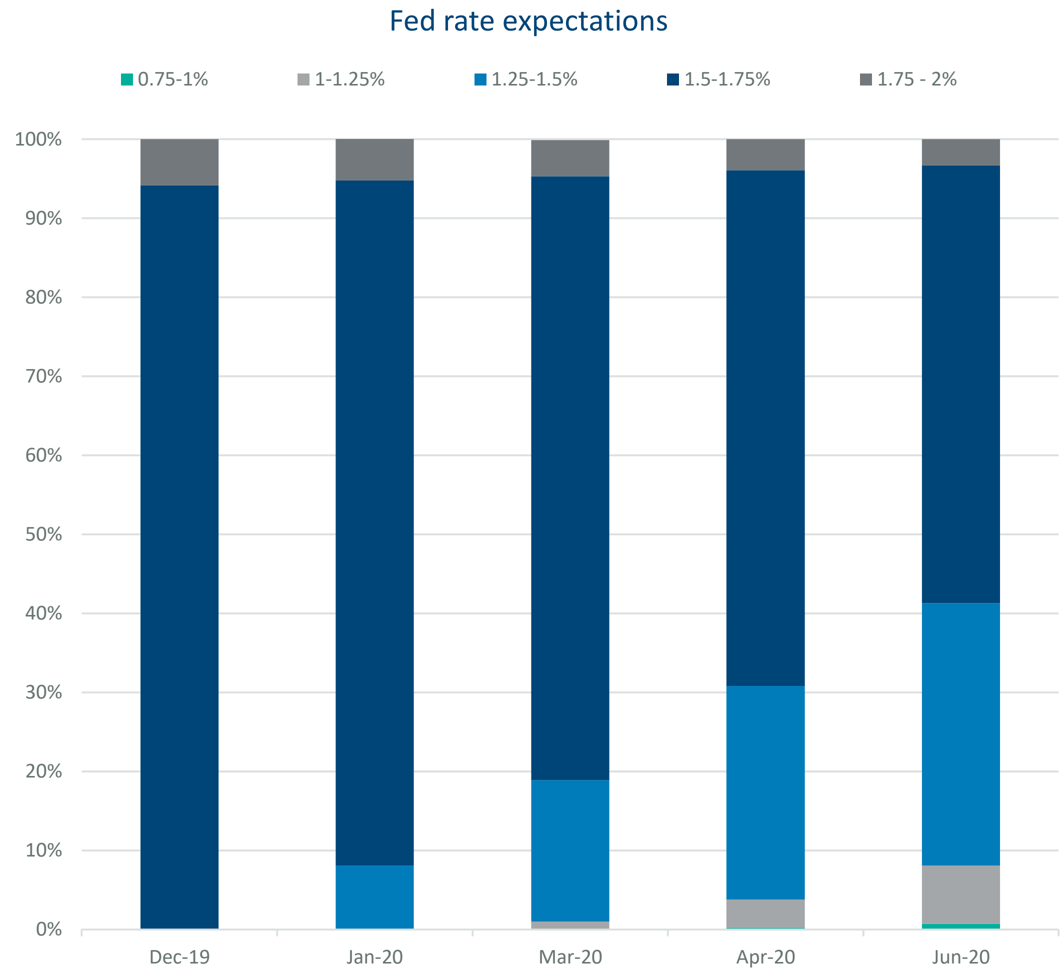




Market update

Global interest rate expectations

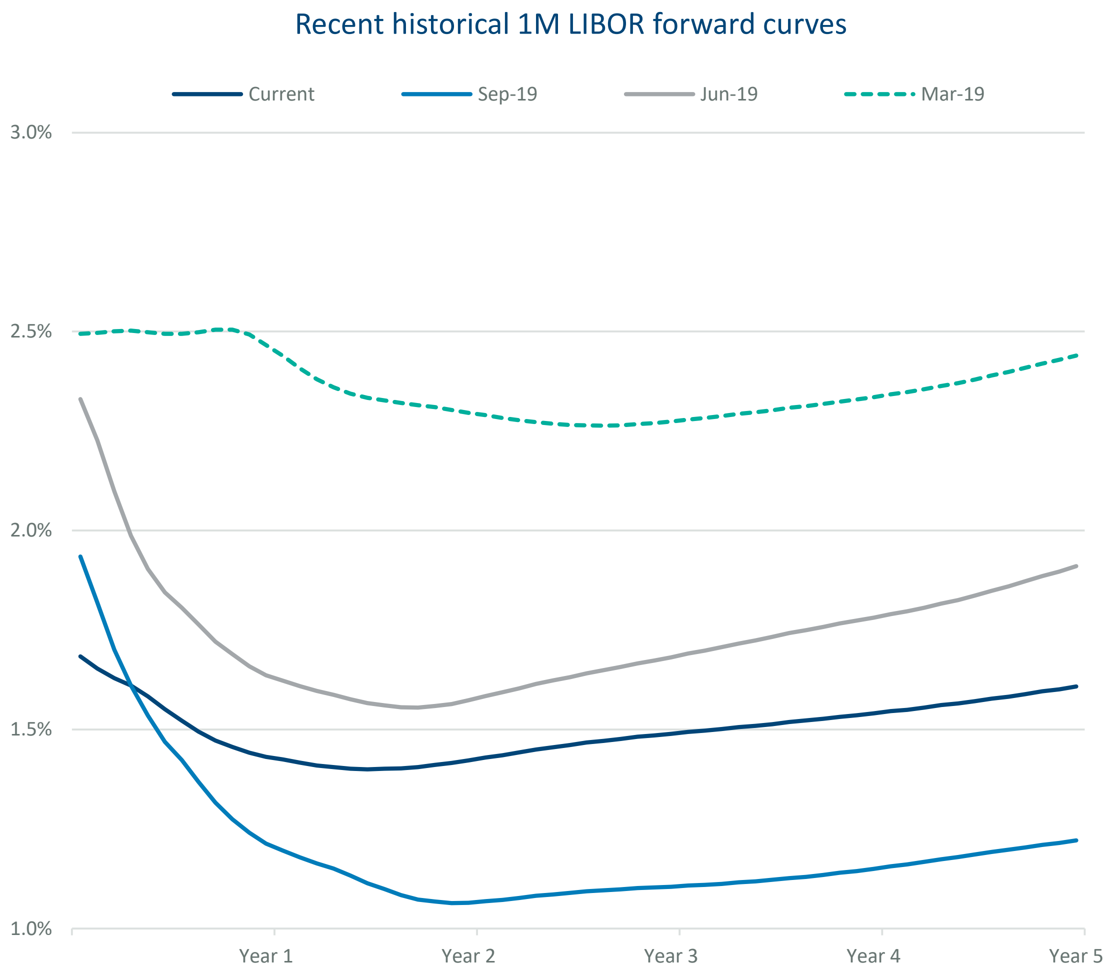


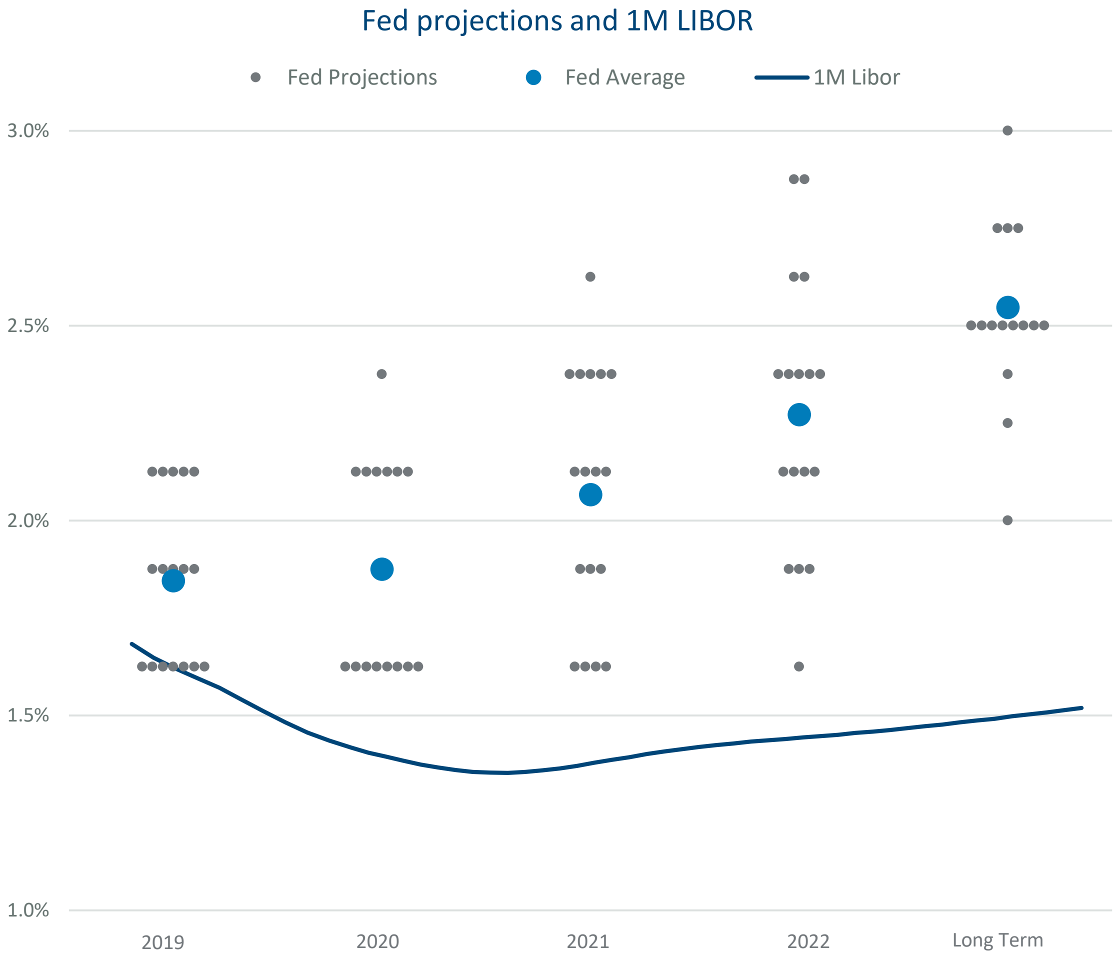


Updated as of 12/9/2019

Market update

LIBOR forward curve evolution





Updated as of 12/8/2019

Managing interest rate risk

Managing interest rate risk

Introduction to hedging

Reasons companies hedge interest rate risk

1. Creates certainty around debt-servicing costs
2. Facilitates easier budgeting and forecast
3. Provides time for the company to make appropriate business changes to adapt to market changes

Managing interest rate risk

Interest rate swap ("101")

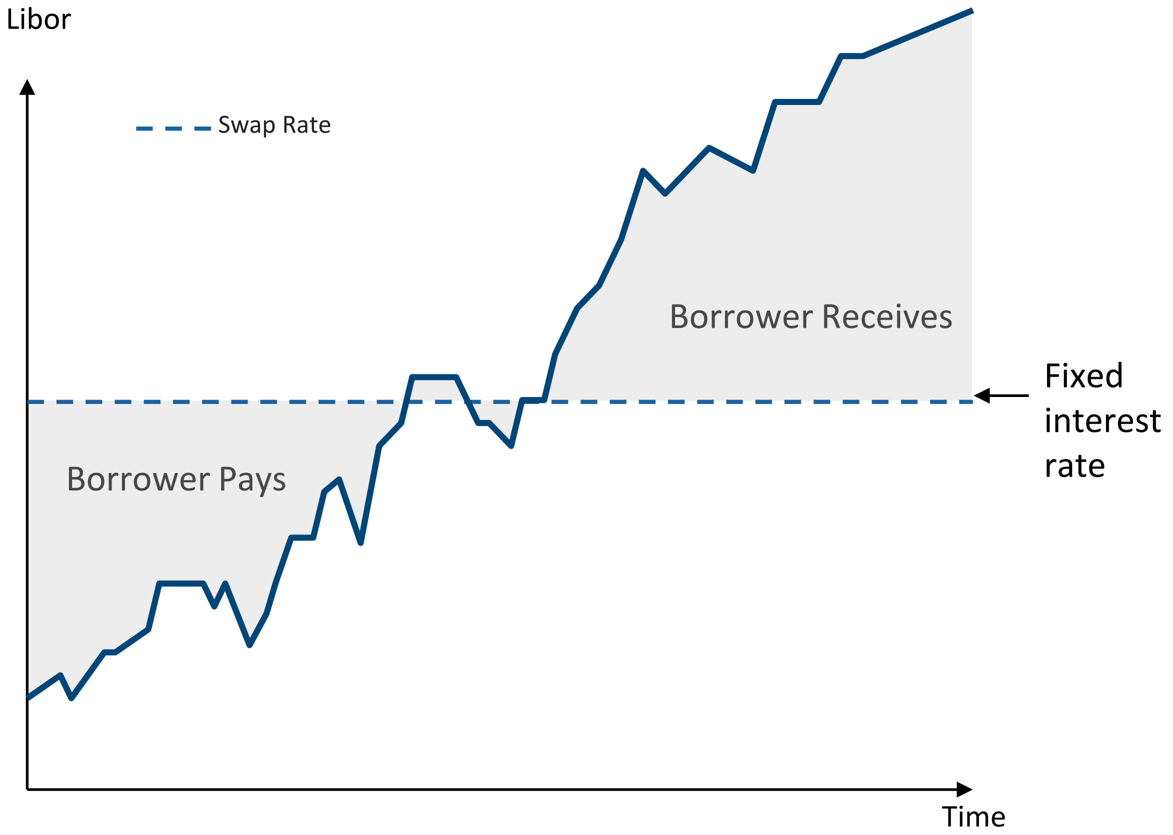
An interest rate swap is a derivative contract that allows a firm to exchange floating rate interest payments for fixed interest payments – or vice versa.

Advantages

- No upfront payment
- Locks in a known interest rate, creating certainty of interest expense
- Trades efficiently across a variety of indices or tenors
- Swap breakage is two-way

Disadvantages

- Requires credit
- Swaps can become liabilities if rates fall
- Additional hedging may be required if the loan contains an embedded floor



Managing interest rate risk

Interest rate cap ("201")

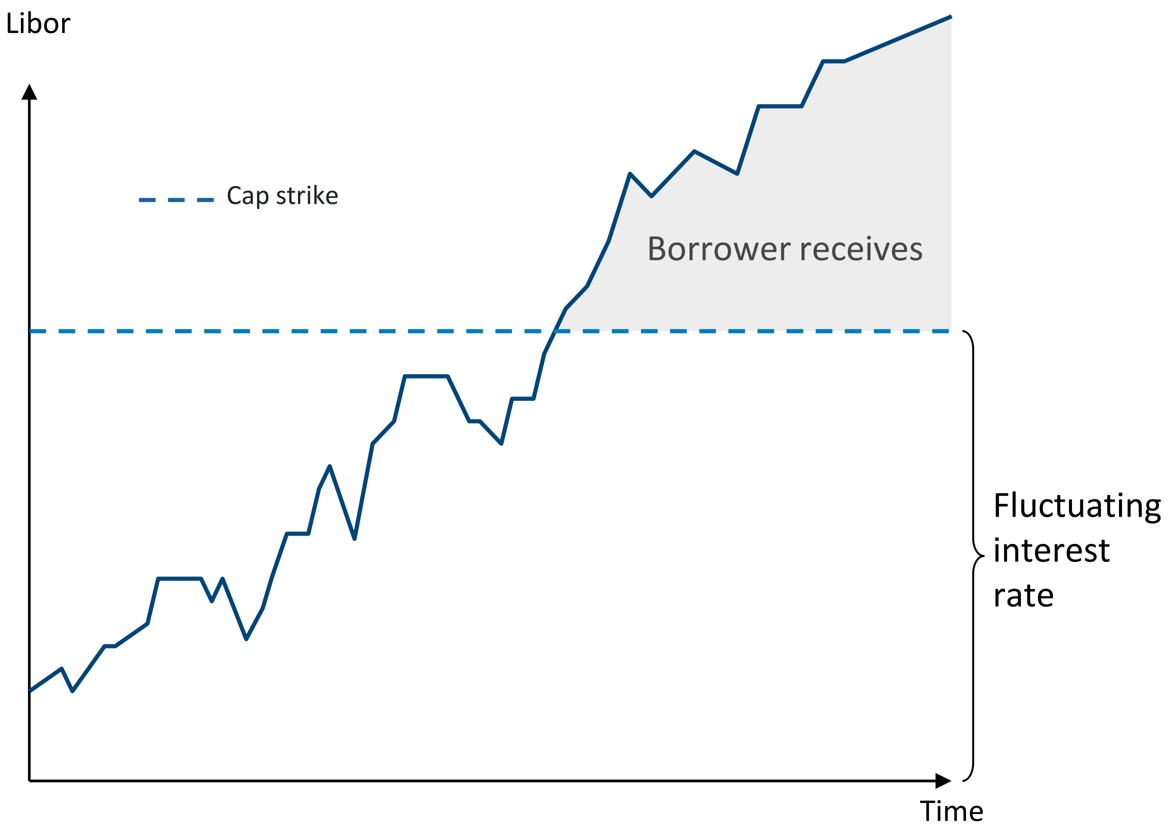
An interest rate cap allows a borrower to limit their exposure if interest rates rises above a certain level, while still allowing them to benefit from any additional lowering of rates.

Advantages

- Cash outlay is fixed and predetermined
- Typically no credit required
- Always an asset to the purchaser
- Purchaser can benefit from low rates by floating below the cap strike

Disadvantages

- Upfront cost (premium) may be significant, particularly for a term in excess of 3 years
- A low cap strike (more protection) may be cost-prohibitive



Managing interest rate risk

Extend-and-blend (“301”)

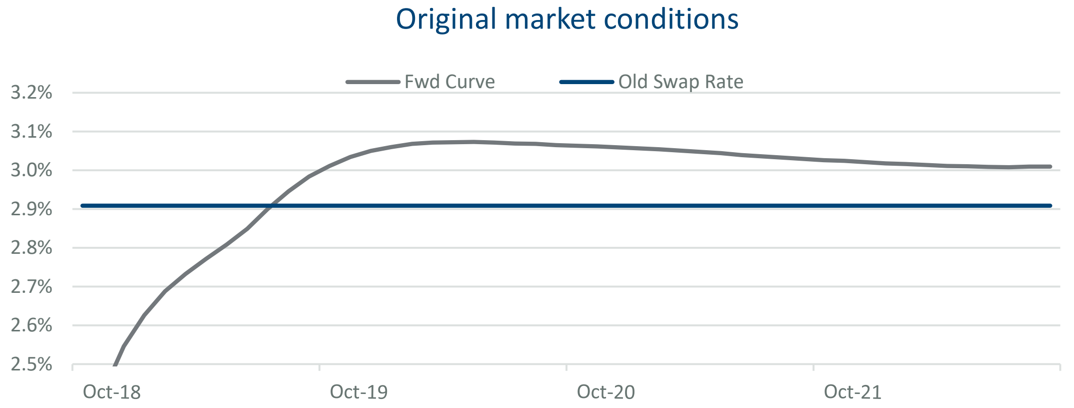
The extend and blend approach allows you to extend an existing pay-fixed swap over a longer period than the original term. The overall value of swap remains the same, but cash flows are spread out over the new time period.

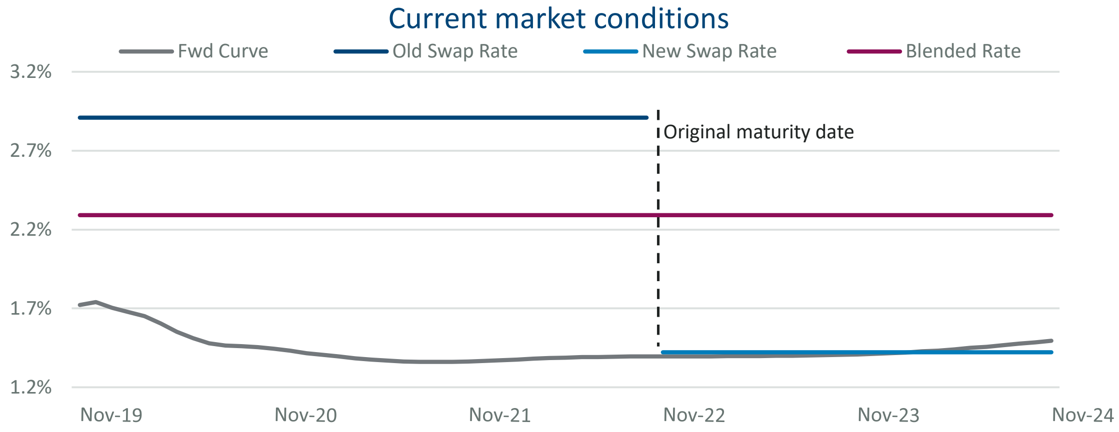
Advantages

- For swaps that are liabilities, cash payments immediately decrease
- The longer-term swap provides protection through the end of the new term
- Liability on current swap trade is effectively reduced to near zero

Disadvantages

- Extend and blend is considered a hedge accounting de-designation/re-designation event
- The decline in payments will not be recognized in P&L statements at the same time they occur
- Offers less visibility into pricing and costs than entering a new swap





Managing interest rate risk

Cross-currency swap (“401”)

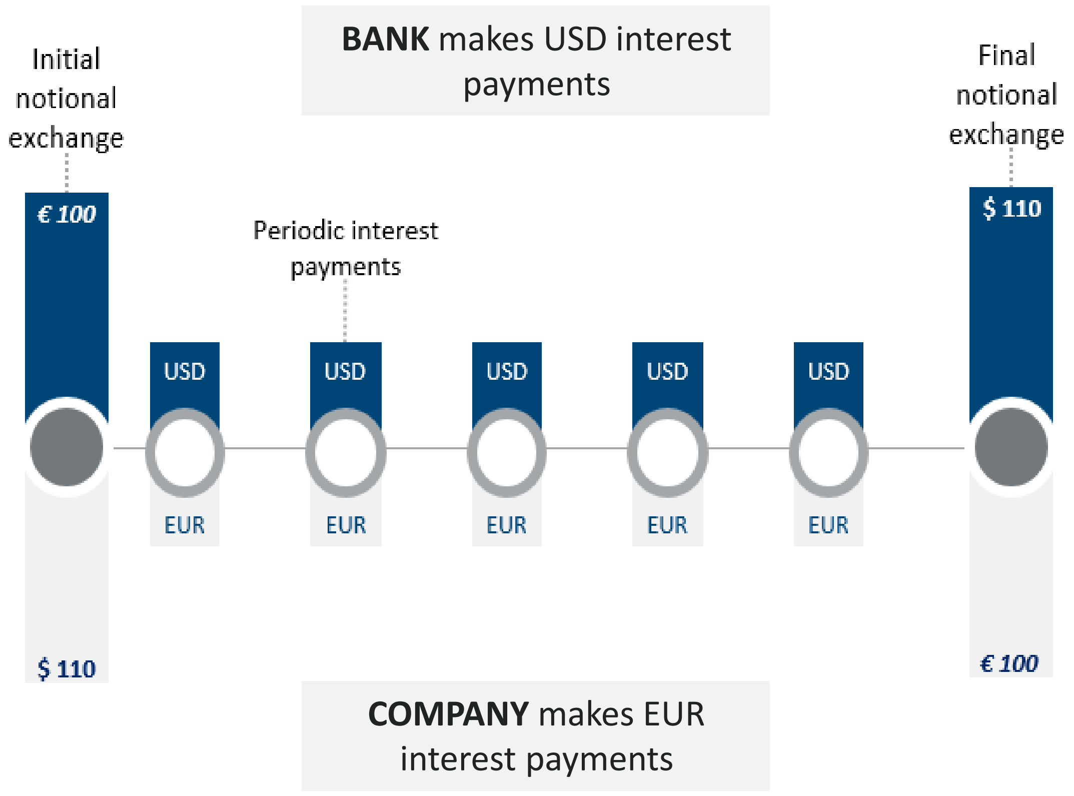
A cross-currency swap is an instrument that synthetically converts debt and related service payments into a currency that either better aligns with the borrower’s capital structure or decreases the total cost of debt servicing.

Advantages

- Enables a company to source debt in more competitive capital markets, while still being able to benefit from lower rate environments in foreign markets
- Finances foreign business acquisition with USD debt due to debt capital markets liquidity
- Ability to leverage foreign revenue to financing foreign interest payments, creating a “natural hedge”

Disadvantages

- Cross-currency swaps can be very credit intensive
- Alignment between capital structure and cash-flows is difficult
- Can present material breakage exposure at final exchange
- Depending on the accounting treatment used, may introduce unwanted volatility to financial statements



LIBOR phase-out

LIBOR phase-out

Background

Cause

Nonrepresentative

- LIBOR (London Interbank Offered Rate) is determined by banks submitting borrowing rates and is currently used as the benchmark rate for 100s of trillions of dollars worth of financial contracts
- After the 2008 financial crisis, uncollaterized interbank lending significantly decreased causing banks to submit rates based on judgement without a reliable way to confirm the submitted rates were accurate
- Recent scandals and billions of dollars in fines demonstrate that LIBOR is susceptible to manipulation

Effect

Discontinuation

- U.K.'s Financial Conduct Authority (FCA) announced that banks would no longer be required to submit rates to LIBOR after 2021
- Regulators have signaled that continued reliance on LIBOR could present a systemic risk and announced it will be phased out.

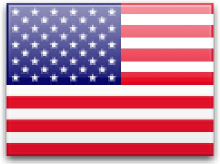
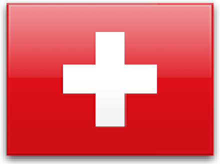
Remedy

Replacement

- The NY Fed Alternative Reference Rates Committee (ARRC) was formed to identify an alternative to LIBOR and encourage voluntary adoption to a risk-free rate (RFR)
- SOFR was chosen as the replacement rate in the US
- CME and LCH are planning to begin discounting cleared trades and calculating PAI using SOFR and October 2020

LIBOR phase-out

Global overview of risk-free rates (RFR)

Jurisdiction	Alternative RFR	Rate administration	Secured vs. unsecured	Status
	Reformed Sterling Overnight Index Average (SONIA)	Bank of England	Unsecured	Transitioned in April 2018.
	Secured Overnight Financing Rate (SOFR)	Federal Reserve Bank of New York	Secured	The FED began publishing SOFR rates in 2018
	Euro Short-Term Rate (ESTER)	European Central Bank	Unsecured	€STR expected to be published 2nd Oct 2019.
	Swiss Average Rate Overnight (SARON)	SIX Swiss Exchange	Secured	Calculation details for SARON to be finalized.
	Tokyo Overnight Average Rate (TONA)	Bank of Japan	Unsecured	The Committee is still considering several options including compounding TONA, term rates derived from TONA, and using TIBOR.

LIBOR phase-out

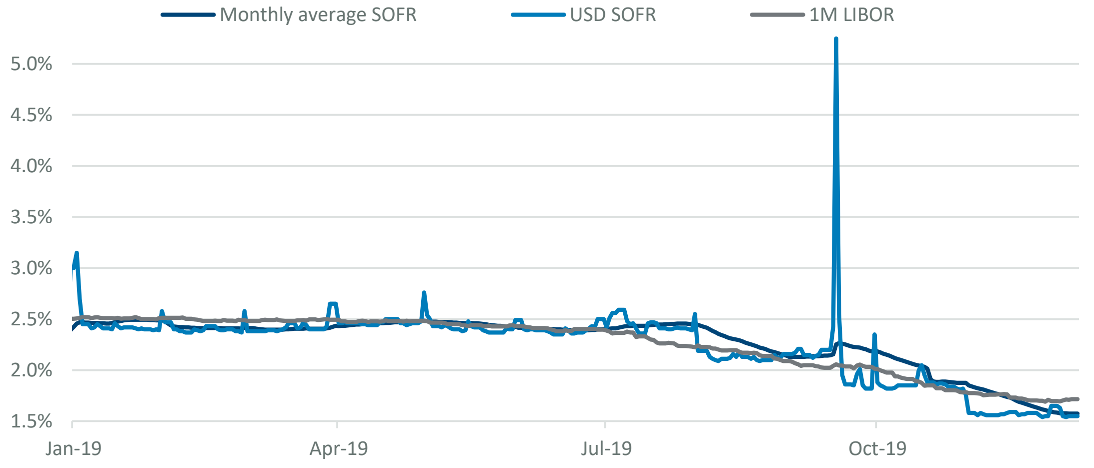
Secured Overnight Financing Rate (“SOFR”)

SOFR is a transaction-based rate that represents the cost of borrowing cash overnight on a collateralized, or secured, basis. Daily volume typically exceeds $800bn. It is published at approximately 8am ET by the NY Fed for the previous trading day

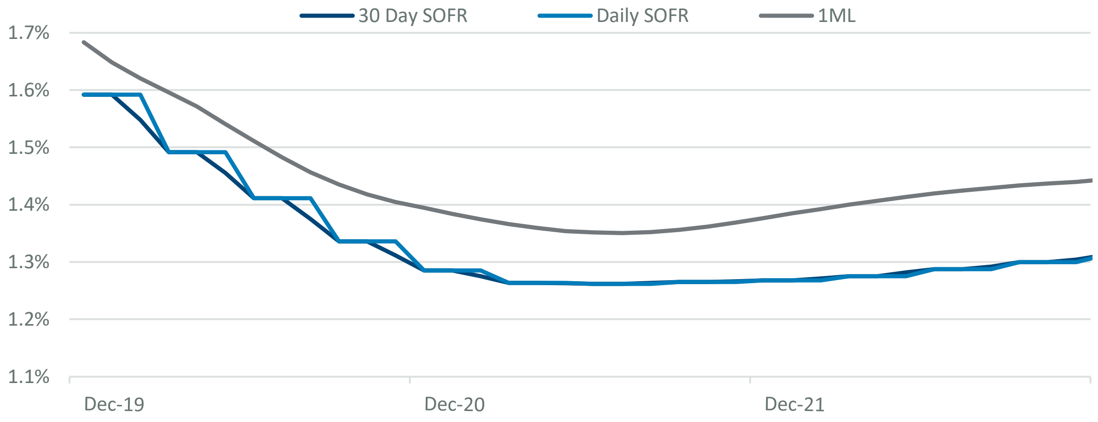
Factors that drive changes in repo rates:

- **Fed Funds Target Rate**: rate paid by Fed in reverse repos, so increases in Fed Funds target rate will drive repo rates/SOFR higher. Most significant driver and establishes baseline range for SOFR
- **Treasury Bill Issuance**: increases in T-Bill issuance push yields higher, leading Money Market Funds to substitute away from repo assets, which increases repo rates/SOFR.
- **Federal Reserve Balance Sheet Roll-off**: Fed puts more collateral in the market, which is typically funded via repo, which in turn increases repo rates/SOFR.
- **Participants in Repo Space**: supply of repo lending impacts repo rates/SOFR.
- **Reduced Balance Sheet Availability**: at quarter-ends banks increase cash to meet regulatory tests and requirements. This cash hoard is funded by repo borrowing, which pushes repo rates up. Largest contributor to year-end spike in repo rates/SOFR.

SOFR vs 1M USD LIBOR historical rates



SOFR vs 1M USD LIBOR forward rates



Chatham was among the first to market with an implied forward SOFR curve. See our site for more detail.

Updated as of 12/8/2019

LIBOR phase-out

Adoption timeline in the U.S.

Material SOFR issuance began in mid 2018. A few selected dates from the Paced Transition Plan (PTP), and market events, are noted below.

2014

Nov. 17th, 2014 FRBNY convenes ARRC to discuss and identify best practices for US alternative references rates.

2017

June 2017 ARRC identifies SOFR as the preferred alternative to USD LIBOR.

July 2017 The UK Financial Conduct Authority (FCA) announces that it will no longer compel banks to contribute to LIBOR beyond 2021.

2018

March 2018 ARRC expands its membership and working groups to include a larger group of market participants.

April 3, 2018 NY Fed begins publishing daily SOFR rates

May 7th, 2018 CME launches SOFR futures.

July 26th, 2018 Fannie Mae issues $6bn in SOFR indexed notes (6, 12, and 18m terms).

July 2018 ARRC issues guiding principles for fallback language.

August 2018 The World Bank issues a $1bn 2y floating rate note indexed to SOFR; Credit Suisse issues a $100M 6m SOFR indexed CD; Barclays issues $525M in SOFR indexed commercial paper; MetLife issues $1bn 2y note.

September 24th, 2018 ARRC releases proposed USD LIBOR contract language.

Oct 2018 CME begins clearing IRS using SOFR PAI & discounting; ICE launches SOFR futures.

2019

Q1 2019 Cumulative issuance of SOFR-linked debt reaches $65b; over 75% from GSEs.

Q1 2019 Indicative SOFR-based term reference rates under development; dialogue around compounding methods underway.

Mid 2019 Final recommendations on safer contract language for FRNs, business loans, and securitizations.

Late 2019 Results of ISDA consultations on fallbacks to USD-LIBOR**.**

Q2 2019 ARRC launched infrastructure and operating working group

Future

2020

Jan 2020: CME planning to offer SOFR options

H1 2020: FRBNY planning to publish daily SOFR averages and potentially a daily SOFR index

Oct 2020: LCH and CME to shift trillions of dollars of IRDs to SOFR for PAI and PV discounting

H2 2020: ICE Bank Yield Index (BYI) for use by market participants expected to launch, a banking credit-sensitive indicative rate

2021

Q3 2021 CCPs to end clearing contracts tied to EFFR for PAI and discounting.

EOY 2021 ARRC's target for a derivatives market with sufficient liquidity to generate a SOFR term structure.

EOY 2021 FCA will no longer compel banks to provide LIBOR submissions

As of October 2019

LIBOR phase-out

Issues that arise due to changing reference rates

Liquidity

LIBOR has liquidity for both exchange-traded and OTC transactions while SOFR has little liquidity, especially for OTC.

Value transfer

Adjusted RFRs will not match the relevant IBOR exactly which will likely lead to a value transfer.

Payment structure

LIBOR resets at the beginning of 1 of 7 interest periods, while SOFR is an overnight rate that resets daily.

Fallback provisions

ISDA intends to select fallback triggers, that will be automatically incorporated into new trades.

Term structure

SOFR is forward-looking, and the derivatives market has indicated a preference for backward-looking construction.

Product conventions

ARRC fallback language used for cash products may not apply or could apply differently to consumer products.

LIBOR phase-out

Potential consequences to consider

Potential for higher interest payments	Economic mismatch	Ongoing hedging
Depending on the terms of your credit agreement language, if LIBOR goes away you may revert to a fallback rate above the initially agreed upon rate	If LIBOR is replaced in both the credit agreement and interest rate swap but the updated reference rate does not match, an economic mismatch will exist	As market participants begin adopting the new reference rate, liquidity will take time to develop. Additionally, understanding a new index creates an administrative burden for all parties involved

LIBOR phase-out

Transition preparation for corporate clients

Inventory → **Assess** → **Evaluate** → **Understand**

Inventory
Inventory current LIBOR exposure under existing loans and derivatives with a focus on those maturing after 2021

Assess
Assess fallback language and understand what rate the debt would fallback to currently

Evaluate
Evaluate models and system impacts to learn what adjustments may be required based on a switch to SOFR

Understand
Understand the anticipated financing schedule for both refinancing existing debt and adding new debt

Chatham
FINANCIAL

Access advantage