Transforming commerce

Firms that disrupt markets often determine whether a particular industry grows or contracts, creating and destroying vast wealth in the process.

We appear to be in the early stages of various new multi-year disruptive transformations in industries including robotics and automation and healthcare.

We see opportunities to invest in 'personalized medicine' among other forms of healthcare technology in 2018.

Given the volatility and risks of investing in early stage disruptors, we believe that investment advice, industry research, and professional management can more than repay their cost.

Accelerating transformation

Steven Wieting, Global Chief Investment Strategist

Ongoing disruption across many industries continues to create investment opportunities, but also demands selectivity.

We invest in industry disruptors. Firms that disrupt markets are often the single force that determines whether an industry grows or contracts, creating and destroying vast wealth in the process. What is not widely appreciated is how long it can take before an industry's transformation is completely reflected in asset prices. Incumbents with obsolete or 'second-best' technology do not simply close their doors at first glimpse of a superior solution or better business model. Their loss of market share can easily take a decade or more. This means that the value of the disruptors may be underestimated, potentially creating an opportunity for investors.

We believe that the gradual demise of second-best industry incumbents is one of the main reasons why even average active equity managers have outperformed passive strategies when investing in the information technology sector over time. Passive strategies are required to hold both losers and winners. The victims of innovation seem to be just as identifiable as the victors, creating an opportunity for active managers. Today, we appear to be in the early stages of many new multi-year industry transformations in industries including robotics and automation and medicine. In our view, this could follow a parallel path to e-commerce's 'hostile takeover' of retailing, and social media's recent ascent to dominance in advertising at the expense of print and other traditional advertising.

Over the past year, robotics and automation equities have outperformed the S&P 500 Index by 24.2%. This is not the culmination of some long-recognized trend. Robotics equities only matched the S&P 500's performance over the past five years. If innovation in automation can drive outsized demand for robotics, history would suggest that outperformance can persist for more than a year.[1]

Automation is a companion to e-commerce. It has helped e-commerce retailers achieve massive productivity gains. In the past year, e-commerce retailers distributed twelve times the dollar volume of merchandise to US consumers per employee that department stores did. They achieved this while also cutting consumer prices. This continues to have a dramatic impact on retailing and real estate, as we have regularly warned over recent years.[2] Automation and digital commerce sent US and global department store equities back to 2010 levels during 2017. Nevertheless, we believe many clients remain underinvested in automation because they believe that the trend is mature. In our view, there is much more disruption and profit potential in store.

Few would argue against the notion that medical technology has improved human lives. Spending to augment longevity and service a globally-rising elderly population represents a secular growth outperformer in our view. We see opportunities to invest in 'personalized medicine' among other forms of healthcare technology in 2018 – The transformation of healthcare. Similar transformations may be imminent in the alternative energy industry and in finance, as we will explore on our Outlook homepage.

Investing in individual early-stage disruptors is a volatile, risky business. Of 35 public firms Citi Research now classifies as 'world champions,' nine have suffered share price declines of 80% or more during their existence, including, for example, Apple. With this in mind, we believe investment advice, industry research and professional management can more than repay their cost.

1 Transforming commerce: The robotics revolution, Outlook 2017
2 Victims and victors of transforming commerce, Outlook 2015

The transformation of healthcare

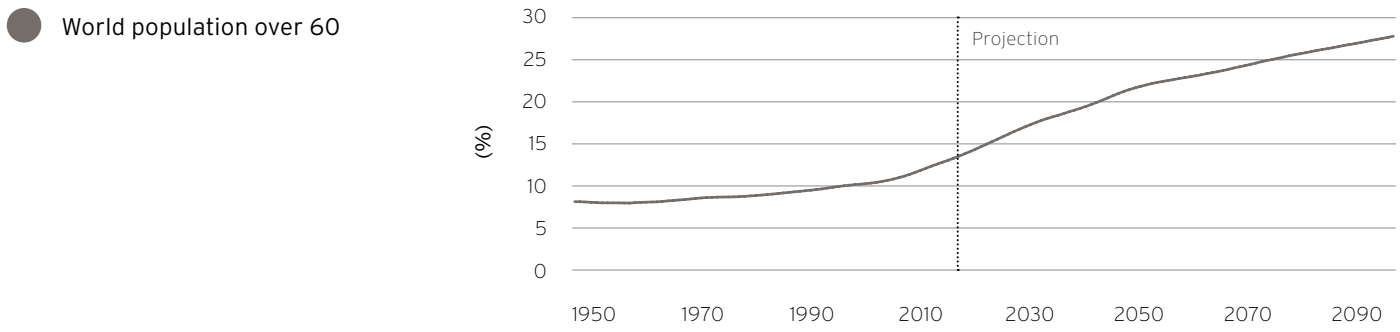
Joseph Cordi, Equity Research Analyst - Citi Investment Management
Diane Wehner, Senior Portfolio Manager, Equities - Citi Investment Management
Rob Jasminski, Head of Global Equities - Citi Investment Management

Disruptive treatments and technology could transform the healthcare industry and create opportunities for investors.

An unprecedented demographic shift is underway across the world. The global population is aging rapidly, and is already older than at any other time in history. This trend is expected to accelerate as life expectancy continues to rise and birth rates remain near historic lows in most developed countries. According to the United Nations, the number of people aged 60 and above is expected to grow from around 12.7% of the global population today to more than 21% by 2050 – **figure 1**.

The global population is aging rapidly, and is already older than at any other time in history.

Figure 1. Rapid aging process



Source: United Nations, via Haver, as of 24 Oct 2017. Covers period from Dec 1950 to Dec 2099. All forecasts are expressions of opinion and are subject to change without notice and are not intended to be a guarantee of future events.

The aging of the world's population is set to have far-reaching effects on economic and business life. Older populations mean significantly higher demand for healthcare treatment, as elderly households account for a greater share of healthcare consumption – **figure 2**. The costs to society of meeting those needs could rise steeply, with healthcare spending accounting for an ever greater proportion of the economy. This could put a large strain on the public finances of already highly indebted nations around the world.

To address this unprecedented shift, a healthcare transformation will be required. New treatments will need to be discovered for previously incurable illnesses and improved treatments for other conditions. Innovative technologies and processes will be necessary to assist with everything from diagnosis to delivery of treatment. Efficiency gains will have to be made across the healthcare industry, thus helping to offset rising cost pressures.

The transformation of healthcare is underway. Medical breakthroughs have opened up the possibility of moving from 'one-size-fits-all' treatment of illnesses towards personalized solutions. New technologies are helping to identify potential health problems more effectively and at an earlier stage. The cost of supplying some of today's most expensive drugs could also be on the verge of a significant decline. We think that these and other developments could create meaningful opportunities for investors.

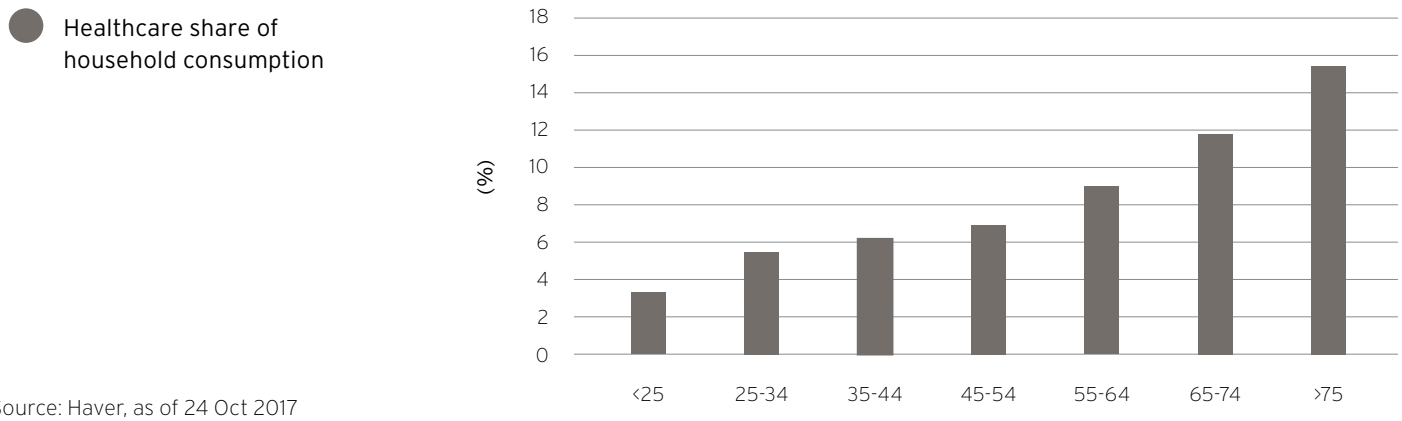
On the horizon: personalized medicine

The ancient Greek physician Hippocrates once remarked that 'it is far more important to know what person the disease has than what disease the person has.' Each human's DNA is unique and this influences the individual's susceptibility to disease, as well as subsequent development, diagnosis and treatment. Owing to the sequencing of the human genome in the early 21st century, precision medicine – personalized treatment of each patient's condition – is already a reality.

Genetic sequencing is currently being exploited in the diagnosis and treatment of illnesses including cancer. Immunotherapy harnesses a patient's own immune system to eliminate or slow the growth and spread of cancerous cells. Using the human body's own defense mechanisms in this way to treat cancer could significantly improve the outlook for many sufferers. The likelihood of the cancer returning after immunotherapy may also be lower than with the traditional treatments of surgery, radiotherapy and chemotherapy. This is because the body stores a memory of how to respond to cancerous cells.

According to Cancer Research UK, the rate of cancer incidence worldwide is forecast to increase from 14.1m new cases in 2012 to 23.7m by 2030. Aside from the human suffering, the cost of treating this upsurge would be heavy. In the US alone, the direct medical costs of treating cancer were estimated at $87.8bn in 2014 , according to the Agency for Healthcare Research and Quality. But this excludes the wider cost of cancer, such as the lost earnings of sufferers, which may be even greater than the medical costs.

Figure 2. Older consumers spend more on healthcare

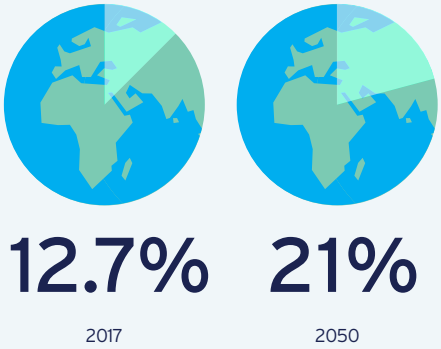


Source: Haver, as of 24 Oct 2017

The transformation of healthcare

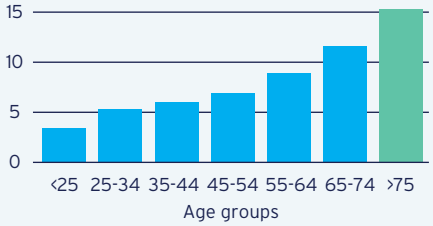
Disruptive treatments and technology could transform healthcare and create opportunities for investors

The percentage of over-60s worldwide is expected to grow rapidly[1]



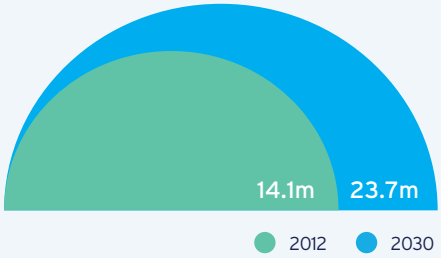
Older consumers spend more on healthcare, presenting an opportunity for new and improved health treatments

US healthcare share of household consumption, %[2]



And some diseases, like cancer, have a higher incidence rate in older people

New cases of cancer worldwide:[3]



In the US alone, the direct medical costs of treating cancer were estimated at $87.8bn in 2014[4]

WHAT ARE SOME OF THE AREAS OF POTENTIAL GROWTH?

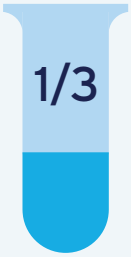
Biosimilars

Biologics are drugs made up of complex molecules manufactured from biological rather than chemical sources

7 out of 10

of the world's top selling prescription drugs were biologics in 2016

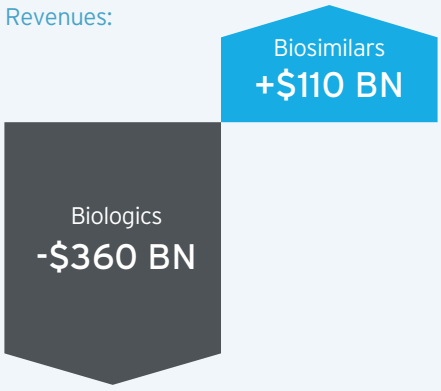
... and biologics consumed nearly



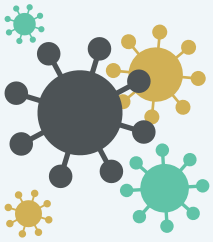
of total US drug spending

Biosimilars – synthetic replicas of biologics – could take billions in revenue from biologics in the decade to 2025

Revenues:



Personalized medicine



Immunotherapy uses the body's own defenses to fight diseases like cancer, and could be worth $35bn a year by 2025

Medical technology

Wearable devices

Early-stage disease detection

Artificial intelligence

Improving diagnosis and administration

Given our outlook for healthcare, we think that it can play a prominent role in diversified equity portfolios

Sources: All sources Citi Research or Citi GPS, unless otherwise stated. **1.** United Nations, via Haver, as of 24 Oct 2017. **2.** Haver, as of 24 Oct 2017. **3.** Cancer Research UK, Worldwide cancer incidence statistics, as of October 2017. **4.** Agency for Healthcare Research and Quality, as of Oct 2017.

Against this backdrop, immunotherapy could have substantial potential benefits. In addition to the human benefit of saving and extending lives, immunotherapeutic treatments could help reduce the costs to healthcare systems and allow cancer sufferers to resume their careers. Citi Research expects such treatments to become the main way of addressing advanced cancer by 2025. For those involved in developing immunotherapeutic treatments, the growth could be substantial. Citi Research recently said that its initial forecast of $35bn annual revenue potential was a clear underestimate. And immunotherapy's uses may extend to chronic infections such as HIV, malaria, and tuberculosis.

Cheaper blockbuster medicines

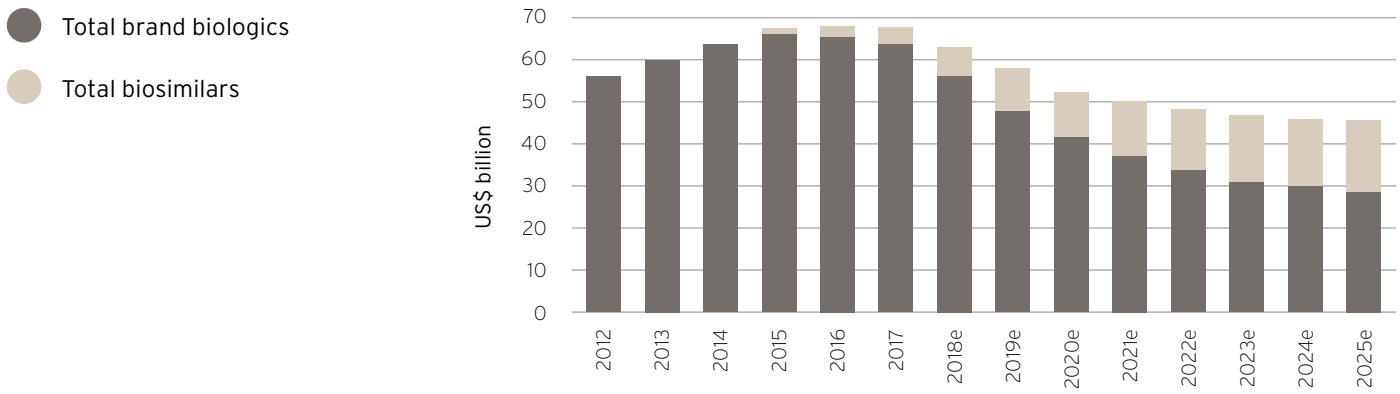
The treatment effectiveness for a wide range of conditions – including asthma, arthritis, cancer, and psoriasis – has already experienced a transformation in recent years. This is thanks partly to biologics, a class of drugs made up of complex molecules manufactured using plant cells, animal cells, or living microorganisms. Seven out of ten of the world's top ten best-selling prescription drugs in 2016 were biologics.[1]

Despite their effectiveness, one drawback of biologics is their high cost, which results from the intensive spending required to research and develop them. In the US, a year's treatment with a biologic 'blockbuster' drug can cost a single patient several hundred thousand dollars. In 2016, we estimate that nearly a third of total US drug spending went on biologics. With demand for such treatments set to grow, the burden on healthcare budgets could be extremely heavy.

Biosimilars – cheaper imitations of biologics – offer a potential remedy to the pressing need for effective treatments at lower cost. These drugs closely replicate the structure and clinical effects of the originals, but typically cost a fraction of the price. The introduction of biosimilar versions of a branded drug could ultimately lower the pricing of the original molecule by more than 80%, as biosimilars are priced at a material discount.

At present, biosimilars remain a fairly new phenomenon. Only six have received regulatory approval in the US as of September 2017. However, this may grow considerably in the years ahead. If so, Citi Research believes that the companies that created the original biologics could lose revenues of $360bn, with around $110bn of that going to biosimilar makers – **figure 3**. So, biosimilars represent both a significant disruptive threat and a growth opportunity.

Figure 3. The opportunity for biosimilars



Source: Citi Research, as of Oct 2017. All forecasts are expressions of opinion and are subject to change without notice and are not intended to be a guarantee of future results.

1 Source: Bloomberg, as of 31 Oct 2017

Medical technologies accelerate transformation

Innovative treatments at cost-effective prices are only part of the coming transformation of healthcare that we expect. We also see medical technology playing an important role in many parts of the healthcare process, from disease prevention, diagnosis, delivery, through to recuperation. Such technology could help to reduce costs, speed up processes, and enhance the quality of patient care.

Wearable devices are one example of a technology that is in increasing use throughout the medical process. They already allow monitoring of risks such as congestive heart failure, diabetes, and high blood pressure. Not only can such devices enable early-stage detection of problems, but can then provide real-time information to healthcare providers about the evolution of the patient's condition. This could help shift the emphasis from treatment to prevention and from standardized to personalized medical care. Their importance should grow as their functionality continues to improve.

We also think that artificial intelligence (AI) will be increasingly deployed in healthcare. Currently, AI is helping to diagnose certain early-stage cancers, such as melanomas. We expect an increasing number of basic but also more sophisticated medical tasks to be undertaken by AI, either reducing or eliminating the need for the involvement of physicians, surgeons, nurses and pharmacists. More and more administrative work within healthcare systems could also be automated, saving labor costs and speeding up processing times.

Healthcare's investment prognosis

The ongoing transformation of healthcare that we expect over the coming years contributes to what we believe makes an attractive investment case for the industry overall. We see healthcare as well positioned to grow throughout economic cycles. In this environment, global large-capitalization pharmaceuticals companies may be able to grow their earnings per share at a compound rate of growth of 6-8% a year. However, particular segments of the industry may achieve more than this. For example, we think global medical technology companies could potentially achieve 10% annualized growth. Particular sub-sectors and companies in the areas we have discussed could achieve more still.

While our prognosis for healthcare investment is positive, we acknowledge that there are risks to this view. Increased government intervention and regulation of the industry in order to tackle rising medical costs is perhaps the biggest risk facing the industry. In the US, the world's largest healthcare market, healthcare spending is projected to grow at 5.6% a year between 2016 and 2025. The healthcare share of GDP could thus rise from 17.8% to 19.9% over the period. Federal, state and local government are projected to finance almost half of that spending, proving a major incentive for intervention on pricing but also to levels of access. Efforts to control prices and regulate the market are unlikely to be confined to the US.

External factors are not the only threats to the healthcare industry. Although we see potential from transformative healthcare technologies, we equally recognize the dislocation risks they pose. The possible revenue losses to the makers of biologics are a case in point. We therefore emphasize the need for careful selection among healthcare investments, seeking to avoid those that are most threatened by disruptive innovation and focusing instead on its potential beneficiaries.

Given our outlook for healthcare, we think that it can play a prominent role in diversified equity portfolios. The sector has historically proved defensive relative to the wider equity market, thanks to the robustness of its earnings through the economic cycle. But we think its potential portfolio benefits go beyond defensiveness. Depending on an investor's objectives, a selection of healthcare investments can be made that seeks growth or yield. In any event, we believe that carefully considered, bottom-up security selection is critical.

1 The Beginning of the End of Cancer T+4, Citi Research, March 2017
2 Citi Research, as of 31 Oct 2017
3 http://www.healthaffairs.org/healthpolicybriefs/brief.php?brief_id=169, as of July 2017
4 National Health Expenditure Projections 2016-2025, The Office of the Actuary in the Centers for Medicare & Medicaid Services, as of Feb 2017

The disruption of money and finance

Steven Wieting, Global Chief Investment Strategist
Robert Jasminski, Head of Global Equities – Citi Investment Management

While cryptocurrencies have dominated headlines recently, we believe the long-term disruptive opportunities in financial technology lie elsewhere.

Few areas of economic activity are immune from disruption nowadays – even closely-guarded state monopolies like money. Traditionally, governments have insisted on the exclusive right to issue currency, often severely punishing those who have tried to use rival means of payment. The advent of cryptocurrencies – digital currencies that allow private parties to transact with each other outside of centrally controlled banking systems – has created a challenge to this monopoly. While the overall value of transactions carried out this way remains a tiny fraction of overall payments globally, they have generated feverish public interest in 2017.

Traditionally governments have insisted on the exclusive right to issue currency, often severely punishing those who have tried to use rival means of payment.

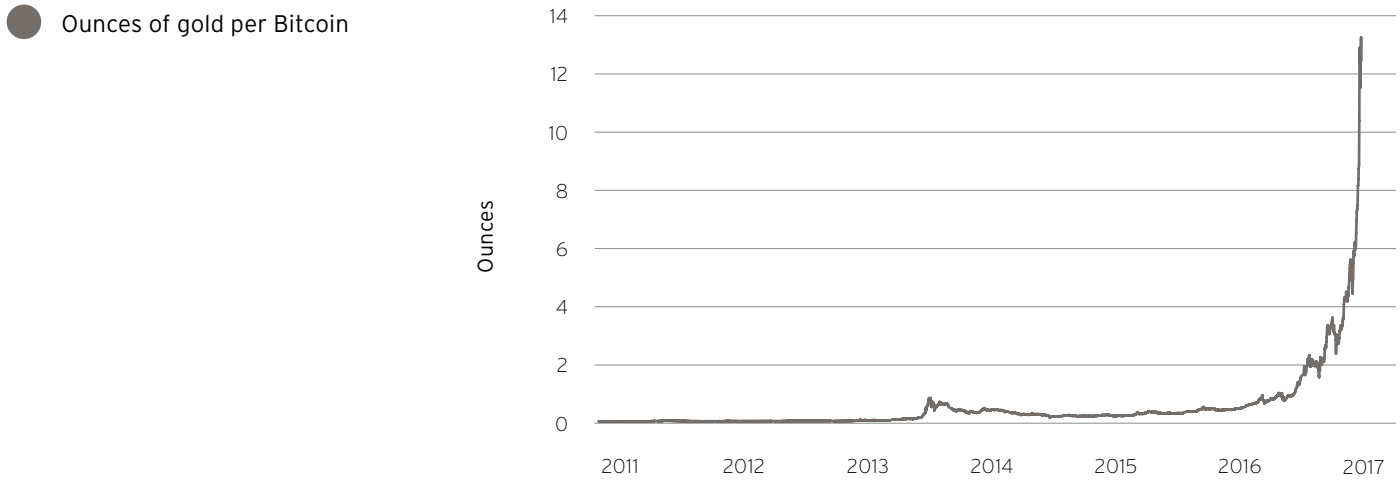
Bitcoin is just one of a growing number of cryptocurrencies or 'tokens' used to facilitate non-cash payments. While its intended use is to make payments, it has become the focus of intense speculative activity. Against the US dollar, Bitcoin has increased by as much as tenfold in 2017, and several times against gold, one of the oldest forms of money – **figure 1**. Many investors have bought it simply because they hope for yet more price gains. Media coverage has helped to fuel interest in Bitcoin and other cryptocurrencies. We see this behavior as the classic symptoms of an asset-price bubble.

It is unclear which, if any, cryptocurrency standard will achieve dominance in the future. The blockchain technology on which Bitcoin is based can be used to facilitate transactions in any currency, including traditional ones. The history of other technologies – from Sony's initial success with Betamax as a video machine standard to Myspace's initial but short-lived dominance in social media – argues against taking a strong view on the future price of Bitcoin or other cryptocurrencies. A further issue is the degree to which governments will tolerate the challenge to their monopoly over money. The authorities have a legitimate stake in preventing cryptocurrencies being used to circumvent international sanctions and capital controls, to facilitate money laundering, or to finance terrorism.

Certain governments have even themselves been the victims of cyber-attacks in which the hackers have placed ransomware on state computer systems and demanded payment in Bitcoin. Various governments are now responding to the challenge, with some seeking to regulate cryptocurrencies and others restricting or banning their use.

At Citi Private Bank, we see innovative financial technology as a critical and investible disruptive force. Society is becoming increasingly cashless, with payments increasingly being made via mobile devices. China – which invented paper money in the 7th century – appears to be leading the way once again. Strong first-mover advantage, the world's largest population, and a less developed traditional banking system have allowed Chinese e-commerce giants to achieve powerful growth in e-payments, diminishing the role of cash in China. In the US, we see potential financial technology beneficiaries among e-payment facilitators, incumbents in the credit card industry, and some technology hardware producers. In our view, such innovators may make somewhat more predictable long-term investment opportunities. In contrast, we see cryptocurrencies as highly speculative vehicles.

Figure 1. How many ounces of gold does a Bitcoin buy?



Source: Haver, as of 13 December 2017. For illustrative purposes only. Not deemed to be a recommendation. Past performance is not indicative of future returns. Real results may vary.

Glossary

Asset class definitions

Cash is represented by US 3-month Government Bond TR, measuring the US dollar-denominated active 3-Month, fixed-rate, nominal debt issues by the US Treasury.

Commodities asset class contains the index composites — GSCI Precious Metals Index, GSCI Energy Index, GSCI Industrial Metals Index, and GSCI Agricultural Index — measuring investment performance in different markets, namely precious metals (e.g., gold, silver), energy commodity (e.g., oil, coal), industrial metals (e.g., copper, iron ore), and agricultural commodity (i.e., soy, coffee) respectively. Reuters/Jeffries CRB Spot Price Index, the TR/CC CRB Excess Return Index, an arithmetic average of commodity futures prices with monthly rebalancing, is used for supplemental historical data.

Global Developed Market Corporate Fixed Income is composed of Bloomberg Barclays indices capturing investment debt from seven different local currency markets. The composite includes investment grade rated corporate bonds from the developed-market issuers.

Global Developed Market Equity is composed of MSCI indices capturing large-, mid- and small-cap representation across 23 individual developed-market countries, as weighted by the market capitalization of these countries. The composite covers approximately 95% of the free float-adjusted market capitalization in each country.

Global Developed Investment Grade Fixed Income is composed of Barclays indices capturing investment-grade debt from twenty different local currency markets. The composite includes fixed-rate treasury, government-related, and investment grade rated corporate and securitized bonds from the developed-market issuers. Local market indices for US, UK and Japan are used for supplemental historical data.

Global Emerging Market Fixed Income is composed of Barclays indices measuring performance of fixed-rate local currency emerging markets government debt for 19 different markets across Latin America, EMEA and Asia regions. iBoxx ABF China Govt. Bond, the Markit iBoxx ABF Index comprising local currency debt from China, is used for supplemental historical data.

Global High Yield Fixed Income is composed of Barclays indices measuring the non-investment grade, fixed-rate corporate bonds denominated in US dollars, British pounds and Euros. Securities are classified as high yield if the middle rating of Moody's, Fitch, and S&P is Ba1/BB+/BB+ or below, excluding emerging market debt. Ibbotson High Yield Index, a broad high yield index including bonds across the maturity spectrum, within the BB-B rated credit quality spectrum, included in the below-investment-grade universe, is used for supplemental historical data.

Hedge Funds is composed of investment managers employing different investment styles as characterized by different sub categories – HFRI Equity Long/Short: Positions both long and short in primarily equity and equity derivative securities; HFRI Credit: Positions in corporate fixed income securities; HFRI Event Driven: Positions in companies currently or prospectively involved in wide variety of corporate transactions; HFRI Relative Value: Positions based on a valuation discrepancy between multiple securities; HFRI Multi Strategy: Positions based on realization of a spread between related yield instruments; HFRI Macro: Positions based on movements in underlying economic variables and their impact on different markets; Barclays Trader CTA Index: The composite performance of established programs (Commodity Trading Advisors) with more than four years of performance history.

High Yield Bank Loans are debt financing obligations issued by a bank or other financial institution to a company or individual that holds legal claim to the borrower's assets in the event of a corporate bankruptcy. These loans are usually secured by a company's assets, and often pay a high coupon due to a company's poor (non-investment grade) credit worthiness.

Private Equity characteristics are driven by those for Developed Market Small Cap Equities, adjusted for illiquidity, sector concentration, and greater leverage.

Real Estate contains index contains all Equity REITs (US REITs and publicly-traded real estate companies) not designated as Timber REITs or Infrastructure REITs: NAREIT US REIT Index, NAREIT Canada REIT Index, NAREIT UK REIT Index, NAREIT Switzerland REIT Index, NAREIT Euro-zone REIT Index, NAREIT Japan REIT Index, NAREIT Hong Kong REIT Index, NAREIT Singapore REIT Index, NAREIT Australia REIT IndeX.

US Preferreds are equity securities that have preference over common stock in the event of a corporate bankruptcy. Because these securities are considered higher-quality, they exhibit characteristics of debt instruments and often do not contain voting rights for their owners.

Index definitions

The Barclays Multiverse Bond Index is a broad fixed-rate multi-currency benchmark.

The CBOE Volatility Index (VIX Index) is a leading measure of market expectations of near-term volatility conveyed by S&P 500 Index option prices.

Citi Emerging Markets Sovereign Bond Index includes local currency sovereign bond indices for 14 emerging markets countries. These indices comprise fixed-rate sovereign debt with at least one-year until maturity. They are market capitalization-weighted and rebalanced monthly for Brazil, Chile, Colombia, Hungary, Indonesia, Malaysia, Mexico, Peru, Philippines, Poland, Russia, Thailand, Turkey, and South Africa.

The Citi Euro Broad Investment Grade Index is a multi-asset benchmark for investment-grade, Euro-denominated fixed income bonds. It includes government, government-sponsored, collateralized, and corporate debt.

Citi US Broad Investment Grade Index (USBIG)—Corporate, is a subsector of the USBIG. The index includes fixed rate US Dollar-denominated investment grade corporate debt within the finance, industrial and utility sectors. This index includes US and non-US corporate securities (excludes US government-guaranteed and non-US sovereign and provincial securities).

Citi's US High-Yield Market Index is a US dollar-denominated index which measures the performance of high-yield debt issued by corporations domiciled in the US or Canada. Recognized as a broad measure of the North American high-yield market amongst all Citi's fixed income indices, it includes cash-pay and deferred-interest securities. All the bonds are publically placed, have a fixed coupon, and are non-convertible

The Citi World Broad Investment Grade Index is a multi-asset, multi-currency benchmark which provides a measure of the global fixed income markets.

The MSCI Europe ex-UK Banking Industry index tracks the performance of major European depository institutions, excluding those domiciled in the United Kingdom.

The Euro Stoxx 600 represents large, mid and small cap companies across 17 countries across Europe including: Austria, Belgium, Czech Republic, Denmark, Finland, Germany, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

HFRI Equity Hedge (Total) Index is an equal weighted index if multiple equity hedge fund managers. Equity Hedge investing consists of a core holding of long equities hedged at all times with short sales of stocks and/or stock index options. Some managers maintain a substantial portion of assets within a hedged structure and commonly employ leverage. Where short sales are used, hedged assets may be comprised of an equal dollar value of long and short stock positions. Other variations use short sales unrelated to long holdings and/or puts on the S&P 500 index and put spreads. In addition to equities, some funds may have limited assets invested in other types of securities.

The HFRI Fund Weighted Composite Index is a global, equal-weighted index of over 2,000 single manager funds.

The HFRI Relative Value (Total) Index is an equal weighted index that maintains positions in which the investment thesis is predicated on realization of a valuation discrepancy in the relationship between multiple securities.

The Korea Composite Stock Price Index or KOSPI is the index of all common stocks traded on the Stock Market Division.

The MSCI All Country World Index represents 48 developed and emerging equity markets. Index components are weighted by market capitalization.

The MSCI Asia ex-Japan index has large and mid-cap representation across 2 of 3 Developed Markets countries and 8 Emerging Markets countries in Asia. It captures approximately 85% of the free float-adjusted market capitalization in each country.

Chilean large and mid-cap companies are represented by the MSCI Chile Index. With 19 constituents, the index covers approximately 85% of the Chile equity market.

The MSCI Emerging Markets (EM) Latin America Index captures large and mid-cap representation across 5 Emerging Markets (EM) countries* in Latin America. With 121 constituents, the index covers approximately 85% of the free float-adjusted market capitalization in each country.

European equities are represented by the MSCI Europe index, which captures large- and mid-cap representation across 15 Developed Markets (DM) countries in Europe. It covers approximately 85% of the free float-adjusted market capitalization across the European Developed Markets equity universe.

The MSCI Kuwait Index is designed to measure the performance of the large and mid cap segments of the Kuwait market. With 8 constituents, the index covers approximately 85% of the Kuwait equity universe.

The MSCI Jordan Index is designed to measure the performance of the large and mid cap segments of the Jordan market. With 4 constituents, the index covers approximately 85% of the Jordan equity universe.

The MSCI Lebanon Index is designed to measure the performance of the large and mid-cap segments of the Lebanese market. With 4 constituents, the index covers approximately 85% of the Lebanon equity universe.

The MSCI Russia Index is designed to measure the performance of the large and mid cap segments of the Russian market. With 22 constituents, the index covers approximately 85% of the free float-adjusted market capitalization in Russia.

The MSCI North America Index is designed to measure the performance of large and mid-cap segments of the US and Canada markets with 725 constituents.

The MSCI Qatar Index is designed to measure the performance of the large and mid cap segments of the Qatari market. With 12 constituents, the index covers approximately 85% of the free float-adjusted market capitalization in Qatar.

The MSCI Turkey Index is designed to measure the performance of the large and mid cap segments of the Turkish market. With 25 constituents, the index covers about 85% of the equity universe in Turkey.

The MSCI United Arab Emirates (UAE) Index is designed to measure the performance of the large and mid cap segments of the UAE market. With 10 constituents, the index covers approximately 85% of the UAE equity universe.

The MSCI USA Index represents more than 600 constituents and approximately 85% of the free float-adjusted market capitalization in the US.

The MSCI World Index represents the performance of more than 1,600 large- and mid-cap stocks across 23 developed markets countries. The index covers approximately 85% of the free float-adjusted market capitalization in each country.

The MSCI World ex-USA Index represents the performance of large- and mid-cap representation across 22 of 23 developed markets countries excluding the United States. With 1,005 constituents, the index covers approximately 85% of the free float-adjusted market capitalization in each country.

SG CTA Index is a benchmark of major commodity trading advisors and calculates the daily rate of return for a pool of CTAs selected from the larger managers that are open to new investment.

SG Macro Trading (Discretionary) Index represents the performance of all the trading strategies, whether available through either onshore or offshore fund structures, as well as managed accounts that are reported to SG Alternative Investment Solutions.

The Standard & Poor's 500 Index is a capitalization-weighted index that includes a representative sample of 500 leading companies in leading industries of the US economy. Although the S&P 500 focuses on the large cap segment of the market, with over 80% coverage of US equities, it is also an ideal proxy for the total market.

The S&P Global Infrastructure Index is designed to track 75 companies from around the world chosen to represent the listed infrastructure industry while maintaining liquidity and tradability. To create diversified exposure, the index includes three distinct infrastructure clusters: energy, transportation, and utilities.

S&P Global Internet Retail Index, shorthand for the S&P Global 1200 Internet & Direct Marketing Retail sub industry, is an index of companies that market and sell products to customers directly over the internet. This sub industry is a part of the Consumer Discretionary sector of the S&P Global 1200 index.

S&P Global Department Store Index, shorthand for the S&P Global 1200 Department Stores sub industry, is an index of companies that sell products in a physical retail establishment that offers a wide range of consumer goods from different product categories known as 'departments'. This sub industry is a part of the Consumer Discretionary sector of the S&P Global 1200 index.

Other terminology

Adaptive Valuations Strategies is Citi Private Bank's own strategic asset allocation methodology. It determines the suitable long-term mix of assets for each client's investment portfolio.

Correlation is a statistical measure of how two assets or asset classes move in relation to one another. Correlation is measured on a scale of 1 to -1. A correlation of 1 implies perfect positive correlation, meaning that two assets or asset classes move in the same direction all of the time. A correlation of -1 implies perfect negative correlation, such that two assets or asset classes move in the opposite direction to each other all the time. A correlation of 0 implies zero correlation, such that there is no relationship between the movements in the two over time.

Diversifiers are hedge funds that typically are expected by HFRM to display low or negative correlation and/or beta to traditional asset classes though they may display significant degrees of market correlation at certain points of the investment cycle. The portfolio managers of such funds are often long volatility and generally may provide attractive diversification benefits to a client's portfolio though returns are often 'unpredictable' and can be volatile. This internal classification is based on the analysis and subjective views of HFRM. The internal classification is subject to change without notice to investors and there is no guarantee that the funds will perform as described above. It is important to note that the market strategy described above may not completely eliminate market risk. There is no guarantee that hedge funds classified as 'Diversifiers' will perform as described above. Hedge funds should not be invested in based on their classification as 'Diversifiers' and other assets in a client's overall portfolio should be taken into consideration before an investment is made.

Extreme Downside Risk (EDR) is a measure used to estimate the risk of an asset allocation. EDR seeks to estimate the typical type of loss, over a 12-month time horizon, that an asset allocation may experience in a period of extreme market stress. It is calculated using

a proprietary methodology and database. For a given asset allocation, this approach estimates the loss, over a 12-month time horizon, that the asset allocation may have experienced during historical periods of extreme market stress. EDR is calculated by taking the average loss in the worst 5% of this historical periods of extreme market stress. EDR does not estimate the maximum possible loss. Potential losses for a given asset allocation may exceed the value of the EDR.

Global macro hedge fund strategies are generally fundamental and discretionary. Managers of these strategies analyze large quantities of macroeconomic data across markets and regions. Those managers try to identify large imbalances in the risk premiums relating to major asset classes, such as fixed income, equities, commodities and currencies. This top-down process helps them to identify potential directional and tactical opportunities.

Managed futures/CTA hedge fund strategies are generally systematic and technical (i.e., quant-driven). Many trade a large number of futures and forwards markets (often 100+) and take positions in response to systematic buy and sell signals generated by computer models that attempt to identify or anticipate market trends. Many of their inputs are price-based indicators, and most models are derived from proprietary trend-following algorithms.

Price-to-book ratio (P/B) compares the capitalization of an individual stock or of an index of stocks to the value of that stock or that index's combined shareholder capital. It is calculated by dividing the current closing price of the stock by the most recently reported book value per share. A low P/B can indicate a lowly-valued company or index, while a high P/B can indicate high valuation.

Price-earnings ratio (P/E) measures a company's or an index of companies' current share price relative to its earnings per share. A low P/E can indicate a lowly-valued company or index, while a high P/E can indicate high valuation.

Return on equity (ROE) is the amount of net income earned as a percentage of shareholders equity. It captures a company's profitability – or aggregate profitability among numerous companies – by showing how much profit is achieved with shareholders' capital.

Strategic asset allocation is the process of creating a long-term investment plan by assembling an appropriate mix of equities, fixed income, cash and other investments. It can potentially enhance portfolio returns and help manage risk.

Strategic Return Estimates are Citi Private Bank's forecast of returns for specific asset classes over a 10-year time horizon. The forecast for each specific asset class is made using a proprietary methodology that is appropriate for that asset class. Equity asset classes are forecast using a proprietary methodology based on the calculation of valuation levels with the assumption these valuation levels revert to their long-term trends over time. Fixed Income asset classes are forecast using a proprietary methodology based on current yield levels. Other asset classes have other specific forecasting methodologies. Please note that hedge funds, private equity, real estate, structured products and managed futures are generally illiquid investments and are subject to restrictions on transferability and resale. Each SRE is gross of actual client fees and expenses. Components of the methodology used to create the SREs include the rate of return for various asset classes based on indices. Termination and replacement of investments may subject investors to new or different charges. Past performance is not indicative of future results. Future rates of return cannot be predicted with certainty. Investments that pay higher rates of return are often subject to higher risk and greater potential loss in an extreme scenario. The actual rate of return on investments can vary widely over time, especially for long-term investments. This includes the potential loss of principal on your investment. It is not possible to invest directly in an index.

Tactical asset allocation looks to adjust the strategic asset allocation of a client's investment portfolio to incorporate shorter-term market insights.

Volatility arbitrage hedge fund strategies typically attempt to exploit differences between the forecasted future volatility of an asset and the implied volatility of options based on that asset.

Yield-to-Maturity (YTM) is the total return received on a bond or index of bonds when held to maturity. The total return includes both the payment of coupons and the return of the principal at maturity.

Bond rating equivalence
Alpha and/or numeric symbols used to give indications of relative credit quality. In the municipal market, these designations are published by the rating services. Internal ratings are also used by other market participants to indicate credit quality.

Bond credit quality ratings	**Rating agencies**		
Credit risk	**Moody's[1]**	**Standard and Poor's[2]**	**Fitch Ratings[2]**
Investment Grade			
Highest quality	Aaa	AAA	AAA
High quality (very strong)	Aa	AA	AA
Upper medium grade (Strong)	A	A	A
Medium grade	Baa	BBB	BBB
Not Investment Grade			
Lower medium grade (somewhat speculative)	Ba	BB	BB
Low grade (speculative)	B	B	B
Poor quality (may default)	Caa	CCC	CCC
Most speculative	Ca	CC	CC
No interest being paid or bankruptcy petition filed	C	D	C
In default	C	D	D

1 The ratings from Aa to Ca by Moody's may be modified by the addition of a 1, 2, or 3 to show relative standing within the category.
2 The ratings from AA to CC by Standard and Poor's and Fitch Ratings may be modified by the addition of a plus or a minus to show relative standing within the category.

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http://www.theocc.com/components/docs/riskstoc.pdf or

http://www.theocc.com/components/docs/about/publications/november_2012_supplement.pdf

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- Concentration Risk. Investment in a basket of Energy Related MLPs may expose the investor to concentration risk due to industry, geographical, political, and regulatory concentration.
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- Changes in tax or other laws affecting MLPs generally;

- Regulatory changes affecting pipeline fees and other regulatory fees in the energy sector;
- The effects of political events and government regulation;
- The impact of direct government intervention, such as embargos;
- Changes in fiscal, monetary and exchange control programs:
- Changes in the relative prices of competing energy products;
- Changes in the output and trade of oil and other energy producers;
- Changes in environmental and weather conditions;
- The impact of environment laws and regulations and technological changes affecting the cost of producing and processing, and the demand for, energy products;
- Decreased supply of hydrocarbon products available to be processed due to fewer discoveries of new hydrocarbon reserves, short- or long-term supply distributions or otherwise;
- Risks of regulatory actions and/or litigation, including as a result of leaks, explosions or other accidents relating to energy products;
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