Central banks

Central bank digital currency monitor: Money of the 21st century?

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Maxime Botteron
Economist - Swiss Macro & Strategy

Claude Maurer
Head of Swiss Macro Analysis & Strategy

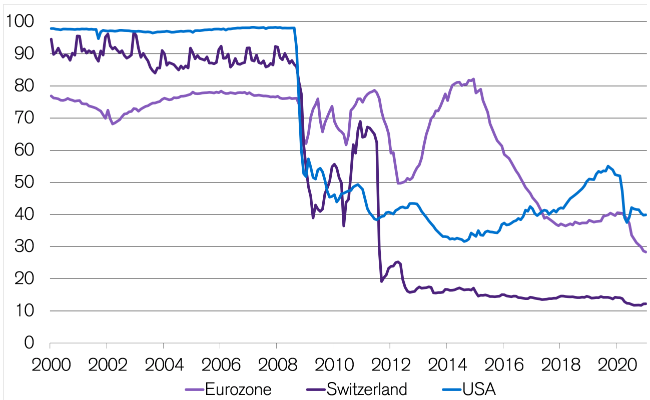
- There is a vast choice of options available to central banks, when considering the design of a central bank digital currency (CBDC). So far, the large central banks in developed markets have focused on establishing key features of potential CBDCs, and some have run proof of concepts.

- But the leader in the money digitalization race is the small Central Bank of The Bahamas, which has already launched its Sand Dollar – the name given to its CBDC.

What is a central bank digital currency?

A central bank digital currency (CBDC) is a digital form of money issued by a central bank. Traditionally, central banks have issued money in two forms: a physical currency in the form of banknotes; and electronic deposit currency in the form of deposits or reserves held at the central bank. The latter, which is accessible only to a limited circle of users (mainly commercial banks), is in fact a form of CBDC. In recent years, central banks have, however, studied new forms of CBDC in conjunction with distributed ledger technology (DLT) and initiated numerous CBDC projects across the globe. In that context, the Bank for International Settlements (BIS) has proposed to define CBDCs as "a digital form of central bank money that is different from balances in traditional reserve or settlement accounts." But this rather broad definition is not entirely satisfactory, as some central banks are working on technological upgrades of the existing traditional reserve or settlement accounts. In this report, we will focus on the enhancements of existing digital central bank money, and on new forms of CBDC that central banks have worked on over the past few years but are not yet widely used.

Figure 1: Central bank issued money is already predominantly digital
Share of banknotes in % of total money issued by the central bank



Source: Refinitiv Datastream, Credit Suisse. Last data point: February 2021.

Why are central banks considering the introduction of new forms of CBDCs?

Central banks' interest in CBDCs is part of a process of reflection on how to adapt the financial system, and in particular the payment system, to the digitalization of society. It is also a response to the emergence of so-called cryptocurrencies and, in particular, the concept of "stablecoins." In this context, the objectives pursued by central banks vary from one bank to another and therefore influence the form that a CBDC will (or could) take:

- Some central banks are studying the efficiency gains that new technologies (such as DLT on which blockchain is based) could bring to the financial system.
- Others, particularly in emerging economies, are interested in the possibilities offered by digitalization to promote financial inclusion (e.g., the extension of financial services, particularly payments, to remote populations where physical banking services are not available).
- Others are exploring digital alternatives to banknotes, as digitalization and mobile payment solutions have reduced their use as a means of payment.
- Central banks are also taking into account the impact that CBDC issuance could have on the conduct of monetary policy, and some are considering CBDCs as a way to expand their monetary policy tool kit.
- Finally, there is no doubt that the emergence of private cryptocurrencies and the interest they have generated has accelerated central banks' thinking about CBDCs. Although there is no unanimity on the subject, cryptocurrencies can be seen as a competitor to traditional banknotes or more broadly as an alternative means of payment over which central banks have little to no control. In issuing a digital currency that would be accessible to a wide circle of users, central banks could ensure they stay in the race of payment digitalization.

The Bahamas – The Sand Dollar
In the Bahamas, the nationwide launch of the CBDC – also called the Sand Dollar – took place on 20 October 2020. The Central Bank of The Bahamas issues the Sand Dollar through authorized financial intermediaries and it serves primarily as a replacement for cash. Given the unique geographic characteristics of the Bahamas – a country that comprises more than 700 islands – financial inclusion and cost-effectiveness are among the key rationales for the issuance of a CBDC. The latter should provide greater access to financial services across all the islands, facilitating the handling of the "know-your-customer" principles for local banks. Enhanced efficiency of the payment system and reduction of fraud or illegal activities are other important objectives that the Central Bank of The Bahamas aims to achieve. (29/03/2021)

Design

Maxime Botteron
Economist - Swiss Macro & Strategy

Claude Maurer
Head of Swiss Macro Analysis & Strategy

Do we already know what form CBDCs will take?
At this stage, it is important to note that central banks have been studying many forms of CBDCs, and the future will tell whether certain features will become the norm and whether CBDCs will become homogenous or whether they will remain tailor-made currencies that meet the specific needs of each central bank and domestic financial system. That said, when designing a new CBDC, a central bank needs to make two fundamental decisions, in our view. The first is whether to make the CBDC accessible to a limited circle of users only or whether to make it widely available. The second decision is related to how a transaction settled with a CBDC is recorded. Here the central bank can decide whether transactions are account-based or value-based (see below).

Who will have access to CBDCs?
The accessibility of CBDCs is a key design feature. So-called wholesale CBDCs include CBDCs whose accessibility is restricted to a group of users, mainly financial institutions. This form of CBDC is similar in concept to the reserves held by commercial banks at their central bank, but unlike reserves, it might not be restricted to commercial banks only and instead include additional intermediaries. The new forms of wholesale CBDCs will therefore need to distinguish themselves by technological features that would allow for efficiency gains, for example by speeding up the settlement of financial transactions. Retail CBDCs on the other hand would be broadly accessible. Essentially, they would be a form of digital banknote or, possibly, a bank account with the central bank that would be accessible to a wide circle of users, including households and non-financial corporates.

How will a transaction settled with a CBDC be recorded?
There are two ways a transaction settled with a CBDC can be recorded. The first is a so-called account-based currency. An example of this form of money is the digital money issued by commercial banks. When a payment is made, an amount is debited to the payer's account and credited to the payee's account. This form of transaction requires some form of identification (identity of the account holder, even if not the actual name or an account number). The second concept of money is called value-based (token). A financial transaction takes place when a token of value is exchanged. Banknotes are an example of a token-based currency. The choice of the type of CBDC will depend on the objective pursued by the central bank as well as on the technology chosen. For example, a simple form of an account-based retail CBDC would be to extend the possibility of opening a current account with the central bank to non-financial companies and households. Token-based retail CBDC issuance is technologically more complex, but also possible. The Swiss National Bank (SNB) has recently published a study that investigated the issuance of such a CBDC and demonstrated its feasibility.

What would differentiate a CBDC from a Bitcoin (or any other cryptocurrency)?
We would first argue that CBDCs are a form of money, while cryptocurrencies are, so far, not. To qualify as money, a CBDC should fulfill the three traditional functions of money: store of value, medium of exchange and unit of account. If central banks continue to adhere to their price stability mandate, the CBDCs issued by them should fulfill the first criterion and make for a good store of value. In addition, due to their privileged legal status, CBDCs should be widely accepted as a medium of exchange. Their acceptance could even be binding (legal tender). Lastly, as long as there is a fixed exchange rate between all forms of central bank issued currencies (e.g., a digital euro would be worth a fixed amount of physical euro, ideally an exchange rate of 1:1), a CBDC will also be a unit of account.

Privately-issued cryptocurrencies, on the other hand, hardly qualify as money. First, owing to substantial price volatility, some are very unreliable stores of value. The more stable ones, known as stablecoins, need the backing of financial assets whose value fluctuates only slightly, such as short-term government bonds or central bank reserves. Hence, it is not the privately-issued cryptocurrency itself that is a good store of value, but the financial assets that back it. Second, the acceptance of privately-issued cryptocurrencies as a means of payment depends solely on the will of the users. The issuers will therefore need to create a need for the users to be willing to accept privately-issued cryptocurrencies as a means of payment. Third, it seems unlikely at this stage, especially given that the first two conditions are barely met, to see privately-issued cryptocurrencies emerging as a unit of account, at least in currency areas where the central bank has a tradition of preserving the purchasing power of its currency.

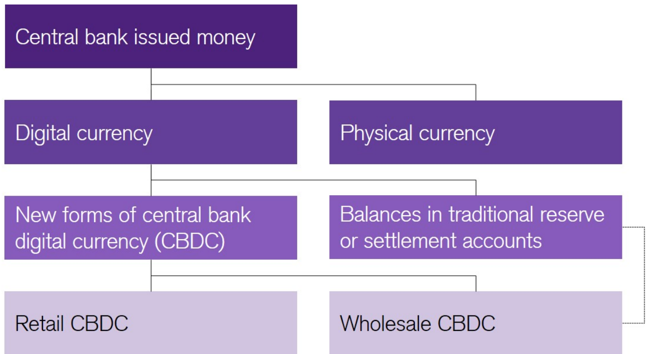
There is some confusion related to the technology on which a central bank could build its CBDC. While the so-called DLT is often regarded as the only option, central banks are actually free to choose the most appropriate technology for their CBDC. Some similarities with the technologies used by privately-issued cryptocurrencies are possible, but other options exist. The SNB for example has proposed to issue a token-based, software-only CBDC without DLT using a verification process known as "blind signature."

Finally, credit and fraud risks are greater with privately-issued cryptocurrencies than with a CBDC. In an economy, the central bank has the lowest credit risk of all agents. Hence, a CBDC carries barely any credit risk. This is obviously not the case for privately-issued cryptocurrencies, even those backed by safe assets, though the latter are safer. Furthermore, central banks obviously have no incentive to issue fraudulent currencies, a risk that cannot be excluded with privately-issued cryptocurrencies

Canada – Project Jasper

In 2016, the Bank of Canada along with Payments Canada and a consortium of commercial banks started to explore the consequences that an adaption of a DLT could have on its wholesale payment system in a proof of concept code-named Project Jasper. The aim of the experiment was to assess whether a DLT could provide an overall benefit relative to the existing payment system in Canada. In a distributed ledger, different parties share a database. Changes to the database can occur if the parties reach consensus on the execution of a transaction. Through this consensus mechanism, all authorized parties within the distributed ledger share the same version of the database without the need for general administration of it. Accordingly, DLT could provide process and cost efficiencies in payment settlements, increase data reliability and traceability, and limit the risk of a collapse or disruption of the payment system. Notwithstanding these benefits, DLT does not seem to provide an overall benefit when compared to current centralized systems for wholesale payments, as shown by Project Jasper. This is mainly due to the fact that interbank payment systems already work quite efficiently. However, benefits could arise in the context of a broader DLT adaption in the financial system, where a DLT-based wholesale payment system was integrated into a DLT-based ecosystem of financial market infrastructures.

Figure 2: Simple diagram of central bank issued money



Source: Credit Suisse

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Opportunities

Maxime Botteron
Economist - Swiss Macro & Strategy

Claude Maurer
Head of Swiss Macro Analysis & Strategy

Will CBDCs replace banknotes?
One of the recurring arguments of central banks interested in CBDCs is the resilience of the payments system in an environment where the use of banknotes for payments has declined or has become less convenient. This is particularly relevant in economies where the supply of banknotes may be complicated for geographical reasons or because of poor infrastructure, but also in developed economies, including Sweden, where banknotes in circulation have decreased significantly in recent years due to the increased use of digital payment solutions. In such an environment, the question arises as to what option economic actors will have to make payments in the event of a major breakdown of the electronic payment system, if banknotes are no longer an alternative. With a retail CBDC, households and non-financial companies could have access to central bank money as an alternative. However, such a retail CBDC would need to be resilient to a breakdown of the payments system, and possibly available offline.

If central banks are successful in issuing convenient CBDCs, CBDCs could, in principle, replace physical currencies. However, such a replacement would likely be a long process, and it does not seem to us that central banks – especially in developed markets – are anywhere close to removing banknotes from the system.

Sweden – E-Krona
According to McKinsey, payments in cash in Sweden accounted for only 9% in 2020, down from 56% in 2010. The steady decline of cash as a means of payment in recent years has prompted the Riksbank to research the issuance of a CBDC. For the so called e-krona project, several technologies and approaches are currently being investigated. At this stage, no decision has been taken on whether a Swedish CBDC will be available as a complement to cash in the future. However, as the mandate of the central bank in Sweden includes the promotion of a safe and efficient payment system, the Riksbank is concerned with the effects that a collapse or disruption of the payments system could have in a country where cash is rarely used. A CBDC could have the potential to support the Riksbank in providing a safe and efficient payment system.

What innovations could a CBDC enable in terms of monetary policy?
By allowing households and non-financial corporates access to central bank money, CBDCs could improve the transmission of monetary policy to the economy. The European Central Bank (ECB), for example, has floated the idea of imposing an interest rate (either negative or positive) on a retail digital euro. However, as long as interest-rate-free banknotes are available, imposing a strongly negative interest rate would not be possible due to the potential flight to cash. Positive interest rates could be imposed, but the shift from cash to CBDC might then make the control of the monetary base more difficult as well. In that respect, programmable digital currencies offer an interesting option. Programmable digital currencies allow users to program a digital currency for a specific purpose based on the attributes of the digital currency itself. The central bank could issue a CBDC whose use would achieve a monetary policy objective, for example by limiting its use for personal consumption or preventing its use for the purchase of financial assets. It might also be possible to set a time limit on the validity of the CBDC to avoid the risk of hoarding and to stimulate consumption and investment. However, at this stage, these examples remain theoretical and early adopters of CBDCs will most likely not include these features. More generally, the targeting of specific economic responses would in effect amount to a form of general fiscal or specific subsidization policy.

Can a CBDC facilitate cross-border payments?
While domestic payment systems in advanced economies are generally efficient, this does not apply yet to cross-border payments, which face numerous obstacles. Transfers are expensive, inefficient, lack transparency, and depend on different systems in each country, making innovation difficult. An easily transferable digital retail CBDC could help improve international payments between consumers and non-financial companies. However, this would require access to CBDCs outside of central bank jurisdictions. For example, if a German consumer wanted to pay for her Spotify subscription in e-krona (the name proposed by the Risksbank for a Swedish CBDC), she would first need to have access to that CBDC. Conversely, if the German consumer wanted to pay for her subscription with a digital euro issued by the ECB, such a payment would be possible only if Spotify was able to accept digital euros. While certainly feasible in developed economies, setting up these kinds of “digital currency areas” may require expensive investments that could limit their implementation in emerging economies. Instead of retail CBDC, one proposed alternative is to settle cross-border payments using wholesale CBDCs. Commercial banks would exchange wholesale CBDCs to settle their customers’ cross-border transactions. Again, the challenges are significant. In particular, it would be necessary to build systems where commercial banks could access several different CBDCs, either at a single central bank or at several central banks. It would also be necessary to ensure that the operational systems are compatible between the different jurisdictions, which would require common standards and rules. As can be

seen, while CBDCs could be considered to facilitate cross-border payments, it is not yet clear whether they offer the best alternative. (29/03/2021)

Risks

Maxime Botteron
Economist - Swiss Macro & Strategy

Claude Maurer
Head of Swiss Macro Analysis & Strategy

What privacy protection can CBDC users expect?

The issue of privacy protection is particularly relevant for retail CBDCs. It is indeed possible to design a CBDC that no longer allows for the anonymity offered by transactions settled with banknotes. On this issue, the objectives of central banks (and governments) could conflict with those of users. Indeed, a CBDC that allows for the monitoring of financial transactions would give governments an additional instrument to fight against the financing of crime and tax evasion. The question is whether users will be willing to share this data with governments (and central banks) or whether they will prefer private alternatives, knowing that the latter also do not always guarantee anonymity. However, privacy protection is an option and central banks could opt for a solution that guarantees a level of transaction anonymity equivalent to that of banknotes. The Swiss National Bank has demonstrated that the technology to guarantee this anonymity is available. The technology chosen will therefore depend on the choice of central banks and governments. At this stage, it is important to note that both are possible.

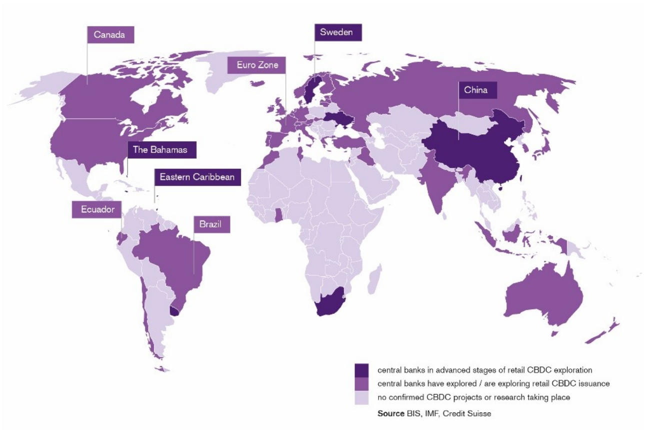
Does a CBDC have the potential to destabilize the financial system?

A recurring concern with retail CBDCs is their potential to destabilize the financial system. This is because most of the money in public hands is held in the form of deposits at commercial banks. As these deposits are not fully backed by reserves at the central bank, bank runs remain a risk. By definition, CBDCs would be much safer than bank deposits, and probably more convenient to use than banknotes. In the event of a crisis, CBDCs could therefore facilitate bank runs and therefore threaten financial stability. But even in normal times, CBDCs will compete with bank deposits, potentially leading to outflows from bank deposits. In issuing (retail) CBDCs, central banks therefore need to ensure that this does not conflict with financial stability. In this regard, Brunnermeier and Niepelt (2019) have shown that it would be sufficient for the central bank to replace the capital outflows recorded by commercial banks to the CBDC with funds granted to the latter. For its part, the ECB proposes to limit the maximum amount that an economic agent could hold in CBDCs or to impose an unattractive interest rate (possibly negative) on the CBDC to deter households and non-financial corporates from holding too much of it.

China – Chinese CBDC

The People's Bank of China (PBoC) seems relatively advanced in the development of a CBDC with pilot projects initiated in several cities. The distribution of China's CBDC is expected to show a two-tier structure, meaning that on a first layer the PBoC issues CBDC to commercial banks, which in turn are responsible for distributing it to their private and corporate clients. As such, the Chinese CBDC can be used for retail payments as an equivalent to cash and forms part of the M0 money supply. Reasons for its development include the efficiency gains regarding interbank clearing and cross-border payments. Furthermore, CBDC has the potential to lower the operating costs of paper currency and coins to the central bank and to foster anti-money laundering policies and discourage illegal activities. In media reports, a potential official presentation of the Chinese CBDC is often put into context with the 2022 Olympic Winter Games in Beijing. A general launch could follow as early as 2023.

Figure 3: Retail CBDC: Which countries are leading?



Source: BIS, IMF, Credit Suisse

The authors would like to thank Tiziana Hunziker, economist in the Swiss Economics and Strategy team at Credit Suisse, for her support in this report. (30/03/2021)

Figure 4: Selected examples of retail CBDCs

Country	Canada	Sweden	Eurozone	China	The Bahamas	Brazil	Ecuador	Eastern Caribbean
Status	Contingency plan	Proof-of-concept	Exploring	Pilot phase	CBDC launched	Exploring	Pilot phase	Pilot phase
Access	Account- and token-based	Account- and token-based	Account- and token-based	Account-based	Account- and token-based	Token-based	Account-based	Token-based
Linkages	Retail & wholesale cross-border linkages	Wholesale cross-border linkages	International linkages	Retail & wholesale cross-border linkages	No cross-border linkages	No cross-border linkages	No cross-border linkages	International linkages
Infrastructure	Conventional and DLT	DLT	Conventional and DLT	Conventional and DLT	Conventional and DLT	DLT	Conventional	DLT

Glossary

Risk warnings

Emerging markets	Emerging markets are located in countries that possess one or more of the following characteristics: a certain degree of political instability, relatively unpredictable financial markets and economic growth patterns, a financial market that is still at the development stage or a weak economy. Emerging market investments usually result in higher risks as a result of political, economic, credit, exchange rate, market liquidity, legal, settlement, market, shareholder and creditor risks.
Hedge funds	Regardless of structure, hedge funds are not limited to any particular investment discipline or trading strategy, and seek to profit in all kinds of markets by using leverage, derivative instruments and speculative investment strategies that may increase the risk of investment loss.
Commodity investments	Commodity transactions carry a high degree of risk and may not be suitable for many private investors. The extent of loss due to market movements can be substantial or even result in a total loss.
Real estate	Investors in real estate are exposed to liquidity, foreign currency and other risks, including cyclical risk, rental and local market risk as well as environmental risk, and changes to the legal situation.
Currency risks	Investments in foreign currencies involve the additional risk that the foreign currency might lose value against the investor's reference currency.
Equity risk	Equities are subject to market forces and hence fluctuations in value, which are not entirely predictable.
Market risk	Financial markets rise and fall based on economic conditions, inflationary pressures, world news and business-specific reports. While trends may be detected over time, it can be difficult to predict the direction of the market and individual stocks. This variability puts stock investments at risk of losing value.
High Yield bond risk	High Yield Bonds are typically rated below investment grade or are unrated and as such are often subject to a higher risk of issuer default.
Perpetual Bond risk	Perpetual Bonds have no maturity date and therefore the Interest pay-out depends on the viability of the issuer in the very long term.
Subordinated Bond risk	In case of liquidation of the issuer, investors can only get back the principal after other senior creditors are paid.
Risk of Bonds with variable/ deferral of interest terms	Investors would face uncertainty over the amount and time of the interest payments to be received.
Callable bond risk	Investors face reinvestment risk when the issuer exercises its right to redeem the bond before it matures.
Risk of Bonds with extendable maturity date	Investors would not have a definite schedule of principal repayment.
Convertible or exchangeable bond risk	Investors are subject to both equity and bond investment risk.
Cocos risk	The bond may be written-off fully or partially or converted to common stock on the occurrence of a trigger event.

Explanation of indices frequently used in reports

Index	Comment
Australia S&P/ASX 200	S&P/ASX 200 is an Australian market-capitalization-weighted and float-adjusted stock index calculated by Standard and Poor's.
BC High Yield Corp USD	The US Corporate High Yield Index measures USD-denominated, non-investment grade, fixed-rate and taxable corporate bonds. The index is calculated by Barclays.
BC High Yield Pan EUR	The Euro Corporate Index tracks the fixed-rate, investment-grade, euro-denominated corporate bond market. The index includes issues that meet specified maturity, liquidity and quality requirements. The index is calculated by Barclays.
BC IG Corporate EUR	The US Corporate Index tracks the fixed-rate, investment-grade, euro-denominated corporate bond market. The index includes both US and non-US issues that meet specified maturity, liquidity and quality requirements. The index is calculated by Barclays.
BC IG Corporate USD	The IG Corporate Index tracks the fixed-rate, investment-grade, dollar-denominated corporate bond market. The index includes both US and non-US issues that meet specified maturity, liquidity and quality requirements. The index is calculated by Barclays.
Canada S&P/TSX comp	The S&P/TSX composite index is the Canadian equivalent of the S&P 500 Index in the USA. The index contains the largest stocks traded on the Toronto Stock Exchange.
Consumer Confidence Indices	Consumer Confidence Indices (CCIs) are based on surveys of consumers' spending intentions and economic situations, as well as their concerns and expectations for the immediate future.
CS Hedge Fund Index	The Credit Suisse Hedge Fund Index is compiled by Credit Suisse Hedge Index LLC. It is an asset-weighted hedge fund index and includes only funds, as opposed to separate accounts. The index reflects performance net of all hedge fund component performance fees and expenses.
CS LSI ex govt CHF	The Liquid Swiss Index ex govt CHF is a market-capitalized bond index representing the most liquid and tradable portion of the Swiss bond market excluding Swiss government bonds. The index is calculated by Credit Suisse.
DAX	The German Stock Index stock represents 30 of the largest and most liquid German companies that trade on the Frankfurt Exchange.
DXY	A measure of the value of the US dollar relative to the majority of its most important trading partners. The US Dollar Index is similar to other trade-weighted indices, which also use the exchange rates from the same major currencies.
Eurostoxx 50	Eurostoxx 50 is a market-capitalization-weighted stock index of 50 leading blue-chip companies in the Eurozone.
FTSE EPRA/NAREIT Global Real Estate Index Series	The FTSE EPRA/NAREIT Global Real Estate Index Series is designed to represent general trends in eligible real estate equities worldwide.
Hedge Fund Barometer	The Hedge Fund Barometer is a proprietary Credit Suisse scoring tool that measures market conditions for hedge fund strategies. It comprises four components: liquidity, volatility; systemic risks and business cycle.
Japan Topix	TOPIX, also known as the Tokyo Stock Price Index, tracks all large Japanese companies listed in the stock exchange's "first section." The index calculation excludes temporary issues and preferred stocks.
JPM EM hard curr. USD	The Emerging Market Bond Index Plus tracks the total return of hard-currency sovereign bonds across the most liquid emerging markets. The index encompasses US-denominated Brady bonds (dollar-denominated bonds issued by Latin American countries), loans and Eurobonds.
JPM EM local curr. hedg. USD	The JPMorgan Government Bond Index tracks local currency bonds issued by emerging market governments across the most accessible markets for international investors.

MSCI AC Asia/Pacific	The MSCI All Country Asia Pacific Index captures large and mid cap representation across 5 developed market countries and 8 emerging markets countries in the Asia Pacific region. With 1,000 constituents, the index covers approximately 85% of the free float-adjusted market capitalization in each country.
MSCI AC World	The MSCI All Country World Index captures large and mid cap representation across 23 developed markets and 23 emerging market countries. With roughly 2480 constituents, the index covers around 85% of the global investable equity opportunity set.
MSCI Emerging Markets	MSCI Emerging Markets is a free-float-weighted Index designed to measure equity market performance in global emerging markets. The index is developed and calculated by Morgan Stanley Capital International.
MSCI EMU	The MSCI EMU Index (European Economic and Monetary Union) captures large and mid cap representation across the 10 Developed Markets countries in the EMU. With 237 constituents, the index covers approximately 85% of the free float-adjusted market capitalization of the EMU.
MSCI Europe	The MSCI Europe Index captures large and mid cap representation across 15 developed markets countries in Europe. With 442 constituents, the index covers approximately 85% of the free float-adjusted market capitalization across the European developed markets equity universe.
MSCI UK	The MSCI United Kingdom Index is designed to measure the performance of the large and mid cap segments of the UK market. With 111 constituents, the index covers approximately 85% of the free float-adjusted market capitalization in the UK.
MSCI World	MSCI World is an index of global equity markets developed and calculated by Morgan Stanley Capital International. Calculations are based on closing prices with dividends reinvested.
OECD Composite Leading Indicators	OECD Composite Leading Indicators (CLIs) are designed to provide early signals of turning points in business cycles with components that measure early stages of production, respond to changes in economic activity, and are sensitive to expectations of future activity.
Purchasing Managers' Indices	Purchasing Managers' Indices (PMIs) are economic indicators derived from monthly surveys of private-sector companies. The two principal producers of PMIs are Markit Group, which conducts PMIs for over 30 countries worldwide, and the Institute for Supply Management (ISM), which conducts PMIs for the United States. The indices include additional sub-indices for manufacturing surveys such as new orders, employment, exports, stocks of raw materials and finished goods, prices of inputs and finished goods, and services.
Russell 1000 Growth Index	The Russell 1000 Growth Index measures the performance of the large-cap growth segment of the US equity universe based on 1000 large-cap companies with higher price-to-book ratios and higher forecast growth values.
Russell 1000 Index	The Russell 1000 Index is a stock market index that represents the highest-ranking 1,000 stocks in the Russell 3000 Index (encompassing the 3,000 largest US-traded stocks, with the underlying companies all incorporated in the USA), and representing about 90% of the total market capitalization of that index. The Russell 1000 Index has a weighted average market capitalization of USD 81 billion and the median market capitalization is approximately USD 4.6 billion.
Russell 1000 Value Index	The Russell 1000 Value Index measures the performance of the large-cap value segment of the US equity universe based on 1000 large-cap companies with lower price-to-book ratios and lower expected growth values.
Switzerland SMI	The Swiss Market Index is made up of 20 of the largest companies listed of the Swiss Performance Index universe. It represents 85% of the free-float capitalization of the Swiss equity market. As a price index, the SMI is not adjusted for dividends.
UK FTSE 100	FTSE 100 is a market-capitalization-weighted stock index that represents 100 of the most highly capitalized companies traded on the London Stock exchange. The equities have an investibility weighting in the index calculation.
US S&P 500	Standard and Poor's 500 is a capitalization-weighted stock index representing all major industries in the USA, which measures the performance of the domestic economy through changes in the aggregate market value.

Abbreviations frequently used in reports

Abb.	Description	Abb.	Description
3/6/12 MMA	3/6/12 month moving average	IMF	International Monetary Fund
AI	Alternative investments	LatAm	Latin America
APAC	Asia Pacific	Libor	London interbank offered rate
bbl	barrel	m b/d	Million barrels per day
BI	Bank Indonesia	M1	A measure of the money supply that includes all physical money, such as coins and currency, as well as demand deposits, checking accounts and negotiable order of withdrawal accounts.
BoC	Bank of Canada	M2	A measure of money supply that includes cash and checking deposits (M1) as well as savings deposits, money market mutual funds and other time deposits.
BoE	Bank of England	M3	A measure of money supply that includes M2 as well as large time deposits, institutional money market funds, short-term repurchase agreements and other larger liquid assets.
BoJ	Bank of Japan	M&A	Mergers and acquisitions
bp	Basis points	MAS	Monetary Authority of Singapore
BRIC	Brazil, Russia, China, India	MLP	Master Limited Partnership
CAGR	Compound annual growth rate	MoM	Month-on-month
CBOE	Chicago Board Options Exchange	MPC	Monetary Policy Committee
CFO	Cash from operations	OAS	Option-adjusted spread
CFROI	Cash flow return on investment	OECD	Organisation for Economic Co-operation and Development
DCF	Discounted cash flow	OIS	Overnight indexed swap
DM	Developed Market	OPEC	Organization of Petroleum Exporting Countries
DMs	Developed Markets	P/B	Price-to-book value
EBITDA	Earnings before interest, taxes, depreciation and amortization	P/E	Price-earnings ratio
ECB	European Central Bank	PBoC	People's Bank of China
EEMEA	Eastern Europe, Middle East and Africa	PEG	P/E ratio divided by growth in EPS
EM	Emerging Market	PMI	Purchasing Managers' Index
EMEA	Europe, Middle East and Africa	PPP	Purchasing power parity

EMs	Emerging Markets	QE	Quantitative easing
EMU	European Monetary Union	QoQ	Quarter-on-quarter
EPS	Earnings per share	r.h.s.	right-hand side (for charts)
ETF	Exchange traded funds	RBA	Reserve Bank of Australia
EV	Enterprise value	RBI	Reserve Bank of India
FCF	Free cash flow	RBNZ	Reserve Bank of New Zealand
Fed	US Federal Reserve	REIT	Real estate investment trust
FFO	Funds from operations	ROE	Return on equity
FOMC	Federal Open Market Committee	ROIC	Return on invested capital
FX	Foreign exchange	RRR	Reserve requirement ratio
G10	Group of Ten	SAA	Strategic asset allocation
G3	Group of Three	SDR	Special drawing rights
GDP	Gross domestic product	SNB	Swiss National Bank
GPIF	Government Pension Investment Fund	TAA	Tactical asset allocation
HC	Hard currency	TWI	Trade-Weighted Index
HY	High yield	VIX	Volatility Index
IBD	Interest-bearing debt	WTI	West Texas Intermediate
IC	Credit Suisse Investment Committee	YoY	Year-on-year
IG	Investment grade	YTD	Year-to-date
ILB	Inflation-linked bond	Personal Consumption Expenditure (PCE deflator)	An indicator of the average increase in prices for all domestic personal consumption.

Currency codes frequently used in reports

Code	Currency	Code	Currency
ARS	Argentine peso	KRW	South Korean won
AUD	Australian dollar	MXN	Mexican peso
BRL	Brazilian real	MYR	Malaysian ringgit
CAD	Canadian dollar	NOK	Norwegian krone
CHF	Swiss franc	NZD	New Zealand dollar
CLP	Chilean peso	PEN	Peruvian nuevo sol
CNY	Chinese yuan	PHP	Philippine peso
COP	Colombian peso	PLN	Polish złoty
CZK	Czech koruna	RUB	Russian ruble
EUR	Euro	SEK	Swedish krona/kronor
GBP	Pound sterling	SGD	Singapore dollar
HKD	Hong Kong dollar	THB	Thai baht
HUF	Hungarian forint	TRY	Turkish lira
IDR	Indonesian rupiah	TWD	New Taiwan dollar
ILS	Israeli new shekel	USD	United States dollar
INR	Indian rupee	ZAR	South African rand
JPY	Japanese yen		

Important information on derivatives

Pricing	Option premiums and prices mentioned are indicative only. Option premiums and prices can be subject to very rapid changes: The prices and premiums mentioned are as of the time indicated in the text and might have changed substantially in the meantime.
Risks	Derivatives are complex instruments and are intended for sale only to investors who are capable of understanding and assuming all the risks involved. Investors must be aware that adding option positions to an existing portfolio may change the characteristics and behavior of that portfolio substantially. A portfolio's sensitivity to certain market moves can be heavily impacted by the leverage effect of options.
Buying calls	Investors who buy call options risk the loss of the entire premium paid if the underlying security trades below the strike price at expiration.
Buying puts	Investors who buy put options risk loss of the entire premium paid if the underlying security finishes above the strike price at expiration.
Selling calls	Investors who sell calls commit themselves to sell the underlying for the strike price, even if the market price of the underlying is substantially higher. Investors who sell covered calls (own the underlying security and sell a call) risk limiting their upside to the strike price plus the upfront premium received and may have their security called away if the security price exceeds the strike price of the short call. Additionally, the investor has full downside participation that is only partially offset by the premium received upfront. If investors are forced to sell the underlying they might be subject to taxing. Investors shorting naked calls (i.e. selling calls but without holding the underlying security) risk unlimited losses of security price less strike price.
Selling puts	Put sellers commit to buying the underlying security at the strike price in the event the security falls below the strike price. The maximum loss is the full strike price less the premium received for selling the put.
Buying call spreads	Investors who buy call spreads (buy a call and sell a call with a higher strike) risk the loss of the entire premium paid if the underlying trades below the lower strike price at expiration. The maximum gain from buying call spreads is the difference between the strike prices, less the upfront premium paid.

Selling naked call spreads	Selling naked call spreads (sell a call and buy a farther out-of-the-money call with no underlying security position): Investors risk a maximum loss of the difference between the long call strike and the short call strike, less the upfront premium taken in, if the underlying security finishes above the long call strike at expiration. The maximum gain is the upfront premium taken in, if the security finishes below the short call strike at expiration.
Buying put spreads	Investors who buy put spreads (buy a put and sell a put with a lower strike price) also have a maximum loss of the upfront premium paid. The maximum gain from buying put spreads is the difference between the strike prices, less the upfront premium paid.
Buying strangles	Buying strangles (buy put and buy call): The maximum loss is the entire premium paid for both options, if the underlying trades between the put strike and the call strike at expiration.
Selling strangles or straddles	Investors who are long a security and short a strangle or straddle risk capping their upside in the security to the strike price of the call that is sold plus the upfront premium received. Additionally, if the security trades below the strike price of the short put, investors risk losing the difference between the strike price and the security price (less the value of the premium received) on the short put and will also experience losses in the security position if they owns shares. The maximum potential loss is the full value of the strike price (less the value of the premium received) plus losses on the long security position. Investors who are short naked strangles or straddles have unlimited potential loss since, if the security trades above the call strike price, investors risk losing the difference between the strike price and the security price (less the value of the premium received) on the short call. In addition, they are obligated to buy the security at the put strike price (less upfront premium received) if the security finishes below the put strike price at expiration.

Risk warning
Every investment involves risk, especially with regard to fluctuations in value and return. If an investment is denominated in a currency other than your base currency, changes in the rate of exchange may have an adverse effect on value, price or income.

For a discussion of the risks of investing in the securities mentioned in this report, please refer to the following Internet link:

https://investment.credit-suisse.com/gr/riskdisclosure/

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Past performance is not an indicator of future performance. Performance can be affected by commissions, fees or other charges as well as exchange rate fluctuations.

Financial market risks
Historical returns and financial market scenarios are no reliable indicators of future performance. The price and value of investments mentioned and any income that might accrue could fall or rise or fluctuate. You should consult with such advisor(s) as you consider necessary to assist you in making these determinations.

Investments may have no public market or only a restricted secondary market. Where a secondary market exists, it is not possible to predict the price at which investments will trade in the market or whether such market will be liquid or illiquid.

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Hedge funds are not subject to the numerous investor protection regulations that apply to regulated authorized collective investments and hedge fund managers are largely unregulated. Hedge funds are not limited to any particular investment discipline or trading strategy, and seek to profit in all kinds of markets by using leverage, derivatives, and complex speculative investment strategies that may increase the risk of investment loss.

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Investors in real estate are exposed to liquidity, foreign currency and other risks, including cyclical risk, rental and local market risk as well as environmental risk, and changes to the legal situation.

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Nannette Hechler-Fayd'herbe
Head of Global Economics & Research
+41 44 333 17 06
nannette.hechler-fayd'herbe@credit-suisse.com

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Authors

Maxime Botteron
Economist - Swiss Macro & Strategy
+41 44 332 90 61
maxime.botteron@credit-suisse.com

Claude Maurer
Head of Swiss Macro Analysis & Strategy
+41 44 333 41 90
claude.maurer@credit-suisse.com