Central banks

Central Bank Digital Currency Monitor: China's CBDC introduction

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China's PBoC is the first central bank in the major economies to develop an official digital currency, formally known as DCEP and informally referred to as the E-CNY. The DCEP project has already been rolled out and is currently being tested in five large Chinese cities. The plan is to use DCEP for the 2022 Winter Olympic Games in Beijing.

In this report, we lay out policy implications that we have identified so far: DCEP is neither necessary nor sufficient for RMB internationalization; domestic adoption of DCEP will likely depend more on mobile coverage (5G and other new infrastructure) than bank service coverage; and DCEP can increase tax efficiency in China and may even pave the way for a value-added tax reduction.

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With the "CBDC Monitor," Credit Suisse aims to share its understanding of the implications for both policy and the financial system that innovations with regard to central bank digital currencies (CBDCs) will have. In a series of "CBDC Monitors," we address different aspects of CBDCs and focus on current central bank projects. In this second issue, we take a closer look at the People' Bank of China's (PBoC) efforts to introduce a CBDC.

Among major economies, China has been a first mover in introducing and piloting an official digital currency, formally known as DCEP (digital currency and electronic payment) and informally referred to as the E-CNY. It will likely supplement physical currency in the near to medium term, but might one day also replace electronic bank money.

There are several motivations behind the launch of DCEP by the Chinese authorities. The first one is to safeguard monetary policy sovereignty in light of the emergence of private cryptocurrencies and mobile payment solutions with e-wallets. While the former are officially banned in China, the use of the latter has increased substantially in recent years. Second, it is supposed to promote financial inclusion. The third and major goal is to increase the efficiency of the payment system and to improve transaction supervision. DCEP is therefore primarily being designed as a means of payment.

China's DCEP project has already been rolled out and is currently being tested in five large Chinese cities. There are also plans to use it next February at the 2022 Winter Olympic

Games in Beijing, possibly combined with incentive discounts for DCEP users. Whether it will also be accessible to international users is still unclear.

Design

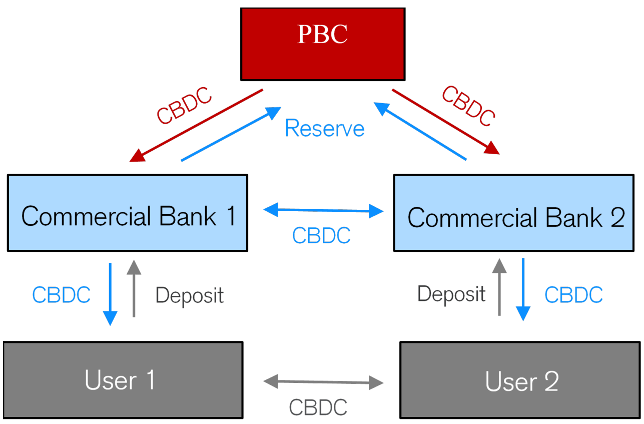
Based on our current understanding, China's digital currency DCEP will function on a centralized ledger operated by the PBoC and is thus not a blockchain cryptocurrency based on decentralized distributed ledger technology (DLT).

DCEP will be in the form of a retail CBDC, i.e. "digital cash" (M0) for general use by households and businesses. However, it will be intermediated by financial institutions in a two-tier operating system. The PBoC will issue DCEP to commercial banks and require 100% reserves against it. When end users (individuals, businesses, etc.) would like to use the digital currency, they first will have to open a digital currency wallet with a commercial bank or qualified payment provider. That provider will relay the request to the PBoC; once the PBoC verifies the request, the DCEP wallet will be created and the user can exchange cash or bank deposits for digital currency (Figure 1).

In theory, there are two forms of a retail CBDC: "token-based" and "account-based." The token-based form requires only a "digital wallet" app containing the currency. The account-based form requires access to an account, implying some form of identity verification sharing. In practice, many CBDC design ideas have both features, i.e. to store the CBDC, access to a uniquely identifiable digital wallet is necessary.

In China's case, it remains unclear at this point what the process will be for opening up such a digital currency wallet compared to opening a traditional bank account, especially if the end user does not already have a traditional bank account. Whether commercial banks or qualified payment providers require e-wallet applicants to have a traditional bank account as a mandatory prerequisite is also uncertain at the current stage.

Figure 1: Flow of funds in China with Central Bank Digital Currency



Source: Yao (2018), International Monetary Fund (IMF)

From a technological perspective, DCEP can also operate in offline conditions once the user has installed the e-wallet on their phone. Specifically, payments could be possible without mobile internet access by using near-field communication technology, a feature that is independent of network connectivity. This would replicate cash in its function as a way of transacting in an offline environment. However, whether near-field communication technology for offline capabilities will be utilized is subject to debate.

Risks

Financial stability considerations have been a motivation behind the launch of DCEP. In China, private mobile payment providers have gained systemic relevance due to their widespread use. To ensure the uninterrupted functioning of the mobile payment system, the PBoC has deemed it necessary to provide a central bank-controlled mobile payment alternative.

For the banking sector, the financial stability implications of DCEP are less of a concern, since its intended purpose is primarily its use as a means of payment. DCEP will not be remunerated and therefore be less attractive as a store of value than interest-bearing bank deposits. Consequently, DCEP will be no competition to bank deposits under normal market conditions, i.e. as long as interest rates are positive and there are no concerns that financial instability could trigger a "run" on traditional bank deposits. Its introduction should therefore not create any large-scale deposit outflows from the traditional financial system.

With respect to privacy protection, DCEP is intended to grant "manageable anonymity" from the user's perspective. All transactions will be recorded, but only the PBoC will have access to the data, whereas private financial institutions will not. This setup offers more privacy to users than traditional private sector payment solutions. At the same time, the PBoC has declared that it would use big data analysis to monitor and prosecute anti-money laundering, terrorist financing, and tax evasion. In practice, standard transactions are likely to be anonymous, while artificial intelligence will be applied to try to identify criminal transactions that authorities can then freeze and sanction.

A similar logic applies to capital flow transparency and the enforcement of capital controls, but the approach is likely to have limitations there. Better tracking of transactions does not change the difficulty of determining whether a particular transaction is a current account transaction (which should be approved) or a capital account transaction (which should be denied). Better tracking only allows shutting down certain channels once it is determined that these channels are facilitating illegal capital flows. Nevertheless, DCEP might play a role in the further development of capital mobility in China, which we discuss in the subsequent section.

Implications

In light of the information released so far about DCEP, we highlight one international and two more domestic-oriented key policy implications.

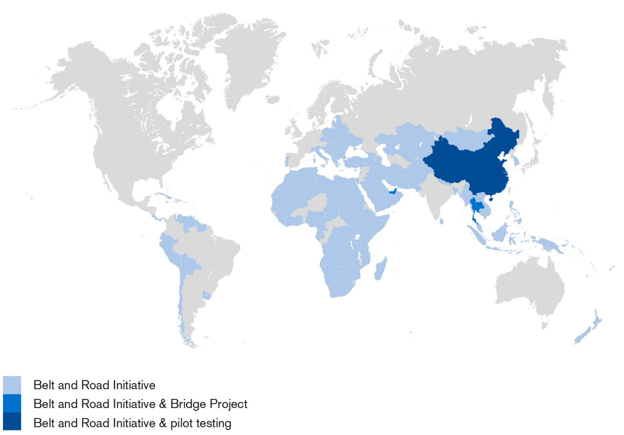
Implication 1: DCEP is neither necessary nor sufficient for RMB internationalization

Enhancing the international role of the renminbi is undoubtedly a strategic medium-term goal of China. Some have argued that DCEP can facilitate this process and advance RMB internationalization.

Indeed, an overseas rollout of DCEP can in theory widen the renminbi's reach and promote its use in cross-border settlements. DCEP adoption would be particularly attractive in the context of the Belt and Road Initiative (BRI, Figure 2). Possible users could include trading partners, Chinese workers abroad, and the unbanked population in BRI countries. The creation of an alternative international payments system would also reduce the reliance on SWIFT (Society for Worldwide Interbank Financial Telecommunication) and the USD in general.

The PBoC appears to be looking into the cross-border use of its digital currency. In conjunction with the Bank for International Settlements (BIS), Hong Kong Monetary Authority (HKMA), Bank of Thailand and Central Bank of the United Arab Emirates, it is exploring potential CBDC cross-border payments through the use of DLT in the joint research project "mCBDC Bridge." Furthermore, the HKMA has announced a pilot testing of DCEP in Hong Kong. Overall, these developments underscore how one component of China's CBDC efforts is the strategic goal of internationalizing the country's currency.

Figure 2: Potential cross-border reach of DCEP



Source: BIS, Nedopil (2021), Credit Suisse

However, we are skeptical that DCEP introduction will by itself significantly advance the international reach of the renminbi.

First, a necessary condition for RMB internationalization would be extensive capital account liberalization. While China has been moving on this front, it is likely to continue to do so only at a gradual and controlled pace. Unfortunately, the introduction of DCEP is not a necessary condition for full convertibility or full capital account liberalization. In fact, it would afford authorities more targeted control over capital account transactions that would ironically allow existing capital controls to remain in place longer by lowering the potential disruption to current account convertibility.

Second, while possible, there is currently no guarantee that DCEP will face looser capital controls than traditional RMB transactions. Only if DCEP were to face lesser capital-flow restrictions would it facilitate RMB internationalization. For instance, if users (foreign or domestic) were allowed to have DCEP wallets without having a China-based bank account and all DCEP could be freely converted into non-RMB currencies and be moved offshore, then more international users would seek to hold and use DCEP. Yet allowing DCEP to become freely convertible into non-RMB currencies would require a certain level of convertibility restrictions between DCEP and traditional RMB. Such restrictions would in turn hinder the widespread domestic adoption of DCEP and thereby counteract the original goal of introducing it.

Finally, we actually see the causality going the other way around. Instead of DCEP facilitating greater convertibility and, in turn, RMB internationalization, convertibility-induced internationalization would likely enhance DCEP adoption. In particular, in an environment of greater RMB convertibility, DCEP should be very useful in cross-border financial transactions. If the PBoC were to succeed in building cross-border partnerships for CBDC transfers with other central banks, like that envisaged under the mCBDC Bridge project, the resulting efficiency gains in the payment system landscape would certainly increase the attractiveness of RMB internationally. However, we do not anticipate the necessary precondition of full RMB convertibility to be achieved in the foreseeable future and consequently expect DCEP to be limited predominantly to domestic payments during the initial stage.

Implication 2: Domestic DCEP adoption to depend more on mobile coverage than bank service coverage

Financial inclusion in China is already fairly high, as approximately 80% of China's population has at least one account with a financial institution (Figure 3). In contrast, mobile payment penetration in China, although impressive by international standards, is much lower than financial penetration and includes only around 60.9% of the population (Figure 4). Likewise, internet penetration in China is also approximately 70.4%, with a meaningful gap between urban and rural areas (Figure 5).

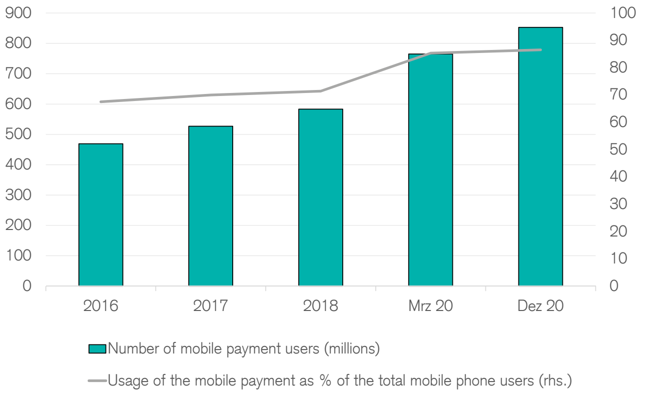
To the extent that DCEP wallet applications are processed by commercial banks and qualified payment providers, bank service coverage is less likely to be a binding constraint to DCEP adoption even if having a traditional bank account is a mandatory requirement. In particular, early adopters will likely be a subset of those already using a mobile payment application that requires internet connectivity. Hence, mobile coverage is more likely to be the binding constraint to DCEP adoption.

Although we do not have the exact cross distribution between those without bank accounts and those without mobile internet capabilities, we suspect that those without banking services might overlap extensively with those without mobile payment capabilities. If this conjecture is true, then DCEP introduction might have a limited impact on expanding banking service penetration in China. Instead, it will more likely increase demand for mobile internet coverage. Consequently, we view the introduction of DCEP as another signal by authorities to prioritize new, digital-oriented infrastructure development and investment as a policy focus.

Figure 3: Bank service coverage

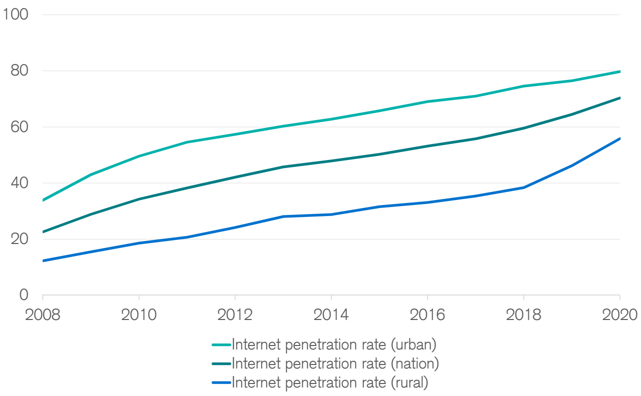
Source: Credit Suisse, World Bank

Figure 4: Mobile payments



Source: Credit Suisse, CNNIC

Figure 5: Internet penetration in China



Source: Credit Suisse, CEIC

Implication 3: DCEP might pave way for VAT reduction and higher tax efficiency

Value-added tax (VAT) is an important component of China's public sector budget, as it makes up approximately one-third of China's fiscal revenue. At the same time, it is not the most efficient taxation scheme. It is a top-line tax relying on revenue as the tax base rather than profitability. Consequently, for any strictly positive VAT rate, there would be businesses that could have been profitable in a profit-based taxation scheme but become unprofitable under the VAT scheme.

The authorities are likely well aware of these economic distortions caused by the current VAT system. However, in an economy where transactions cannot be accurately verified in a timely manner, relying more on a profit-based taxation scheme would be more susceptible to tax evasion than a VAT scheme, as the necessary amount of transaction verification is less under the VAT scheme.

A broad-based adoption of DCEP should lower the cost of tracking and verifying these transactions. This opens up an advantage of CBDCs that has been discussed relatively little so far but can be of interest for other countries with a high reliance on VAT or inefficient tax systems.

First, if authorities are able to better track whether a transaction has occurred, VAT avoidance will be more difficult, which will increase the potential tax base. In China, around 55% of potential VAT revenue is not collected due to poor administration, tax evasion, or fraud, according to the OECD. In this context, DCEP can potentially enable real-time transaction tracking and hence provide tax authorities with a more complete picture of when businesses generate revenue. While this is also true with other forms of electronic payments, and policymakers can and at times do request information of those transactions for law enforcement purposes, a digital currency could enable more direct monitoring of transactions and increase the difficulty of tax avoidance. A potentially wider tax base implies that fiscal authorities should be able to maintain the same fiscal revenue with lower tax rates.

Second, better transaction verification capabilities would also lower the difficulty faced by tax authorities to confirm costs incurred by businesses in addition to revenue generated.

Consequently, profit verification would not be materially more difficult than revenue verification. It is conceivable that the authorities will eventually move away from VAT to a profit-based tax scheme for businesses, thus lowering the magnitude of economic distortion and allowing more businesses to become viable and profitable in tax terms.

Conclusion: DCEP as a blueprint?

Overall, the introduction of DCEP will bring along efficiency gains on several fronts. Better transaction transparency allows for a more efficient tax system, the fight against financial crime will become faster and more targeted, and a public lender of last resort for digital cash will improve financial stability. On top of those benefits, infrastructure investment for better mobile coverage is likely to be a side effect of introducing DCEP. These improvements might equip China with a competitive advantage over other countries, but being a first mover also carries risk. Moreover, China's advanced stage in its CBDC launch is also thanks to private sector innovation and the widespread use of private mobile payment solutions that have put the state on the spot to act and catch up. DCEP's introduction now comes with a massive power shift from private companies to public institutions. From the user's perspective, it also comes at the cost of privacy vis-à-vis the central authorities – a feature that might ultimately curtail DCEP's attractiveness for foreign users. It also raises doubts about whether the Chinese model can serve as a blueprint for CBDCs in other countries. The widespread rollout of DCEP over the coming months will certainly show whether the improvements can outweigh the disadvantages for domestic users. In any case, central banks around the world will be closely watching the experiment. (16/04/2021)

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/

This document may include information on investments that involve special risks. You should seek the advice of your independent financial advisor prior to taking any investment decisions based on this document or for any necessary explanation of its contents. Further information is also available in the information brochure "Risks Involved in Trading Financial Instruments" available from the Swiss Bankers Association.

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.

Emerging markets

Where this document relates to emerging markets, you should be aware that there are uncertainties and risks associated with investments and transactions in various types of investments of, or related or linked to, issuers and obligors incorporated, based or principally engaged in business in emerging markets countries. Investments related to emerging markets countries may be considered speculative, and their prices will be much more volatile than those in the more developed countries of the world. Investments in emerging markets investments should be made only by sophisticated investors or experienced professionals who have independent knowledge of the relevant markets, are able to consider and weigh the various risks presented by such investments, and have the financial resources necessary to bear the substantial risk of loss of investment in such investments. It is your responsibility to manage the risks which arise as a result of investing in emerging markets investments and the allocation of assets in your portfolio. You should seek advice from your own advisers with regard to the various risks and factors to be considered when investing in an emerging markets investment.

Alternative investments

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.

Commodity transactions carry a high degree of risk, including the loss of the entire investment, and may not be suitable for many private investors. The performance of such investments depends on unpredictable factors such as natural catastrophes, climate influences, hauling capacities, political unrest, seasonal fluctuations and strong influences of rolling-forward, particularly in futures and indices.

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.

Private Equity

Private Equity (hereafter "PE") means private equity capital investment in companies that are not traded publicly (i.e. are not listed on a stock exchange), they are complex, usually illiquid and long-lasting. Investments in a PE fund generally involve a significant degree of financial and/or business risk. Investments in private equity funds are not principal-protected nor guaranteed. Investors will be required to meet capital calls of investments over an extended period of time. Failure to do so may traditionally result in the forfeiture of a portion or the entirety of the capital account, forego any future income or gains on investments made prior to such default and among other things, lose any rights to participate in future investments or forced to sell their investments at a very low price, much lower than secondary market valuations. Companies or funds may be highly leveraged and therefore may be more sensitive to adverse business and/or financial developments or economic factors. Such investments may face intense competition, changing business or economic conditions or other developments that may adversely affect their performance.

Interest rate and credit risks

The retention of value of a bond is dependent on the creditworthiness of the Issuer and/or Guarantor (as applicable), which may change over the term of the bond. In the event of default by the Issuer and/or Guarantor of the bond, the bond or any income derived from it is not guaranteed and you may get back none of, or less than, what was originally invested.

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