Prime Partners

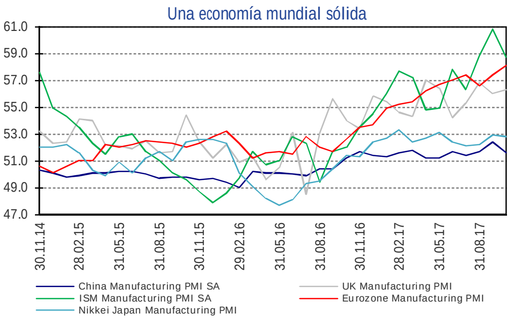
DEPUIS 1998

MARKET INSIGHT

NOVIEMBRE 2017

Las acciones continúan su ascenso en el marco de una economía "Ricitos de oro"

Los inversionistas continuaron dando preferencia a los activos de riesgo en octubre, en particular a las acciones. Ciertamente, las condiciones coyunturales continúan siendo buenas y los índices PMI internacionales no contradicen la idea de que el crecimiento económico mundial mantendrá un buen ritmo durante los próximos 6-9 meses. El escenario de un repunte sincronizado de los ciclos económicos regionales es ampliamente aceptado y nada lleva a pensar que las esperanzas desde ese frente carezcan de fundamento. Seguimos pensando que la gran probabilidad de que ello se concretice (70%) debe atribuírsele a la continuación de un escenario de "Ricitos de oro" (*goldilocks*), al



menos durante la primera parte de 2018.

Los avances en relación a una disminución de los impuestos en los Estados Unidos han constituido igualmente una fuente de satisfacción para los inversionistas.

Un proyecto concreto debería ver la luz antes de finales de año a más tardar, lo que debería ser beneficioso tanto para las empresas como para los individuos a partir del próximo año. Con ello se estaría favoreciendo, por un lado, el crecimiento estadounidense y, por otro, la toma de beneficios de las empresas.

Este último punto, cuyo alcance sigue siendo incierto, permitió que las acciones estadounidenses establecieran una sucesión de records históricos durante las últimas semanas. Tanto así que la actual temporada de beneficios (tercer trimestre 2017) se muestra de buena calidad.

De manera general, las acciones internacionales progresaron claramente en octubre, mientras que los llamados activos "refugio" (los bonos de los EE.UU., el franco suizo y el oro) cedieron de una manera a veces importante. Aunque la volatilidad implícita de las acciones estadounidenses (VIX) progresó poco durante las últimas semanas, sigue estando en niveles particularmente bajos desde el punto de vista histórico.

"Buscamos oportunidades de reforzar las inversiones alternativas dentro de nuestra política de inversión."

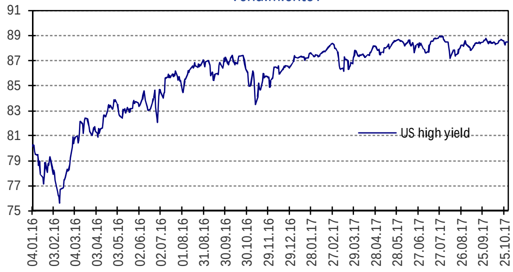
FRANÇOIS SAVARY, CHIEF INVESTMENT OFFICER, PRIME PARTNERS

Todo esto demuestra una vez más que apetito por el riego sigue dominando.

No obstante, hay que señalar que durante el mes de octubre las inversiones en bonos de altos rendimientos brillaron menos que las acciones. En la actualidad, muchos inversionistas dudan del atractivo de tales inversiones, luego de la fuerte contracción de los spreads a lo largo de los últimos dieciocho meses.

La decorrelación reciente con las inversiones bursátiles es vista por algunos como la prueba de que a partir de este momento entramos en la última fase del ciclo financiero. Históricamente durante esta etapa las acciones han mantenido su progresión a pesar de las condiciones menos favorables para los bonos de alto rendimiento.

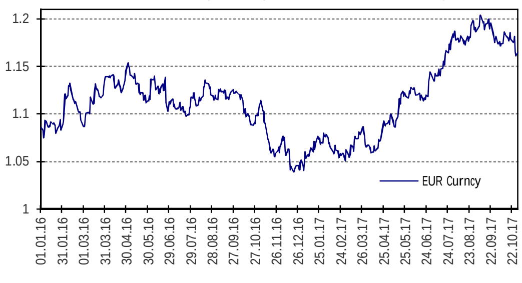
¿El fin del mercado alcista para los bonos de alto rendimiento?



Por otro lado, mientras que el banco central europeo dio a conocer las modalidades de la reducción de sus compras de activos de aquí a septiembre de 2018, la Reserva Federal estadounidense inició el (lento) proceso de reducción del tamaño de su balance durante el mes de octubre. La normalización de la política monetaria continuará en EE.UU. a lo largo de los próximos trimestres, por lo que seguimos previendo tres alzas de tasas de aquí a finales del próximo año. La perspectiva de un tal ajuste se ve reforzada por los cambios en materia fiscal que mencionamos anteriormente.

En este contexto, según nuestros cálculos, no es ilógico que el dólar recupere fuerza en el mercado de divisas. Un objetivo de 1,15 con una posible extensión a 1,12 frente al Euro nos sigue pareciendo factible. Con todo, pensamos que no hay que dejarse llevar por la euforia en lo que concierne a la divisa del Tío Sam, la cual debería seguir una tendencia a la baja para finales de 2018.

Euro/Dólar: un objetivo a partir de los 1.12 no es imposible



En el frente geopolítico, Xi Jinping ha salido fortalecido del Congreso del Partido Comunista. La falta de nominación de un “heredero natural” hace pensar que el líder chino no compartirá el poder durante los próximos años. No se puede negar que los importantes desafíos económicos que deberá afrontar el Imperio del Medio requieren de una acción decidida. Todavía es demasiado temprano para decir si la “sacralización” de Xi marca un viraje hacia reformas económicas y financieras indispensables. En cualquier caso, cuenta con todos los mecanismos del poder para reforzar el modelo económico chino y hacerlo más sostenible a mediano plazo.

En líneas generales, los cambios económicos y políticos de las últimas semanas aportan tranquilidad a la comunidad financiera. No obstante, no podemos disimular cierto “escepticismo” en relación al consenso que se ha venido dando sobre el ciclo económico y financiero. Así, estimamos que la probabilidad de una aceleración complementaria del crecimiento mundial a partir de los niveles actuales es limitada (15%), mientras que los operadores no muestran mayor inquietud por las posibles trayectorias en materia de inflación. Por consiguiente, hemos mantenido nuestra política de gestión del riesgo durante las últimas semanas.

Asimismo, continuamos con la reducción de nuestras inversiones en obligaciones dentro del segmento del crédito de alto rendimiento. Desde nuestro punto de vista, este tipo de activo ha perdido el atractivo que tenía a principios de 2016, momento durante el cual incrementamos considerablemente nuestra exposición. Por el contrario, hemos aumentado ligeramente nuestra ponderación en acciones, a través del refuerzo de nuestra asignación en valores de los países emergentes.

Somos optimistas respecto a las acciones emergentes

Esto no quiere decir que hayamos descartado completamente nuestra visión un tanto defensiva en relación a las acciones dentro de nuestra asignación. Aunque tenemos una preferencia por los mercados bursátiles frente a los activos de renta fija, no creemos que se justifique sobreponderar las acciones en el actual contexto.

En conclusión, mantenemos el rumbo definido durante los últimos meses y buscamos oportunidades para reforzar las inversiones alternativas dentro de nuestra política de inversión. Estas últimas deberían permitirnos controlar los riesgos inherentes a la naturaleza de un ciclo económico y financiero cada vez más consolidado, el cual debería caracterizarse por un repunte de la volatilidad a lo largo de los próximos trimestres.

Ginebra, 1ro de noviembre de 2017

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What are economic indicators telling us? KEEP HEDGE!

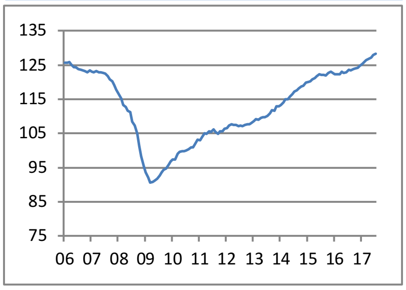
USA

WEEK 45

Leading Indicator Total — Positive

Price as of: 31.07.2017 128.3 **LEADING**

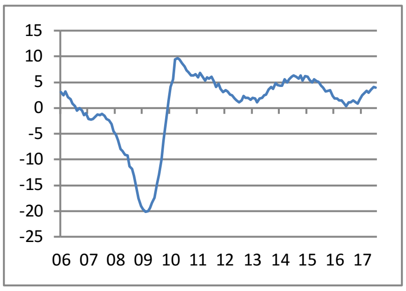
Comment:



Leading Indicator MoM — Positive

Price as of: 31.07.2017 3.9 **LEADING**

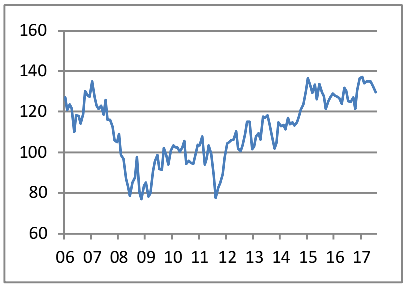
Comment:



OECD Leading US — Positive

Price as of: 31.07.2017 129.6 **LEADING**

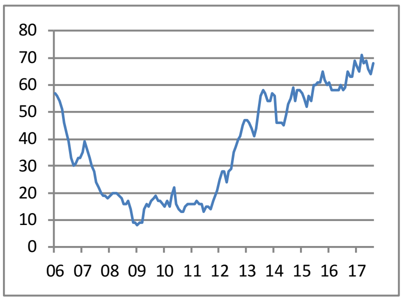
Comment:



National Association Home B — Neutral

Price as of: 31.08.2017 68.0

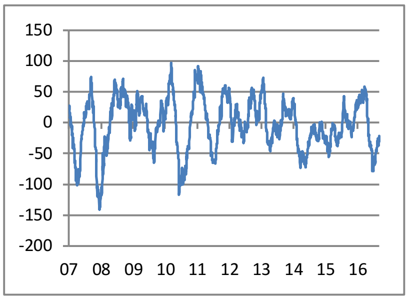
Comment:



Citigroup Surprise Index — Positive

Price as of: 30.08.2017 -21.2

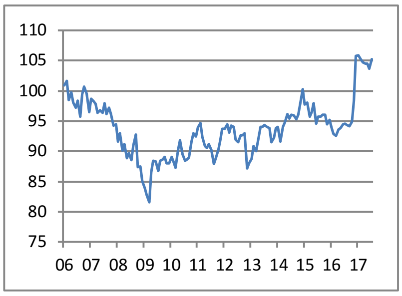
Comment:



Small Business Optimism — Neutral

Price as of: 31.07.2017 105.2

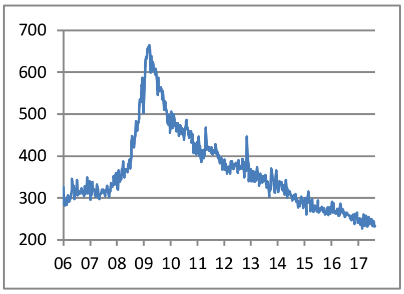
Comment:



Initial Jobless Claims — Positive

Price as of: 18.08.2017 234

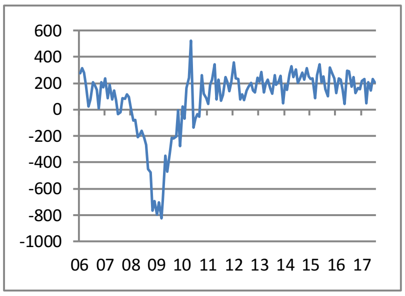
Comment:



Nonfarm Payroll — Positive

Price as of: 31.07.2017 209

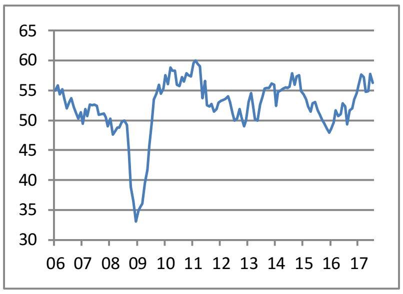
Comment:



PMI Manufacturing — Positive

Price as of: 31.07.2017 56.3

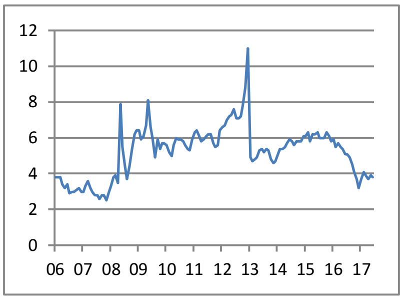
Comment:



Saving Rate (% of disp. Income) — Neutral

Price as of: 30.06.2017 3.8

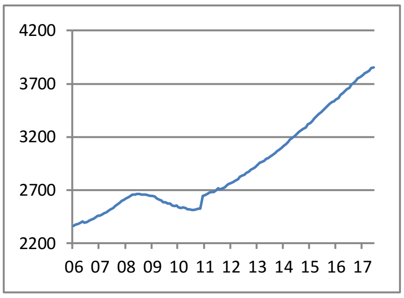
Comment:



Consumer Credit — Positive

Price as of: 30.06.2017 3'856

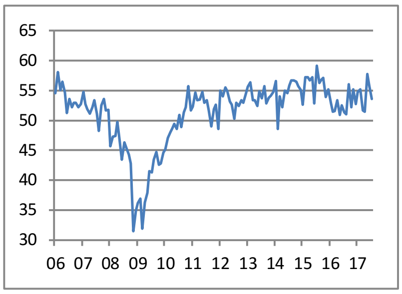
Comment: Improving



ISM Non-Manufacturing — Neutral

Price as of: 31.07.2017 53.6

Comment:



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What are economic indicators telling us? **KEEP HEDGE!**

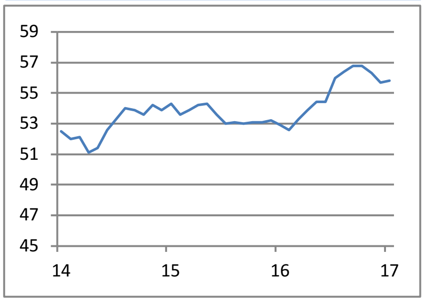
EUROPE

WEEK 45

PMI Composite — **Positive**

Price as of: 31.08.2017 55.8

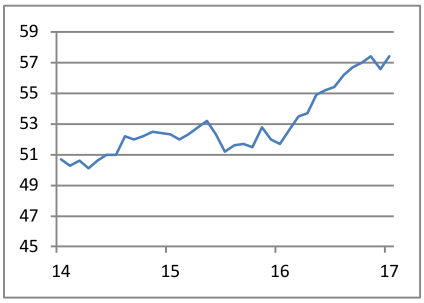
Comment:



PMI Manufacturing — **Positive**

Price as of: 31.08.2017 57.4

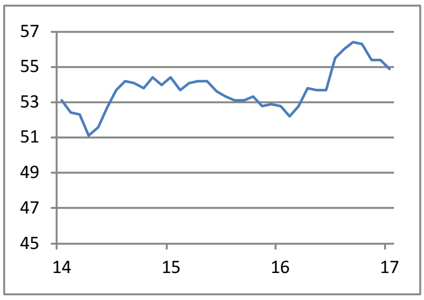
Comment:



PMI Services — **Positive**

Price as of: 31.08.2017 54.9

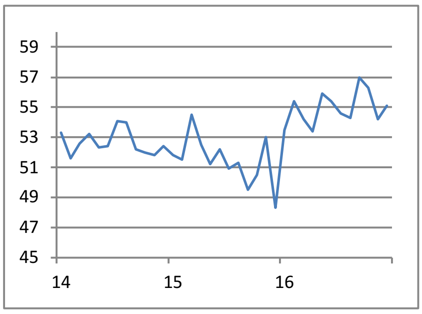
Comment:



PMI Manufact. UK — **Neutral**

Price as of: 31.07.2017 55.1

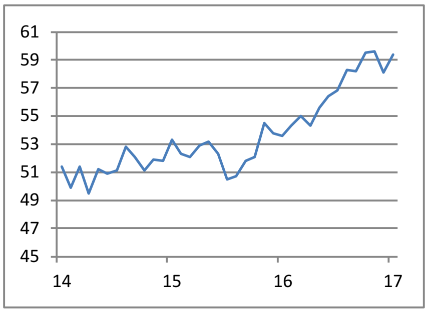
Comment:



PMI Manufact. Germany — **Positive**

Price as of: 31.08.2017 59.4

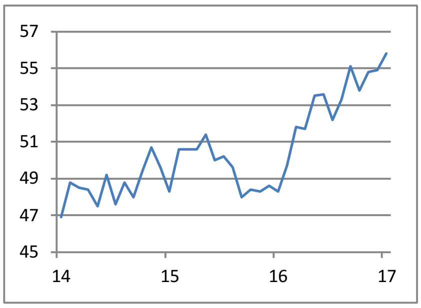
Comment:



PMI Manufact. France — **Neutral**

Price as of: 31.08.2017 55.8

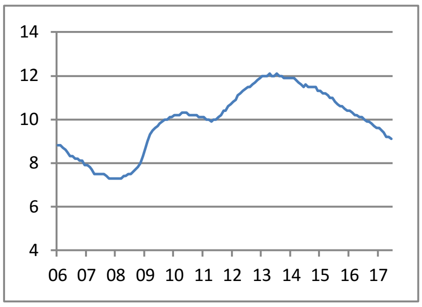
Comment:



Unemployment Rate — **Positive**

Price as of: 30.06.2017 9.1

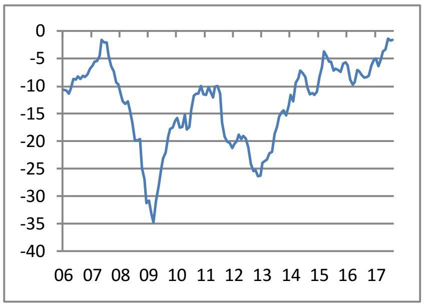
Comment: improving



Consumer Confidence — **Positive**

Price as of: 31.08.2017 -1.5

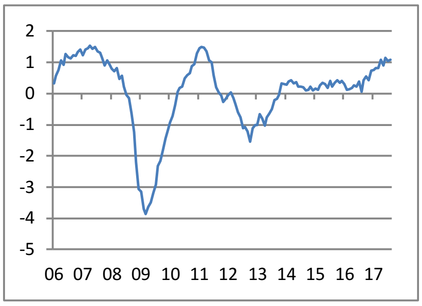
Comment:



Business Climate Indicator — **Positive**

Price as of: 31.08.2017 1.1

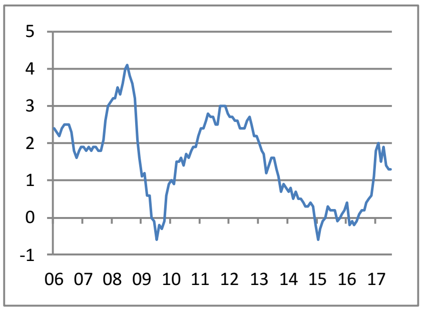
Comment:



Inflation — **Neutral**

Price as of: 31.07.2017 1.3

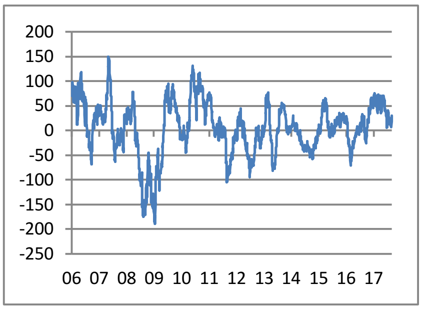
Comment: improving



Citi Economic Surprise Index — **Neutral**

Price as of: 30.08.2017 29.8

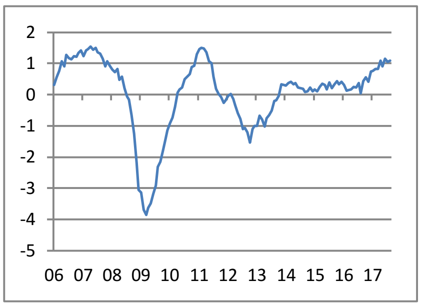
Comment:



Business Climate Indicator — **Positive**

Price as of: 31.08.2017 1.1

Comment:



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WORLD INDEXES

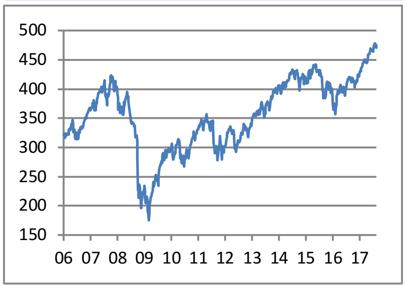
HEDGE !!!

WORLD

WEEK 45

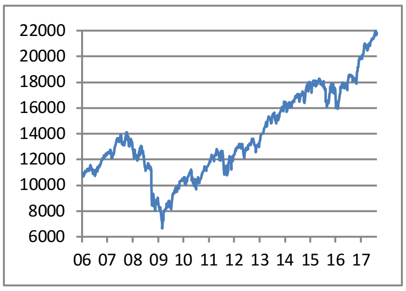
MSCI ACWI

Price as of: 06.11.2017 498.9



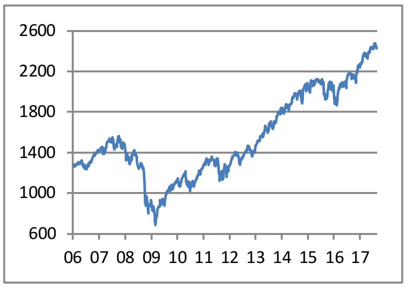
DOW JONES INDUS. AVG

Price as of: 06.11.2017 23'539.2



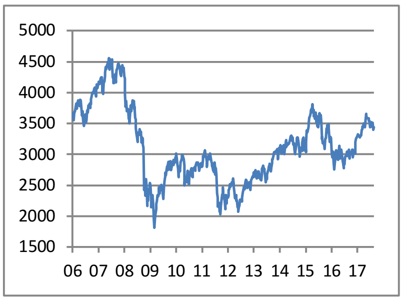
S&P 500 INDEX

Price as of: 06.11.2017 2'587.8



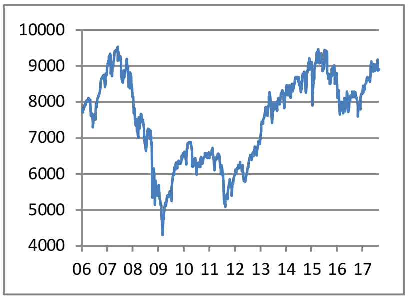
Euro Stoxx 50 Pr

Price as of: 06.11.2017 3'690.0



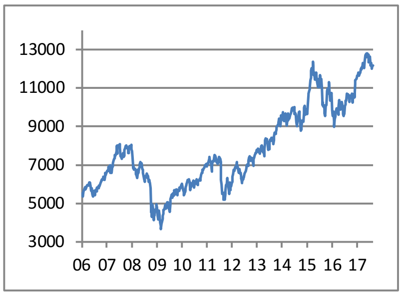
SWISS MARKET INDEX

Price as of: 06.11.2017 9'322.1



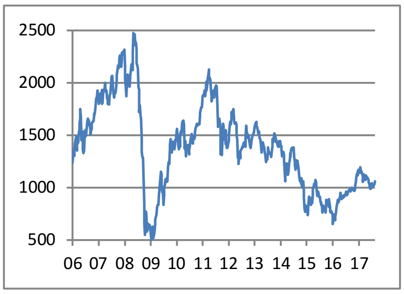
DAX INDEX

Price as of: 06.11.2017 13'478.9



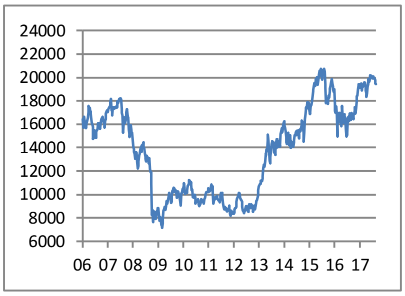
RUSSIAN RTS INDEX $

Price as of: 06.11.2017 1'109.4



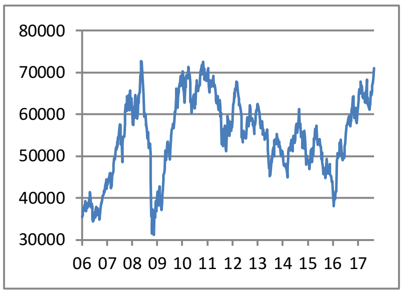
NIKKEI 225

Price as of: 06.11.2017 22'548.4



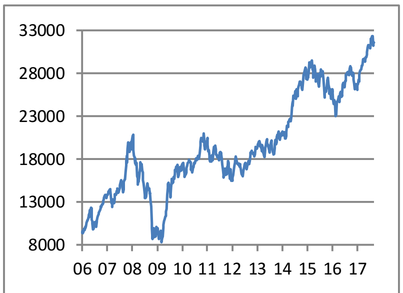
BRAZIL IBOVESPA INDEX

Price as of: 06.11.2017 73'915.4



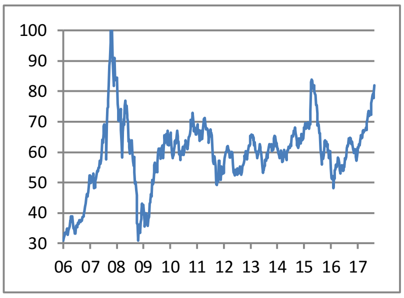
S&P BSE SENSEX INDEX

Price as of: 06.11.2017 33'687.0



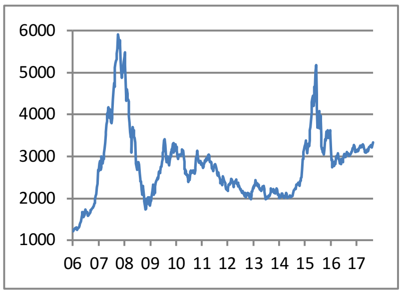
MSCI CHINA

Price as of: 06.11.2017 87.1



SHANGHAI SE COMPOSITE

Price as of: 06.11.2017 3'384.6



FOREIGN EXCHANGE

WORLD

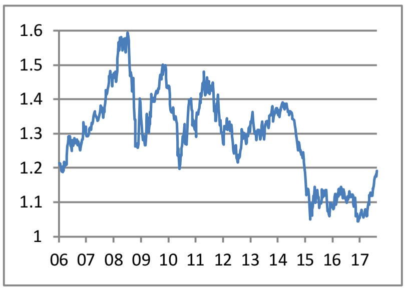
WEEK 45

Swiss Franc Spot

Price as of: 06.11.2017 1.0017

Euro Spot

Price as of: 06.11.2017 1.161



British Pound Spot

Price as of: 06.11.2017 1.307

Japanese Yen Spot

Price as of: 06.11.2017 114.310

Brazilian Real Spot

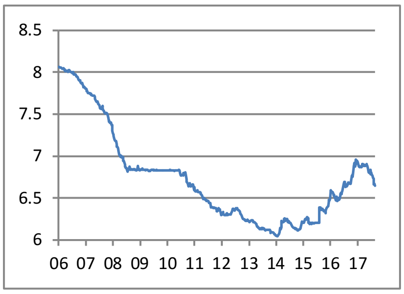
Price as of: 06.11.2017 3.314

Mexican Peso Spot

Price as of: 06.11.2017 19.194

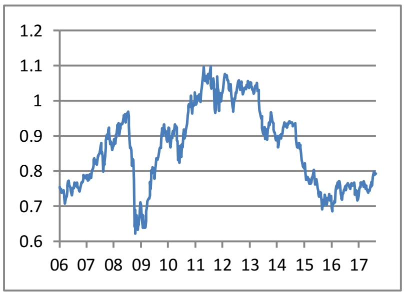
China Renminbi Spot

Price as of: 06.11.2017 6.637



Australian Dollar Spot

Price as of: 06.11.2017 0.765

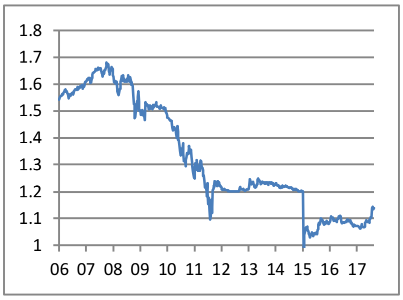


Canadian Dollar Spot

Price as of: 06.11.2017 1.277

EUR-CHF X-RATE

Price as of: 06.11.2017 1.163



GBP-CHF X-RATE

Price as of: 06.11.2017 1.309

EUR-NOK X-RATE

Price as of: 06.11.2017 9.487

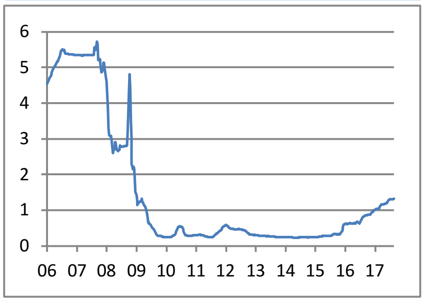
INTEREST RATES

WORLD

WEEK 45

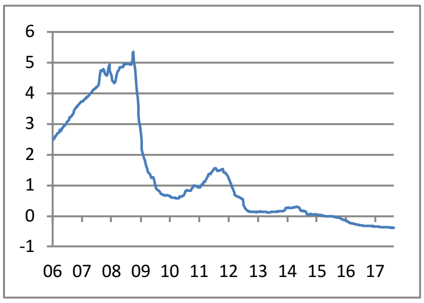
ICE LIBOR USD 3 Month

Price as of: 25.08.2017 1.318



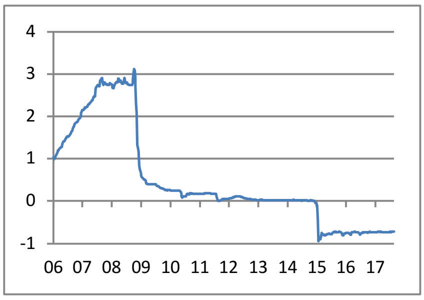
ICE LIBOR EUR 3M

Price as of: 25.08.2017 -0.374



ICE LIBOR CHF 3 Month

Price as of: 25.08.2017 -0.726



US Generic Govt 2 Year Yield

Price as of: 25.08.2017 1.332

Euro Generic Govt Bond 2 Year

Price as of: 25.08.2017 -0.730

SWITZERLAND

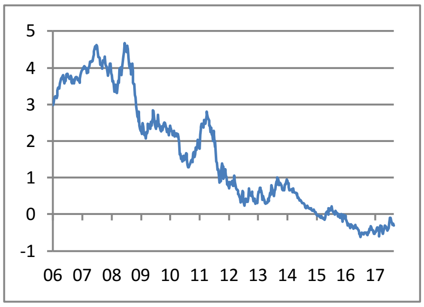
Price as of: 25.08.2017 -0.874

US Generic Govt 5 Year Yield

Price as of: 25.08.2017 1.757

Euro Generic Govt Bond 5 Year

Price as of: 25.08.2017 -0.312



SWITZERLAND

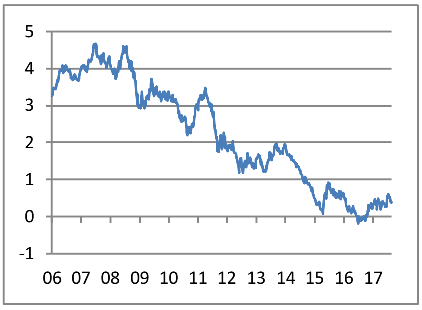
Price as of: 25.08.2017 -0.587

US Generic Govt 10 Year Yield

Price as of: 25.08.2017 2.166

Euro Generic Govt Bond 10 Year

Price as of: 25.08.2017 0.380



SWITZERLAND

Price as of: 25.08.2017 -0.162

Prime Partners S.A.

COMMODITIES

WORLD

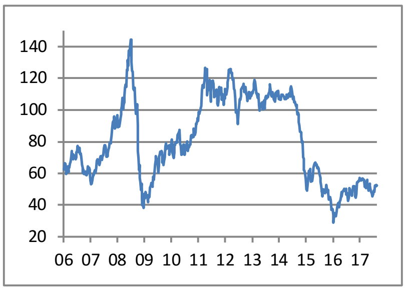
WEEK 45

TR/CC CRB ER Index

Price as of: 06.11.2017 189.380

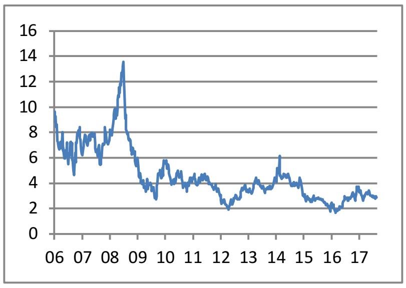
Crude Oil Brent

Price as of: 06.11.2017 62.390



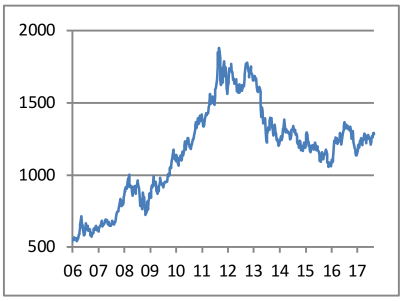
Natural Gas

Price as of: 06.11.2017 3.055



GOLD SPOT $/OZ

Price as of: 06.11.2017 1'269.940

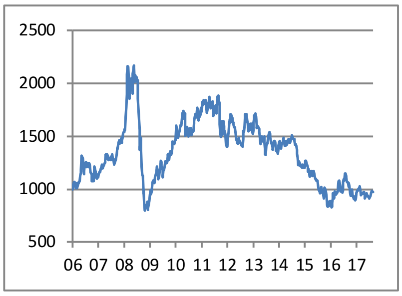


SILVER SPOT $/OZ

Price as of: 06.11.2017 16.867

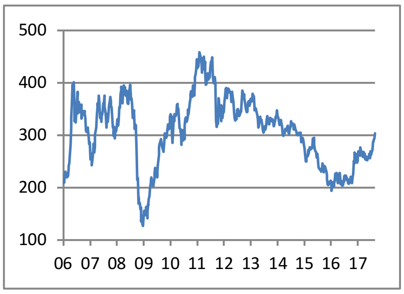
PLATINUM SPOT $/OZ

Price as of: 06.11.2017 921.780



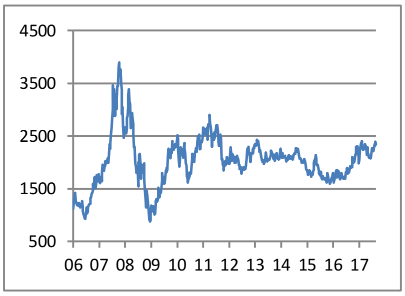
Copper

Price as of: 06.11.2017 314.400



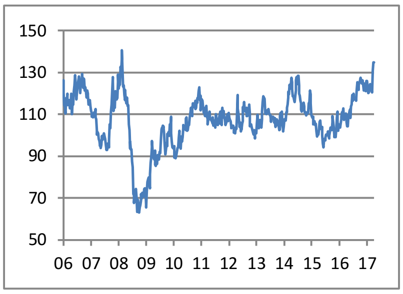
LME LEAD SPOT ($) OFF

Price as of: 06.11.2017 2'475.000



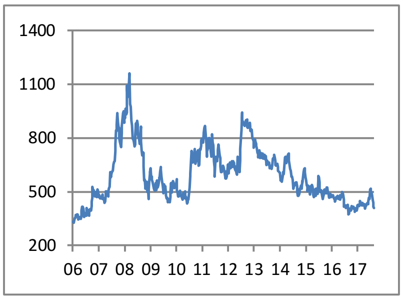
NCDEX Aluminium Spot

Price as of: 06.11.2017 139.800



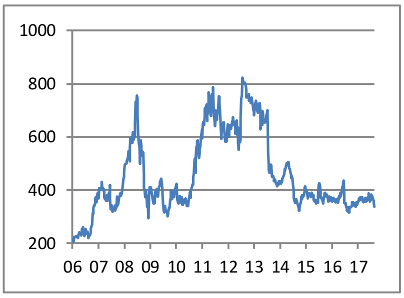
Wheat

Price as of: 06.11.2017 429.500



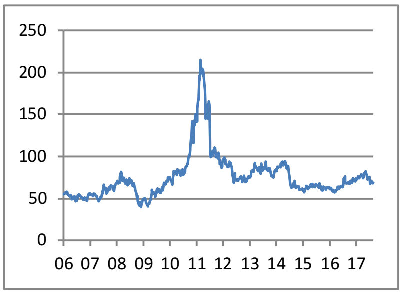
Corn

Price as of: 06.11.2017 350.250



Cotton

Price as of: 06.11.2017 68.650



Cryptocurrencies

Beneath the bubble

Chief Investment Office WM | 12 October 2017

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- Cryptocurrencies have soared in popularity since 2008, with more than 1,000 in existence today and an aggregate value greater than the market capitalization of IBM. But we are highly doubtful whether they will ever become mainstream currencies. The need for companies and individuals to pay tax receipts in government-issued currency, and the potentially unlimited crypto-money supply, pose significant barriers to widespread adoption. We think the sharp rise in crypto-currency valuations in recent months is a speculative bubble.
- But while we are doubtful cryptocurrencies will ever become a mainstream means of exchange, the underlying technology, blockchain, is likely to have a significant impact in industries ranging from finance to manufacturing, healthcare, and utilities. We estimate that blockchain could add as much as USD 300-400bn of annual economic value globally by 2027.
- Investing in the blockchain wave is akin to investing in the internet in the mid-nineties. Blockchain could lead to significant disruptive technologies in the coming decade. But for the time being, technological shortcomings still need to be resolved, it remains unclear which specific applications will prove most useful/profitable, and actual revenue and profitability associated with the industry is currently limited. Despite these challenges, investors seeking long-term opportunities from blockchain technology can start to position in two broad groups: technology enablers – in software, semiconductors, and platforms; and early & successful adopters – in finance, manufacturing, healthcare, utilities, and the sharing economy.

Interview on pp 9-10 has been amended. Please disregard the earlier version of this report.

Introduction

Cryptocurrencies have soared in popularity since 2008, with more than 1,000 in existence today and an aggregate value greater than the market capitalization of IBM. But we are highly doubtful whether they will ever become mainstream currencies. The need for companies and individuals to pay tax receipts in government-issued currency, and the potentially unlimited crypto-money supply, pose significant barriers to widespread adoption. We think the sharp rise in crypto-currency valuations in recent months is a speculative bubble.

What is a cryptocurrency?

Most of us are familiar with using digital currencies. Ever since IBM released their 3651 controller and 3663 checkout terminals in 1973, the role of digital currency has grown, pushing the bounds of mobility, convenience, and security. Debit and credit cards, automated teller machines, point-of-sale chip and pin and contactless technology, the rise of e-commerce, and new peer-to-peer payment methods like Venmo and Square, have all promoted the use of digital currency as an alternative to traditional cash and checks.

But in recent years, interest has grown in a new type of currency – cryptocurrency. Seeking to satisfy the demand of individuals looking for a digital platform to transact securely, anonymously, and outside of government influence, since 2008 the volume and usage of cryptocurrency has exploded. At of the end of September 2017, Coinmarketcap – a cryptocurrency market tracker – lists over 1,100 cryptocurrencies that trade in over 5,500 markets worldwide and with an aggregate value approaching USD 150bn; more than the market capitalization of IBM and McDonald's. The most prominent, Bitcoin, accounts for just under half of this.

So what is cryptocurrency, and why would one use it?

Under development in some form or another since 1983 (see timeline), cryptocurrencies are digitally coded scripts that attempt to replicate the government-backed currencies we use today. However, while transactions in government-backed currencies are tracked by central clearing houses or banks, cryptocurrency transactions are tracked by blockchain, a publically-viewable, digital ledger. The backbone of the cryptocurrency network is made up of 'miners': individuals or syndicates who use highly-efficient networks of computers to solve complex mathematical sequences in exchange for transaction fees and, in some cases, newly created cryptocurrency.

This distributed, rather than centralized, set-up creates a number of advantages over government-backed currencies. First, by allowing transactions to be made directly between two parties, rather than through an intermediary, blockchain could make transacting quicker and cheaper. Second, raising funding in cryptocurrencies is also more straightforward than through a traditional initial public offering (IPO). This has helped spur growth in the initial coin offering (ICO) market. Finally, the pseudonymous nature of cryptocurrencies (the accounts transacting are known but the owners are not) and non-governmental nature of the currencies, means that cryptocurrencies have also gained traction among people concerned about privacy, among those politically opposed to government management of currencies, and as a medium of exchange on the online black market.

Will they ever become true currencies?

Although cryptocurrencies, and the underlying blockchain technology, have advantages that have spurred their growth, we are doubtful that cryptocurrencies will ever become mainstream currencies. Currencies have two basic roles, which cryptocurrencies lack.

Timeline

1983: Berkeley programmer David Chum invented Blind Signature technology – an untraceable payment system that separated a person's identity from their transaction[1].

Late 1980s: Self-proclaimed libertarian anarchist group 'Cypherpunks' outline some mainstays of modern cryptocurrency (pseudo-anonymous protection of identity, proof-of-work systems[2], private/public-key encryption and separation from government-backed currency[3]) in their memorandum The Crypto Anarchist Manifesto.

1997: Adam Beck introduces first successful proof-of-work algorithm, such algorithms would become an important means of controlling the money supply of a given cryptocurrency.

1997: Wei Dei – another member of the Cypherpunks and a researcher for Microsoft[4] – released B-money, indulging the concepts of decentralization and digital contracts[5].

2004: Hal Finney – a computer scientist and Cypherpunk[6] – developed the first successful reusable proof-of-work (RPOW) protocol based on Beck's earlier work. RPOW allowed users to transfer digital tokens by destroying and creating tokens during each transfer[7]. This process constituted the first proof-of-work digital cash system.

2004: Nick Szabo – a computer scientist and cryptographer – launched a protocol that merged Wei Dei's concept of decentralization and Hal Finney's RPOW to create Bit Gold, the cryptocurrency that served as the predecessor to Bitcoin[8].

2009: The first popularized cryptocurrency – Bitcoin – is launched following the release of a paper titled, *Bitcoin: A Peer-to-Peer Electronic Cash System,* by someone writing under the pseudonym Satoshi Nakamoto.

Failing as a medium of exchange – why crypto-currencies will never be used for a majority of transactions

The first and most important role of a currency is to act as a widely accepted medium of exchange. Currencies in themselves have no natural value – gold, for instance, is naturally as worthless as paper[9], sea shells, or wooden sticks (all of which have been used as currencies). Currencies only have value when they can buy things that are useful.

In this regard, government backed currencies carry a huge advantage. Governments set taxes, and tax is the largest single payment in almost any economy. In developed economies over a third of all economic activity that takes place in a year is paid to the government as tax. As such, people will always demand government-backed currencies because they are useful for paying taxes. One of the earliest government-backed paper currencies was that of the Chin dynasty of northern China. In 1192 the Chin Emperor decreed that certain taxes (previously paid in copper coin) must instead be paid in paper currency. This created a demand for the paper currency, giving it a value[10].

In theory, a company could receive a crypto-currency for goods sold. But it would then need to pay corporation tax, payroll tax and sales taxes in government-backed currency. And the company would be taking an exchange rate risk. If the government-backed currency rose in value against the crypto-currency the company would be at risk of significant loss.

Equally, if a company decided to start paying staff costs (on average 70% of costs in a developed economy) in bitcoins, the firm would be expecting its staff to take on an exchange rate risk. This is unlikely to be acceptable to most employees. Staff also need to pay tax in government-backed currency.

This does not stop crypto-currencies from being accepted as a limited form of medium of exchange (see "the currency of crime"). But if governments refuse to accept crypto-currencies for tax payments, the single most important transaction in an economy, that significantly reduces demand for crypto-currencies. Governments are highly unlikely to ever take this step. Governments generally prefer taxes to be raised in the same currency as their liabilities, and also generally prefer to issue liabilities in the same currency that they can control if necessary. This makes it highly unlikely that crypto-currencies could ever be used for a majority of transactions in an economy.

Failing as a store of value – why crypto-currencies will never be used as a store of value

The second role of a currency is to act as a store of value. People need to believe that what their cash can buy today, their cash will buy tomorrow. In order to maintain the store of value, central banks take a lot of trouble to keep a currency's value roughly stable (i.e. control inflation). This is done by making sure that the supply of currency generally matches the demand for a currency. If the balance is maintained the currency will broadly keep its store of value.

An individual crypto-currency cannot achieve this balance, which explains their volatility. Crypto-currency supply cannot go down. A fall in demand for a specific crypto-currency will therefore cause that crypto-currency's value to collapse as supply outstrips demand. For context, Bitcoin's collapse in value in early September was worse than the collapse in the value of the German mark at the start of the Weimar hyperinflation[11]. To be sure, this is nothing to do with the immaturity of the market. Singapore's cash and demand deposits are about USD134bn, not much more than Bitcoin (at $4500 per unit Bitcoin's total value is about USD74bn). But Singapore's dollar is a very stable store of value, because the Monetary Authority of Singapore spends a lot of time and effort making it a stable store of value. Bitcoin's value gyrates wildly because its supply cannot be readily changed.

The store of value of a crypto-currency is further damaged by tax risks. Holding a currency generally has a different tax treatment to holding an asset. If a British subject holds pounds sterling, the recent rise in the value of the pound against the dollar generates no tax liability. However, if the government considers Bitcoin as an asset (rather than a currency) then a rise in Bitcoin's value against sterling could create a capital gains tax liability. And if there is uncertainty about where tax liabilities may arise, or whether they would be incurred, it is likely to undermine peoples' belief in the currency as a store of value[12].

While the supply of individual crypto-currencies cannot be readily changed, the supply of crypto-currencies overall can be infinitely increased. Crypto-currencies have few barriers to entry. Anyone who wants to set up a new crypto-currency can do so. This means that while there may be limits on how much of an individual crypto-currency can be created, there are no limits on how many different crypto-currencies can be created.

The possibility of limitless supply of different crypto-currencies creates the risk of further collapses in value. If a new crypto-currency were created which is easier to "mine," and which allows more transactions to take place more quickly, demand for that crypto-currency might naturally increase. Existing crypto-currencies would likely see demand fall; a crypto-currency that has been superseded by a new crypto-currency with superior technology has little value. As the supply of existing crypto-currencies cannot fall to match the decline in demand, the result would be a collapse in the value of existing crypto-currencies. A good example of this are New York City taxi medallions, which were previously seen as a "store of value" due their limited supply, providing the right to earn cash flow from riders. Their value has plunged in recent years following the advent of ride-hailing apps.

The currency of crime?

While crypto-currencies will almost certainly never be used for a majority of transactions in an economy, they could conceivably be used for some purchases. The possible role of crypto-currencies in illegal transactions is interesting. It could be argued that greater banking regulation and transparency along with more sophisticated attempts to identify money laundering have reduced the supply of government-backed money to the illegal economy. If this is so, then it is entirely in line with historical precedent that those operating in the illegal economy will seek to create their own alternatives to government-backed money, and crypto-currencies could fill that role.

The problem with crypto-currencies as criminal-currencies is that the criminal economy is not a closed economy. The desire to, at some stage, transfer money or assets between the illegal and legal economies would mean that there would have to be a conversion rate between crypto-currencies and government-backed currencies. This would fluctuate with the effectiveness of law enforcement, the demand for illegal goods and services from otherwise law-abiding citizens, and possibly with the penalties for crime. This would make for an uncertain store of value, in a way that a cash-based criminal economy does not.

Are crypto-currency prices a bubble?

What are bubbles?
The term "bubble" is a bit like the term "recession" – a word that is much used in the media but does not have a formal definition in economics. A bubble is assumed to occur when asset prices cannot be explained by fundamentals. However, there has to be more to a bubble than pricing alone. Fundamentally-based models are not entirely accurate, and so a price may appear to deviate from fundamentals and not be a bubble. Deviating from fundamental value must be a necessary condition, but not a sufficient condition for a bubble.

Bubbles nearly always occur when there is something new, or relatively new in the economy. Change, by definition, creates uncertainty about the future. The tulips of the seventeenth century were new and exotic (to Europeans). The joint stock companies of the Mississippi and South Sea bubbles in the eighteenth century were relatively new financial structures. The 1920s saw mass entertainment (radio and cinema) and mass transport (cars). The dot com bubble had the internet. A constant theme of bubbles is the ability of speculators to shout that dreaded cry "this time it's different." Logical arguments against the bubble can then be disregarded as speculators declare that the doubters simply do not understand that the world has changed. The problem with this theory is that the world never changes that much.

A second characteristic of bubbles is that there must be a delay in expected real-world (rather than asset-market) returns. If an asset promised a real-world return in a short space of time, any failure to deliver would undermine the asset price. The great thing about the tulip bulb speculation was that the purchaser had to wait until the bulbs had grown in order to be able to see what flowers had been purchased. The Mississippi and South Sea bubbles both depended on fabulous wealth from far distant colonies and trade that was supposed materialize in a few years. The dot com bubble promised future wealth, and in the meantime nothing as vulgar as earnings need be considered. Of course there were asset price gains to be realized immediately in each bubble, but the underlying value story could not materialize for some time.

In the later stages of a bubble there is normally a mix of buyers in the market. There are those who still believe in the potential real-world profit at some distant point in the future, and there are those that are likely to be investors who are buying purely in anticipation of a rising asset price, without any reference to future profit. Such investors are not looking to future value, they are hoping that they can get out before the bubble bursts. In the Mississippi Bubble in 1720, the promoter (Law) complained that people were trying to convert shares into gold for speculative gain, rather than holding on in the expectation of future returns (which never materialized). The South Sea bubble in the United Kingdom in 1720 saw similar speculation – not just in the South Sea company, but in the hundreds of imitator companies that were launched at the same time. When there was a regulatory attack on such companies, the speculative owners of stock were forced to sell earlier than anticipated. These stocks had been bought on margin, meaning that the owners were looking entirely for speculative short-term gain and not for longer-term value. The regulatory tightening precipitated a sudden collapse in price.

Are crypto-currency prices a bubble?

Applying the aforementioned characteristics to cryptocurrency prices, they demonstrate most of the characteristics of a bubble. Cryptocurrencies are relatively new. The real world benefits are said to take years to materialize, even among evangelists. And the relatively high volume of cryptocurrency turnover, against limited real-world use, suggests that many buyers are seeking speculative gain, never intending to use cryptocurrencies to make a real-world transaction. The remaining characteristic – fundamental value – is the most difficult to assess, since unlike in government-backed currencies, no crypto-currency has an economy behind it. But with each of the other characteristics of typical bubbles in evidence, a twenty-fold increase in bitcoin prices in just two years, and an absence of any fundamental economic backing, cryptocurrency prices are almost certainly a bubble.

What is Blockchain?

While we are doubtful whether cryptocurrencies will ever become a mainstream means of exchange, the underlying technology, blockchain, is likely to have a significant impact in industries ranging from finance to manufacturing, healthcare, and utilities. We estimate that blockchain could add as much as USD 300-400bn of economic value globally by 2027.

Imagine UBS analysts were asked to write this research paper in a single master document. In such a scenario, only one analyst would be able to work at a time. A shared platform would improve efficiency, allowing multiple analysts to work on their respective segments in a single master document, with changes made visible in real-time.

This is a gross oversimplification of blockchain technology, but helps explain the concept. Blockchain is essentially a distributed database, which is shared and continuously reconciled. Traditional databases are run on a master-replica architecture (see Fig. 1), where a trusted party alone can update the master copy, while replica databases mirror the transactions updated in the master database.

Fig. 1: Traditional databases run on master-replica architecture

Source: UBS, as of September 2017

Traditional databases are cumbersome and require huge investments in back-offices to reconcile and verify the validity of transactions.

In contrast, with distributed databases, or ledgers, under a blockchain, every user in the system has a copy of the database (see Fig. 2). This structure reduces costs – individual users do not need to rely on a central party or intermediary, it improves security – any potential change to the database has to be verified by the majority of users using cryptography, and it makes the system more robust – there is no central party at risk of cyber-attack or malfunction.

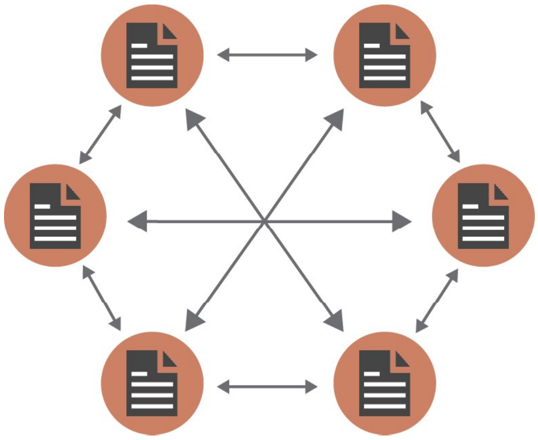
How does it work? Put simply, every 10 minutes or so, all users are required to approve all the transactions (called blocks) done on the network, using cryptography (or hash values), and record them in a chronological order (chain). The term block-chain refers to this block of transactions recorded in a ledger through an immutable chain (see Fig. 3).

Security is improved by the use of hash values – strings of letters and numbers which transform data through mathematical transformation. If an individual user were to make any changes, the hash function would return a totally different hash value, demonstrating that the record has been altered. This helps prevent any malign user from altering past transactions, making the network immutable.

To summarize the key advantages of a blockchain network:

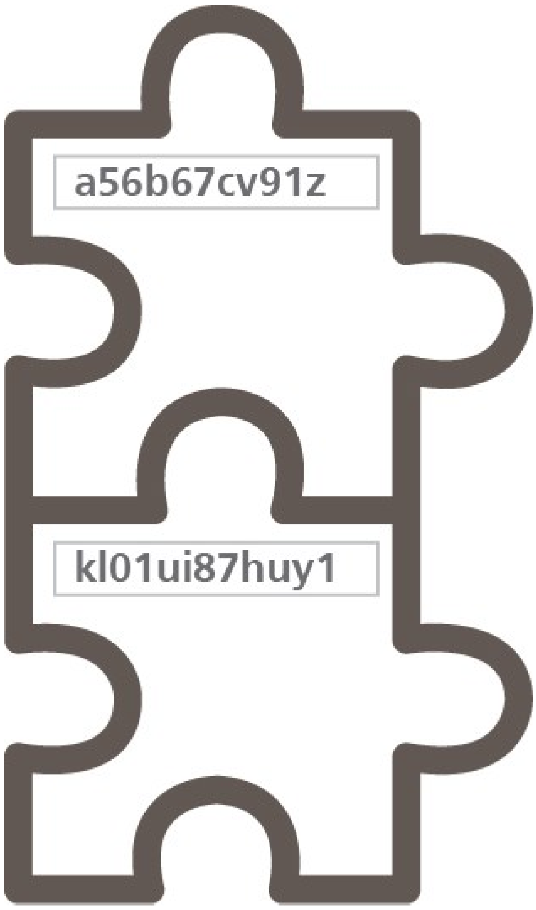
- Disintermediation: Blockchain makes the centralized server less relevant. This allows peer-to-peer transactions with less oversight or intermediation of a third party, while still not exposing the system to counterparty risks.
- Security: The cryptographic nature of blockchain transactions makes the network more secure than traditional databases. Hash values prevent any maligned user from altering the transactions.
- Resilience: In addition to its immutability, blockchain networks are resilient as they do not have a central point of failure. Also, given the encrypted and chain nature of the data blocks, any potential damage to the data would not affect records of historical transactions.
- Lower costs: By eliminating or reducing the reliance of intermediates and associated costs, blockchain networks can significantly reduce transaction costs. The ability to monitor transactions in real-time, for example, can reduce the effort needed to reconcile dispute resolutions.

Fig. 2: Every transaction needs to be verified by all the users in distributed databases like blockchain



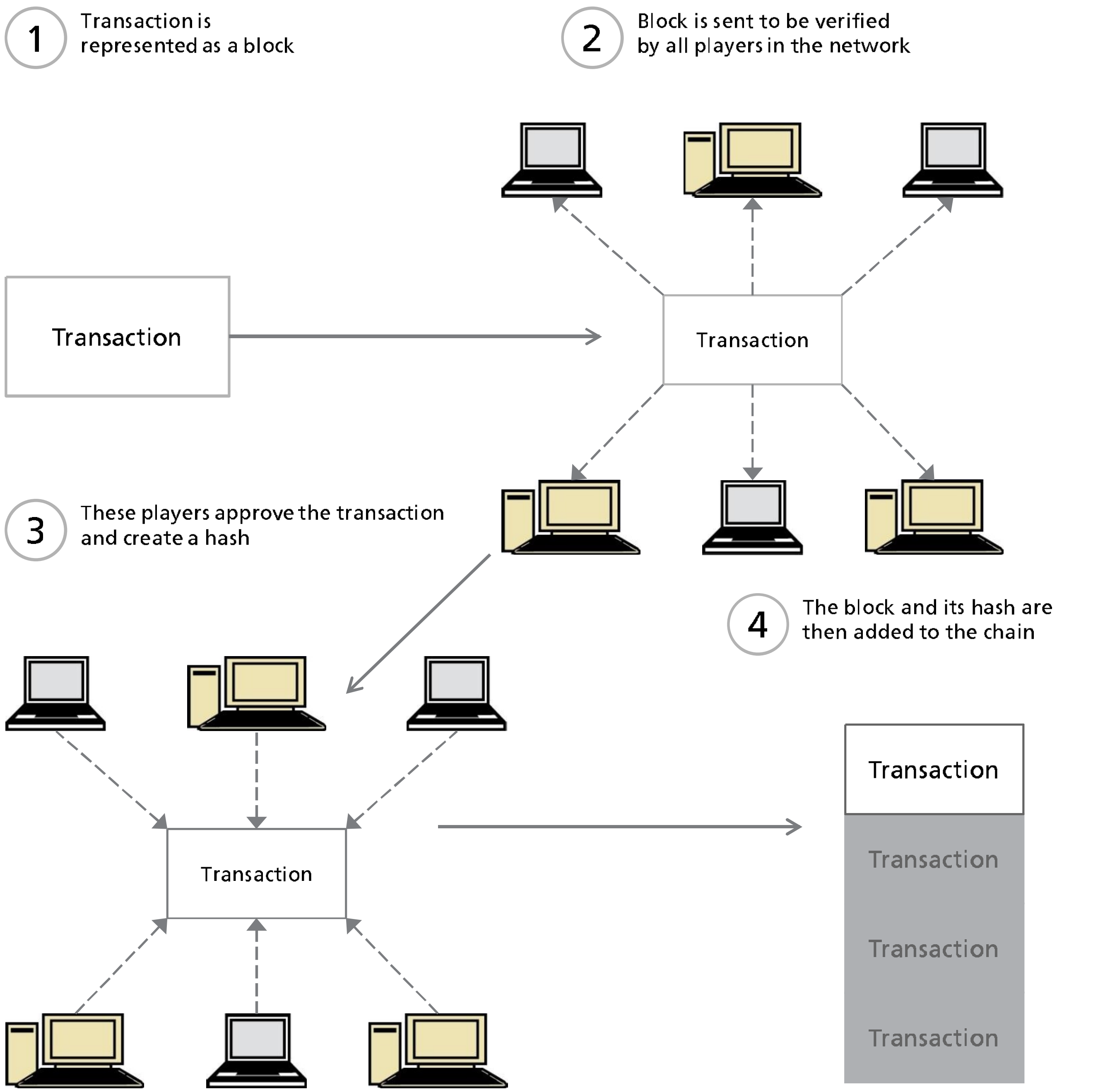
Source: UBS, as of September 2017

Fig. 3: An example of hash values in blockchain transactions



Source: UBS, as of September 2017

Fig. 4: How blockchain networks work



Source: Reuters, FT, WEF, UBS

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Interview

Peter Stephens leads UBS's exploration and development of Distributed Ledger Technology solutions, based out of the Level39 FinTech accelerator in London's Canary Wharf. Since 2003, he has worked at UBS in a variety of technology roles in Europe and Asia. He spent the last nine years based in Hong Kong, where most recently he represented the UBS Group CTO in Asia Pacific, with an added focus on the UBS global strategic regulatory change portfolio. His earlier career focused on UBS Investment Banking Operations technology, prior to which he worked as a technology consultant for IBM and PwC, based out of London.

Peter Stephens, Head of Blockchain and UK Innovation, UBS AG

What is UBS technology's involvement in blockchain?
We are exploring distributed ledgers and smart contracts and how they may apply to complex financial instruments, and we are engaging in a variety of experiments and the development of new business models. We are platform agnostic and the way we incubate blockchain projects is to move from a very early stage that is largely conceptual with a proof of concept or demo, after which we try to get stakeholder buy-in to take it to the next level. Assuming everything goes smoothly, and the project gets funding from the UBS Group Innovation Board, we go through an acceleration phase to make a minimum viable product and run a production pilot. Today we have five such blockchain projects that have reached that level of maturity, all planning to enter the live pilot stage next year. Interestingly, most are running on different blockchain distribution ledger platforms, so there is limited technology overlap. One of the things we found at an early stage of our research is that there are several fundamental building blocks required for the technology to be useful on an institutional level. Two of these key building blocks, which we require for almost every project, are digital cash and digital identity.

Can you shed more light on the utility settlement coin project?
The Utility Settlement Coin (USC) project began as a project between UBS and Clearmatics Technologies in late 2015, to explore a new model for digital cash. The project is currently in its third phase and now involves 10 other consortium members. USC is an asset-backed digital cash instrument implemented on distributed ledger technology and is being designed for use within institutional financial markets. It will be fully backed by cash held at a central bank and will be convertible at parity with a bank deposit in the corresponding currency. In summary, USC is not a new cryptocurrency that we are issuing, but a way of using tokens that are fully asset-backed to reduce risk, improve capital efficiency and ultimately improve the time and complexity involved to clear and settle trades.

Continued on next page.

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What are the other projects UBS is currently working on?
The first project likely to go live is a rather unusual one. It is related to the reference data area, and basically creates a golden resource public reference data, specifically Legal Entity Identifiers and associated data attributes, that can be used across financial institutions. This data is key to accurate regulatory reporting. We are collaborating with market participants and traditional reference data providers to use Ethereum as a consensus mechanism to improve the quality of this data across the market. Another major project we are currently engaged in is related to trade finance, where we are partnering with IBM. Many other organizations are also investigating the potential of distributed ledger technology in the area of supply-chain finance. In the trade finance offering, we are targeting a solution that offers the best of both worlds – the security of letters of credit and the convenience of open account. Another interesting project, where we are working together with ZF and IBM, is providing a car e-wallet. It positions us for a future with electric, autonomous cars, as it would provide, for example, wallet financing for micro payments like charging, parking and tolls. It also gives us an opportunity to understand consumer markets and the interaction with Internet of Things (IoT) devices. Finally, we have other consortium projects pairing us with R3 as well as a project with Ripple on real-time, cross-border payments.

How do you see blockchain affecting some regular banking functions?
It is possible that blockchain will be adopted faster in other sectors, as it is sometimes difficult to collaborate as quickly in the highly regulated area of financial space. Nonetheless, the progress so far in financials has been impressive. At the moment, the most popular areas include supply chain finance, where blockchain help create efficiencies and help solve the double spending problem, or in areas like liquidity management and capital efficiency. For example, tokenization in a fully regulatory-approved environment could help traditionally illiquid assets become more liquid, and be more attractive as collateral. Post-trade is another interesting area of development. A lot of people are excited about DLT potential for clearing and settlement, but we believe financial assets have to be fully digitized and managed on a blockchain network, with regulators on board, before any real efficiencies can be realized. Regulatory reporting will then be able to become a function of the regulator having a node on the network rather than using DLT as a dedicated channel only for reporting.

What are some of the challenges you see with blockchain adoption?
Like any new technology, blockchain faces many challenges, including issues of privacy, scalability, security, regulatory topics and collaboration. While public blockchain or cryptocurrency networks may be more secure than centralized solutions, apart from around the edges, a whole new security conversation will need to begin once private or permissioned networks scale up and as user data gets increasingly stored in a distributed form across multi-party networks. On the collaboration front too, it is a challenge as getting a lot of traditionally competing organizations to essentially work together and create efficiencies out of the underlying infrastructure is not going to be an easy task, given the varying pace, expectations and also legal frameworks.

Any other key messages you would like to deliver?
While we are excited about blockchain technology and happy with the way some of our projects are heading toward production, we are only in the initial stages, as many other projects are still in the experimental phase. We hope the blockchain-related challenges get fixed in the next few years, and we expect a steady increase in the technology's adoption. It's time to get the stuff running, and in the process learn and finally decide where its biggest potential is.

What are the potential applications?

Despite the media attention on cryptocurrencies like bitcoin, we believe blockchain has far greater potential. Just as internet has transformed our lives with email, e-commerce, or smartphone apps, we believe blockchain as an infrastructure technology can power future disruptive technologies through distributive ledgers, smart contracts, tokens or identity management.

We expect blockchain to generate an annual economic value of USD 300-400bn globally by 2027 across six major industries: financials, manufacturing, healthcare, public services, utilities and the sharing economy. This includes the additional economic value created by the introduction of new product services and categories, and a consumer surplus arising from better products, lower prices, and an overall improvement in efficiency. Our estimate, which represents 0.5–0.7% of the combined revenues/spending of the six industries, is consistent with our belief that blockchain will become mainstream over the next 5-10 years, offering both cost savings and new business opportunities.

While in developed markets blockchain can help corporations to fix legacy system challenges and drive efficiency gains, blockchain could have a particularly big impact in emerging markets, where it could build "trust" and allow countries to leapfrog stages of digital development. Transaction costs, access to sufficient capital, public service provision, and bureaucracy are all particular challenges in emerging markets that could be improved with adopting blockchain technologies.

Financials
In an industry that relies on acting as an intermediary in transactions, the distributed nature of blockchain could be seen as a potentially major threat to financials. But it also promises significant cost savings for incumbents. Four out of five banks will already be adopting blockchain technology by 2018, according to the World Economic Forum.

As part of this report, we have interviewed UBS's Head of Blockchain and UK Innovation (see page 9) to show how the technology provides significant growth opportunities, and not just risks.

- **Post-trade services:** While typical stock exchange transactions happen in real-time, post-trade services like settlement, custody, stock lending, and collateral management may take days. Blockchain can help reduce reconciliation and other operational risks. The DTCC (Depository Trust and Clearing Corporation), a central book-keeper for trades in New York processing almost USD 1.6 quadrillion of trades annually, is currently rolling out blockchain solutions for its post-trade services.
- **Compliance:** Blockchain can significantly improve the current know-your-client (KYC) and compliance processes across banks by creating digital identities for clients, inter-operable across multiple platforms and institutions. The process would also allow clients to control the kind of information that is shared with the ability to keep track of authorizations.
- **Trade finance:** Blockchain can greatly enhance trade finance services currently offered by banks by leveraging smart contracts, which can automatically trigger contingent payments. This would help free up capital, and boost efficiency particularly among small businesses and

in emerging markets, where the bulk of transactions are still done on paper. Even today in China, almost three-quarters of trade or bill financing transactions are carried out on paper-based platforms.

- **FX transfers:** From early 2018, Bank of Tokyo-Mitsubishi UFJ is teaming up with six major banks from the US, Europe and Australia to start cross-border remittance services using blockchain. In doing so, blockchain could help improve speed and reduce transaction costs, relative to current processes.
- **Insurance claims:** A major bottleneck in the insurance industry is the claims management process, where often there are disputes between customers and insurers, and between insurers and reinsurers. Blockchain technology can solve the problem by time stamping and auditing insurance documents, and also embedding smart contracts that could automate payments once a payment-triggering event occurs.
- **Digital currencies:** Blockchain technology can be used to improve the inter-bank settlement system for existing mainstream currencies. Early this year, a few global banks decided to join a group led by UBS to create a digital cash system that would make payments via a ledger-based technology, known as the USC; please see Page 9 for more details on this.

Manufacturing

While blockchain might seem most applicable to service-driven industries, the opportunities in manufacturing are not to be underestimated, and we expect billions of dollars of savings or economic value being created. We see two areas where blockchain can have the biggest impact: supply chain and Internet of Things.

- **Supply chain:** Global manufacturing supply chains are currently opaque and suffer from significant inefficiencies. Blockchain can improve transparency through identification management, improve inventory management through transparent entry of activities, and manage product quality through verifiable transactions and by making payments faster through smart contracts. Walmart is already using blockchain technology to track its pork supplies from farms in China to its US stores.
- **IoT:** The distributive nature of blockchain technology can empower IoT units, such as smart sensors in industrial equipment, by making networks quicker and more resilient. For example, blockchain could allow a sensor in the manufacturing line to communicate directly with one at point-of-sale, bypassing the traditional hub, saving both time and money.

Healthcare

Healthcare companies generate around 5% of all the data generated globally, according to Bloomberg, but data is not widely shared, as patients are often uncomfortable sharing their medical history. Blockchain can solve some of the problems by providing anonymized clinical data as part of a distributed ledger, allowing inspection agencies like the US Food and Drug Administration (FDA) or research institutes to access only the relevant information, while maintaining patient confidentiality.

Public services

While government agencies maintain trusted records like the registration of births, marriages, property transfers or new companies, many records are still made on paper, and even where records are stored electronically, databases often work independently. Blockchain can help integrate databases, as well as maintaining the integrity and security of records. A good example is real estate registration. According to the American Land Title Association, about 30% of property titles in the US are found defective at the time of registration, due to a lack of a proper chain of titles. Blockchain's resilient and secure chain-based database could help resolve this kind of problem. It could also revolutionize the current electoral voting process by integrating identity management and cryptography to maintain the confidentiality, resilience, security, and integrity of an election.

Utilities

We are positive on the growth prospects for smart grids that use decentralized, smaller electricity generation resources, e.g. solar panels and energy storage (or even electric cars). Future smart grids will allow households to consume according to their needs, and even sell their surplus electricity back to the grid. Subject to regulation, blockchain could take the concept of smart grids to the next level by allowing users to conduct peer-to-peer transactions, i.e. selling power to consumers in their locality and collecting payments real-time through smart contracts.

Sharing economy

The sharing economy has been gaining traction in recent years as seen by the success of ride-sharing services like Uber or Didi, or home-sharing services like Airbnb. China is a global leader, and the government's State Information Center expects the sharing economy to account for 10% of its GDP in 2020, and around 20% by 2025. Blockchain's identity management solutions fit well with the sharing economy, by helping build trust and making networks more secure. In particular, blockchain could help manage the integrity of user reviews by making them difficult to alter. By embedding smart contracts, blockchain could also accelerate payments when pre-set conditions are met.

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Interview

Jennifer Zhu Scott is the co-founder and principal of Radian and Radian Blockchain Ventures, focusing on Artificial Intelligence, blockchain, and renewable energy. Before this, she was head of business development and strategy in APAC for Thomson Reuters and led the firm's speech-to-text, deep search, video-indexing projects. She co-founded one of the first education companies in China and exited before moving to the UK as a senior advisor to the education subsidiary of Daily Mail & General Trust. During 2014-16, Jennifer served as one of the 18 council members of China Council convened by the Global Agenda Council, the World Economic Forum's think-tank. She is currently serving as one of 20 members of the Council of The Future of Blockchain. In 2013, Jennifer was honored by WEF as a Young Global Leader. Jennifer studied Applied Mathematics at Sichuan University in China and also holds an MBA in Finance with Manchester Business School. She also studied public policy and leadership at Yale University in 2013 and Harvard Kennedy School in 2016. Jennifer is China Fellow of Aspen Institute and a permanent member of the Aspen Global Leadership Network.

Jennifer Zhu Scott, Co-founder and Principal, Radian and Radian Blockchain Ventures

Where are we in the blockchain cycle?

Two factors prohibit us from having a straightforward answer: a) There are uneven adoption speeds and hype between cryptocurrencies and every other application; and b) arguably, blockchain is the least understood disruptive technology at the moment. This lack of understanding, plus over-exuberance in the space contributes to an unhealthy hype in terms of what the technology can and cannot do. We need to realize that blockchain's applications are much narrower than the hype claims. But for the right applications, the implications and impacts are profound. Many people are starting to pay attention to blockchain due to the cryptocurrencies' price surge, which is an incomplete view that overlooks many other meaningful applications in identity, supply chain, etc. I would argue that the interest in blockchain is slightly over the peak of inflated expectations in the hype cycle, especially in the cryptocurrency space. Regulators' necessary interventions will stop some irresponsible actors and allow compliant and responsible players to leverage the technology's capabilities. However, there is a need to bring more attention to non-financial applications for blockchain.

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During the past decade, technology has helped create totally new business models like apps, social networking or the sharing economy. What new businesses could emerge from blockchain in the future?
If the internet has enabled people to share and transfer information, then blockchain technology will enable people to share and transfer value. Regardless of everyone's views on bitcoin, one undeniably powerful fact that bitcoin has demonstrated is that with blockchain, it is easy to create a decentralized peer-to-peer economy. This will empower and transform any online community-driven business, from e-commerce to social media. Blockchain will also change how people transfer and monitor online physical goods of value. The decentralized nature of blockchain makes fraud impossible; therefore, for tracing and tracking diamonds, art, wines, and some (not all) organic goods supplies and trades, adopting blockchain will become essential. I estimate such a necessity will be realized within the next three to five years. Smart contracts have the potential to reorganize how renewable energy is shared, distributed, and scaled. At Radian, it is important for us to be a positive and intelligent force as the renewable sector adopts smart contracts. For governments and large corporations, the applications and implications in identity, traceability and decentralized transactions are very real in a reasonable time horizon. I also believe that IoT related blockchain protocols will play a crucial role in the debates about data ownership in the coming 3-5 years. A new data trading, transaction and owning ecosystem will become possible in the foreseeable future.

Between developed and emerging markets, where do you see blockchain creating more impact?
In general, an absence of legacy issues is always an advantage in making emerging markets adopt faster than in the markets where existing infrastructure needs to be replaced or displaced. As an extreme example, deep in an economic collapse, many Venezuelans aren't trading gold, but bitcoins. I'm also aware of efforts being made by REFUNITE, an NGO serving refugees, to use distributed ledger and middleware to secure data, enable scalable transactional systems across its ecosystem and create a vibrant and inclusive network for communications and online transactions for the under-served population that has no access to internet. Having said that, the decentralized nature is also a threat to the countries that enforce capital controls. Most of these countries are emerging markets. We will see a mixed impact on different countries depending on the political system, regulatory environment, the availability of talent, etc.

Where is the biggest upside for blockchain? In B2C or B2B applications?
Neither. The most powerful upside of blockchain will be on C2C (consumer-to-consumer). The companies that are first to figure out how to use the decentralized nature to empower their individual customers, users or audience with the right incentives and infrastructure will be able to scale, fast and cheap. It's hard to compare and generalize B2C (business-to-consumer) and B2B (business-to-business) because it would really depend on each use case.

How will the user interface of blockchain evolve over the next few years?
I believe that moment will arrive faster than we realize. In the past six months, I have seen significant user-interface (UI) improvements in many blockchain applications. People who truly understand the underlying coding and math of blockchain are in the minority, just like there aren't many people who truly appreciate the complex technology behind iPhone screens. It's worth mentioning that we are at the infancy stage of a potentially multi-decade development and one day blockchain-enabled applications need to be as seamless as smartphones. We need to get to a place where ordinary users can intuitively interact with an application without realizing it is empowered by blockchain.

Any other key messages you would like to deliver on blockchain?
If we truly care about the long-term potential and impact that blockchain technology will have, a healthy dose of skepticism is urgently needed. I understand many people in this space are very passionate about the technology, the protocols of their interests, and all the potential that has been promised. Such passion disables them from taking any constructive criticism. It's very short-sighted. Not every solution needs to be decentralized. Several popular protocols still have a lot of work to do to prove themselves in terms of scalability and security. Blockchain application is not universal and can't solve every single problem. But if we find the right problems, the technology can be profoundly transformational.

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Interview

David Treat is a managing director and the global head of Accenture's Financial Services Blockchain practice, co-lead of Accenture's Firm-wide Blockchain Strategic Growth Initiative and manages Accenture's relationship with several large Financial Services clients. He is well known as an advocate for the power of Blockchain technologies. He most recently worked with Microsoft to build a digital ID network using blockchain technology, as part of a United Nations-supported project to provide legal identification for 1.1 billion people worldwide with no official documents.

David Treat, Managing Director, Financial Services, Blockchain Lead, Accenture

How do you see blockchain adoption at your customers over the next few years compared to previous software-driven cycles like office automation or cloud transition?

The pieces of the puzzle are coming together and will continue to move quickly. We're seeing enterprise leaders engaged and driving innovation; a flourishing start-up community; innovation coming from large tech companies across the full spectrum of technology; governments and regulators engaged; and consortia collaborating and providing a forum to discuss and set standards.

And the technology itself is continuing to mature, as we've seen through our evaluation framework. As with all major business transformations, challenges will arise from the risk, control and legal aspects of how new innovations are applied. The good news is that there is active engagement by legislators and regulators to understand and contribute to how blockchain technology will play out.

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Why should business processes transition to blockchain?
While not a panacea, this technology is already being deployed across industries, across processes and across the globe. Two of our broader themes are identity and supply chain / trade finance. With identity, for example, we are working with a UN-affiliated program called ID2020, in partnership with Microsoft and Avanade. Here, we are working to help address the digital identity challenges of more than 1.1 billion individuals. We demonstrated the proposed solution at the ID2020 Summit at the United Nations in June. It includes biometric innovations that we've had in the field for years with UNHCR, blockchain and a unique identifier (like a DNS). This project has broad commercial applications as well, and it illustrates how profoundly this technology can improve the way we live and work.

Other than Financials, which industries should be early adopters of blockchain?
We are seeing activity across all industries, from digital-rights management for musicians and artists; to track and trace for everything from diamonds and pharmaceuticals, to livestock and fashion; to greater transparency in financing trade; to simplification of real estate and lending; to data management in government and healthcare, and much more.

From a return on investment perspective, how do companies evaluate returns while investing in blockchain – from a revenue maximization or cost reduction?
We published a study earlier this year illustrating how and where eight of the ten largest investment banks would find the most value by implementing a blockchain solution. The study, which can be found (https://www.accenture.com/us-en/insight-banking-on-blockchain), found significant value across the middle and back office.

How will blockchain adoption differ in emerging markets compared to previous enterprise technologies?
One of the more significant differences may be a leapfrog effect, moving from paper-based processes to blockchain-based digital processes where appropriate. In addition, in emerging markets, blockchain-based systems will allow more individuals to have access to banking, education, healthcare, aid and more.

Enterprises will also clearly benefit, but their journey through the technology will require some dismantling of systems and, for blockchain to reach its full potential, a complete reimagination of how processes are run and business is conducted. While we're seeing really interesting projects emerge across the globe, we haven't even begun to scratch the surface.

Investing in the blockchain wave

Investing in the blockchain wave is akin to investing in the internet in the mid-nineties. Blockchain could lead to significant disruptive technologies in the coming decade. But for the time being, shortcomings with the technology still need to be resolved, it remains unclear which specific applications will prove most useful/profitable, and actual revenue and profitability associated with the industry is currently limited.

Resolving challenges
We see five particular challenges that need to be resolved:

- **Speed:** Despite a secure and resilient network, the current design of blockchain technology suffers from slower speeds due to performance-related challenges associated with data computation, storage, and transmission. For example, encryption requires significant computation capacity on each terminal, slowing down network performance. Increased users and transactions, and higher storage and transmission requirements may also slow speeds.
- **Regulatory challenges:** Blockchain is still perceived skeptically by regulators, thanks in part to the association with cryptocurrencies. Regulators may be uncomfortable that the anonymous or pseudonymous nature of blockchain transactions means regulators may not be able to fully monitor transactions. The legal system may also need to adjust to the existence of smart contracts. Data may also reside across national boundaries due to the distributive nature of databases, creating regulatory complexity.
- **Lack of talent:** With blockchain being an emerging technology, there is a serious shortage of talent globally, which may slow down adoption. In particular, integrating blockchain into business processes requires managers and senior executives to fully understand the concept, which is still a work in progress.
- **Integration challenges:** With many traditional business processes still expected to run on traditional databases even after blockchain projects are launched across corporations, integration challenges may arise in terms of how to integrate both databases and deal with the costs of switching and overhaul in related business processes. These integration challenges may force some companies and governments to take a wait-and-see approach.
- **Finding the right applications.** There are many processes which may not benefit meaningfully from blockchain. For example, while blockchain adoption would improve the payments network, we see limited need to overhaul the current retail payment processing system with blockchain. Retail payments using card networks are widely accepted, with reasonable transaction costs, and are real-time in nature with strong protection for both consumers and merchants. Similarly, while blockchain could conceptually be implemented in high-frequency trading, it is more cost efficient to settle balances at the end of the day versus in real-time for every transaction. Additionally, blockchain is unlikely to fully replace many traditional databases or networks running on standard protocols.

Investing today
Despite these challenges, we are confident that as blockchain technology matures, and with increased investments from large corporations and gov-

ernments, these teething problems will eventually be resolved, but it will take time.

Investors today seeking long-term opportunities from blockchain technology can start to position in two broad groups: technology enablers, and early & successful adopters.

Among technology enablers, we believe software companies stand to benefit from increased blockchain adoption as their solutions help run blockchain networks, and it also worth paying attention to semiconductor companies, as blockchain networks would increase demand for storage and particularly memory due to faster write-and-read speeds. Encryption of blockchain networks requires additional processing speed, benefiting companies exposed to semiconductors like application specific integrated circuits (ASIC) central processing units (CPUs), application processors, and graphics processing units (GPUs). Major technology platform companies who embrace blockchain technology would also be able to launch new products and services and further disrupt incumbent companies in other industries.

In incumbent industries, companies that are early movers and successfully adopt blockchain will reap the benefits of the technology both in the form of cost savings, and in the introduction of new products and services. We believe investors will be best rewarded by identifying these as beneficiaries. Conversely, we would avoid technology laggards in incumbent industries that fail to invest in blockchain technology, and those are most exposed to significant disruption risks.

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Interview

Bart Stephens is a Founder and Managing Partner of Blockchain Capital, the General Partner of Crypto Currency Partners. He is also a Managing Partner of Stephens Investment Management, LLC (SIM). Stephens Investment Management is a family owned and operated hedge fund and venture capital firm. Bart and his brother and Co-Founder Brad pioneered "Nanocap" investing – venture capital style investing in public markets focused on sub-micro-cap equities. Prior to co-founding SIM, Bart was Executive Vice President, Venture Capital for Ivanhoe Capital Corporation (ICC), an international investment firm. And before joining ICC, Bart was a founding investor and Head of Corporate & Business development for Oncology.com. Oncology.com grew to become the internet's largest cancer related web-site before being sold to Pharmacia (now Pfizer) in 2001.

Bart Stephens, Managing Partner and Co-founder, Blockchain Capital

How is blockchain positioned vis-à-vis previous technology cycles?
Blockchain is difficult to compare with previous technology cycles like the internet, cloud or social. It is not only a significant technology breakthrough in data architecture or in terms of security providing distributive or decentralized networks, but we also get a feeling of a major movement happening globally.

A lot of people attracted to bitcoin or ethereum, or the ideas that underpin these technologies, are connected based on political or philosophical ideas. A lot of technologists investing in blockchain or bitcoin are here not to make money but they want to be part of a new universe. They believe the financial system is broken after what happened in 2008 and the way financial institutions are interconnected. What is interesting about the cryptocurrency world is it is like a parallel universe as Wall Street and Cryptostreet don't intersect. In terms of the broader blockchain technology, we are in the early stages of the cycle as the technology is used to solve new business problems, which is threatening the status quo of incumbents in a frictionless way without the involvement of intermediaries.

How do you see blockchain technology's role in disruption?
When I sent my first email in the 90s, I was still in college and I was too narrowly focused and thought email was bad for US postal service. Fast forward 25 years, the internet has disrupted many businesses and not just postal service - whether it is E*Trade disrupting financial institutions or Amazon disrupting retailers. The internet has been a horizontal-enabling technology that has impacted every vertical. We see blockchain as being somewhat similar to internet. As one of the oldest VC firms investing in blockchain technology, we invest in companies that are set to disrupt financial services or legal services with smart contracts, or healthcare and, international trade. We see blockchain as not just a technology breakthrough but a social movement set to impact every single industry.

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How do you see the future of tokenization?

Most people like to focus on ICOs, which is about transactions. What is more important than the transaction is the idea about the tokenized networks, which we call Capitalism 2.0. Tokenized networks allow not just crowd-sourcing of capital, where they may attract investors or speculators but they also attract the future users of the company's technology that can build a strong ecosystem by generating significant value. It is a better meritocratic way to reward value creators, not passive investors or speculators.

How do you see the role of regulators evolving on blockchain technology?
What regulators got right with the US tech companies, where today the platform companies alone have a combined market cap of around USD 4 trillion, is they took a light-touch attitude during their initial days. Today, Silicon Valley is home to global innovation, and if not for a favorable regulatory regime during its early days, the spectacular growth we've seen wouldn't have been achieved. What we are trying to lobby with regulators is that blockchain technology represents the internet of value – it is crucial that we get this right, to allow the innovation to grow. Blockchain technology is transnational and the US regulators are doing a great job in trying to find a balance between regulating it and making sure the US remains competitive on a global basis. They are watching the space and in the process learning, and we hope they get it right and foster innovation in the country.

What are the challenges you see investing with blockchain networks?
The first and foremost risk is regulatory given the mixed messages from global regulators on the topic. The other risk is leadership risk as bitcoin is a leaderless movement focusing on decentralized or distributed networks. Finally, there is sociological risk as blockchain is a movement where the interests of most participants are aligned towards the lack of centralized networks, but the question is whether they continue to share the same values in the future. That being said, one risk blockchain doesn't have is technology risk as the open-source nature of technology is going to stay, with significant improvements seen in the future.

Any other key messages you would like to deliver on blockchain?
Blockchain technology is here to stay and if you don't have exposure to blockchain technology, start looking at it. Ignoring this technology would be like staring at the internet two decades back or even the last decade and missing the huge disruption and growth opportunities we have seen with the internet industry. Blockchain is a game-changing technology and we are only in the first innings.

End notes

[1] "Blind signatures for untraceable payments" D. Chum. 1983.

[2] Note: Timothy May referred to proof-of-work system as proof system.

[3] "The Crypto Anarchist Manifesto", Timothy C. May, https://www.activism.net/cypherpunk/crypto-anarchy.html, Accessed 25 September 2017.

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[5] "b-money". W. Dai. http://www.weidai.com/bmoney.txt. Accessed 25 September 2017.

[6] Satoshi Nakamoto Institute. http://nakamotoinstitute.org/finney. Accessed 27 September 2017.

[7] "RPOW – Reusable Proofs of Work". Hal Finney. August 2004. http://nakamotoinstitute.org/finney/rpow/index.html. Accessed 28 September 2017.

[8] "Bit Gold". Nick Szabo. 29 December 2005. http://nakamotoinstitute.org/bit-gold/. Accessed 25 September 2017.

[9] A fact discovered by early European settlers in North America, who tried to purchase food and other essentials from the local population using gold coin as a medium of exchange. North American locals did not use gold as a medium of exchange, saw no practical use for gold whatsoever, and so rejected the exchange.

[10] Unfortunately, the Chin Dynasty printed money faster than they could engineer demand for it, and over time the system gave way to hyper-inflation. This is a clear demonstration of why money supply should be controlled by economists. Nonetheless, the point remains that throughout the rising inflation paper currency was demanded, and had some value, because taxes had to be settled using paper notes.

[11] There is no technical definition for what constitutes hyperinflation. However a decline in spending power of 50% over the course of a month (or any pro rata decline over a different time period) is generally considered to constitute hyperinflation. Measured in Bitcoins per dollar, Bitcoin's spending power declined 40% in the first two weeks of September 2017.

[12] There is a parallel with gold here. Gold is not considered currency in the United Kingdom – and gold bullion is subject to capital gains tax as with any other asset. However British gold coins produced by the Royal Mint (a sovereign or a Britannia) are considered currency and are not subject to capital gains tax.

Appendix

Terms and Abbreviations

Term / Abbreviation	Description / Definition	Term / Abbreviation	Description / Definition
A	actual i.e. 2010A	COM	Common shares
E	expected i.e. 2011E	GDP	Gross domestic product
Market cap	Number of all shares of a company (at the end of the quarter) times closing price	Shares o/s	Shares outstanding
UP	Underperform: The stock is expected to underperform the sector benchmark	CIO	UBS WM Chief Investment Office

Appendix

Generic financial research – Risk information: UBS Chief Investment Office WM's investment views are prepared and published by Wealth Management and Personal & Corporate Banking or Wealth Management Americas, Business Divisions of UBS AG (regulated by FINMA in Switzerland), its subsidiary or affiliate ("UBS"). In certain countries UBS AG is referred to as UBS SA. This material is for your information only and is not intended as an offer, or a solicitation of an offer, to buy or sell any investment or other specific product. Certain services and products are subject to legal restrictions and cannot be offered worldwide on an unrestricted basis and/or may not be eligible for sale to all investors. All information and opinions expressed in this material were obtained from sources believed to be reliable and in good faith, but no representation or warranty, express or implied, is made as to its accuracy or completeness (other than disclosures relating to UBS). 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Appendix

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Asset Allocation Polls

A participant walks past a poster at the Asian Financial Forum in Hong Kong January 20, 2010. REUTERS/Bobby Yip

The Reuters Global Asset Allocation Poll is a monthly survey of recommended global portfolio allocations from many of the world's top investment firms, based in the U.S., Britain, continental Europe, China and Japan.
The polls were conducted from October 16 to 30, 2017.

- **Global funds raise U.S. equity exposure to seven-month high**
- **U.S. funds favor bonds over stocks as economic cycle ages**
- **European equity bulls lift holdings to 9-mth highs**
- **Wary of c.banks, share prices, UK funds ease off on equities**
- **Japan fund managers increase North American stocks in October**
- **China funds boost equity exposure to 7-month high, cut cash**

REUTERS®

Global funds raise U.S. equity exposure to seven-month high

By Claire Milhench

With U.S. stock markets climbing to new highs in October, global investors raised U.S. equity holdings to seven-month highs, a Reuters poll showed on Tuesday, encouraged by strong corporate earnings and the revival of U.S. tax-cut plans.

The monthly asset allocation survey of 51 wealth managers and chief investment officers in Europe, the United States, Britain and Japan was conducted between Oct. 16-27.

During this period, U.S. tax-cut plans passed a key legislative hurdle , reviving hopes that corporate America would reap the benefits.

That helped U.S. stocks scale new highs in October, boosted also by better-than-expected company earnings and upbeat third- quarter U.S. growth numbers . The Nasdaq tech index looks set to end the month over 3 percent higher, and the Dow Jones is up 4.5 percent .

Not surprisingly, global investors' exposure to U.S. stocks rose 2.1 percentage points in October to 40.8 percent of their global equity portfolios, the highest level since March.

While overall equity exposure dipped a touch to 47.5 percent of global balanced portfolios, investors remained upbeat.

"It has been more than eight years since the March 2009 low and yet we still see few signs of the imbalances that usually signal the end of a bull market in equities," said Trevor Greetham, head of multi-asset at Royal London Asset Management (RLAM).

"At some point, a sustained rise in inflation will trigger a concerted effort by central banks to tighten monetary policy, but we're not there yet."

Only 38 percent of poll participants who answered a question on the U.S. Federal Reserve, European Central Bank and Bank of England thought all three would tighten monetary policy by the end of the year.

Although the Fed was widely expected to raise rates again in December, respondents disagreed about the path the ECB and BoE would take.

In late October - after most participants had filled in the poll - the ECB said it would cut its bond purchases in half from January. But it did extend the scheme until the end of next September .

"Tapering is not tightening," Greetham said.

As for the BoE, Sandra Crowl, a member of the investment committee at Carmignac, noted the bank had a juggling act to perform - inflation is rising while weaker investment and consumer spending are cutting into growth .

EURO ZONE CUT

Within global bond portfolios, investors cut holdings of euro zone debt by one percentage point to 28.9 percent - the lowest since June - while trimming UK gilts to 9.9 percent.

Emerging market debt remained in favour, its share in portfolios up 1.2 percentage points to 12.1 percent.

Poll participants were split 50/50 on whether a new German finance minister would loosen the country's fiscal policy, after Wolfgang Schaeuble agreed to step aside .

"The Germans are (somewhat rightly) terrified that the current policy of the ECB is way too loose for them," said Mouhammed Choukeir, chief investment officer at Kleinwort Hambros. Their only way to offset that loose monetary policy is with a prudent fiscal policy, he said.

However, Peter van der Welle, a strategist at Robeco, said that Germany's current budget surplus and sturdy economy provided a benign backdrop for a new governing coalition to pursue a less restrictive fiscal policy.

There was little consensus on whether the impasse in Brexit negotiations made a hard Brexit - one without a trade deal - more likely. Half of those who answered a special question on the subject thought it would.

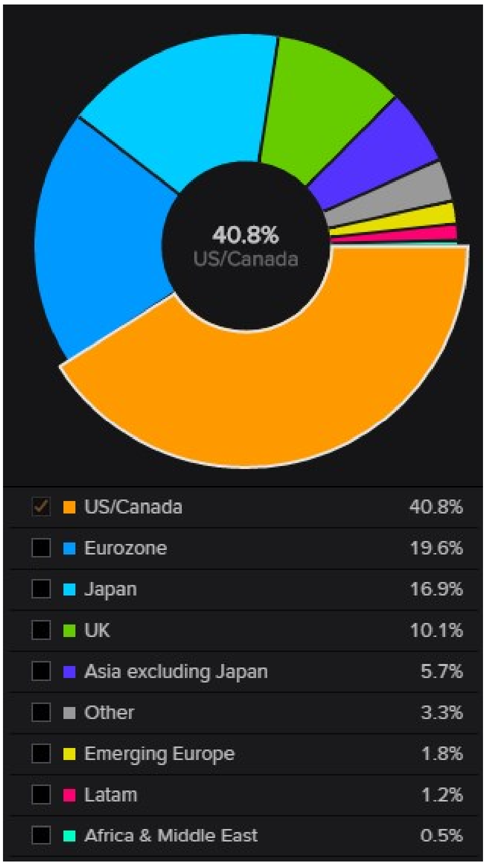
David Vickers, senior portfolio manager at Russell Investments, said that after a disastrous election result for the Conservatives, the general view was that Brexit would only get softer.

"We view the impasse as transitory as the UK government will likely be more conciliatory in negotiations and be willing to make concessions," he said.

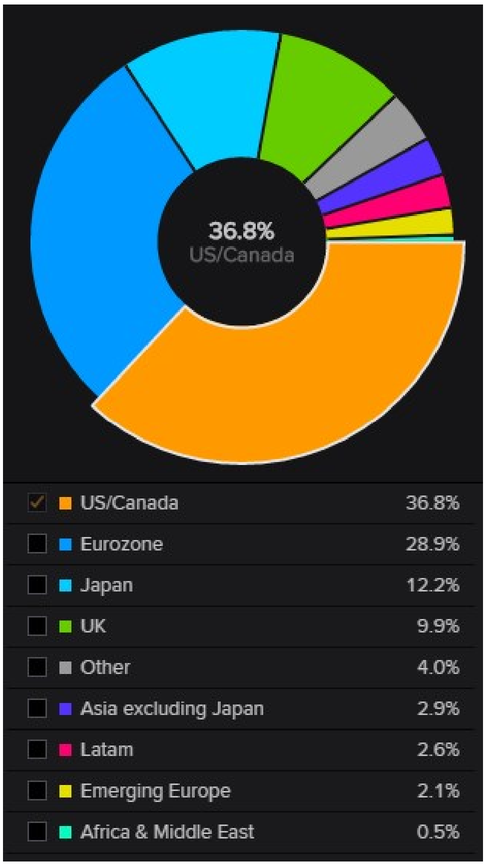
But others, such as Martin Wolburg, senior economist at Generali Investments, noted several hurdles ahead, including the exit bill, the Northern Ireland border issue and European Union citizens' rights in the post-Brexit Britain.

"If no progress towards a deal is made in December, investors are likely to price a significantly higher risk of no deal," said Jan Bopp, asset allocation strategist at J Safra Sarasin.

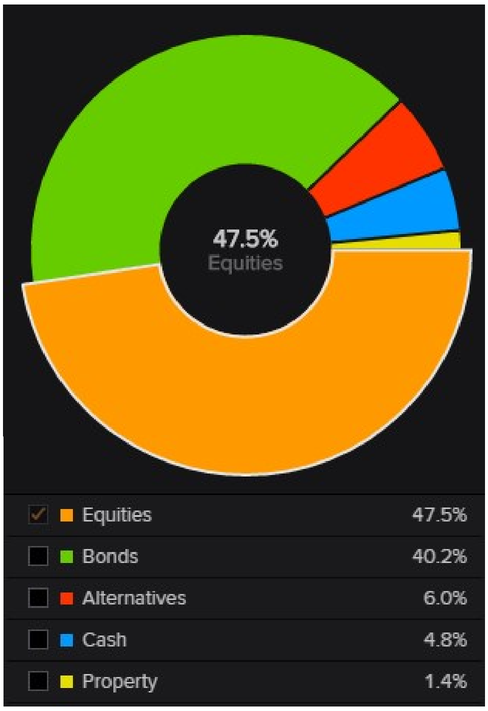
Global equity allocation



Global bond allocation



Global balanced allocation



A street sign for Wall Street is seen outside the New York Stock Exchange (NYSE) in Manhattan, New York City, U.S. December 28, 2016. REUTERS/Andrew Kelly

U.S. funds favor bonds over stocks as economic cycle ages

By Shrutee Sarkar

U.S. fund managers increased recommendations for bond holdings in their model global portfolio to a five-month high in October on expectations the current economic cycle is nearing its end, a Reuters poll showed.

The monthly survey of 13 U.S.-based asset managers taken Oct. 16-30 showed global bond allocations accounted for an average 35.1 percent, up from 34.8 percent the previous month, and the highest since May.

Stock allocations were held steady at 56.7 percent, with the remainder spread among cash, property and alternative investments.

World stocks have hit a series of record highs this year with the global economy on its best roll in years, pushing major central banks to shift their bias away from policy easing.

While the current equity bull market is in its ninth year, recommended allocations to stocks have held below 60 percent and bonds above 30 percent in the Reuters U.S. Asset Allocation Poll for over four years - a reversal of the previously more common split in model global portfolios.

Several U.S.-based global fund managers said that recent composition has performed almost as well as an all-stock portfolio, with less risk.

Worries that several developed economies are at a late stage in the current economic cycle - the U.S. expansion is already almost 100 months old - and expectations that inflation is not set to accelerate have boosted their preference for bonds.

"Once you start to look through the smooth macro surface at the underlying risks and uncertainties, there are a few problems that might pop up even over the short-term cyclical horizon and upset the eerie calm in financial markets," said a fund manager at a large U.S. investment firm.

"The most important macro uncertainties – 'the ABCs of caution' – are the aging U.S. economic expansion and the coming end of central bank balance sheet expansion."

They also expect the current run-up in the equity market to grind higher based on continued global growth, even as they worried the move away from easy monetary policy by major central banks could weigh on global stocks.

"In 14 of the past 15 Federal Reserve rate hiking cycles - dating back to 1965 - equity valuations contracted during the 12 months following the initial hike. Clearly, it hasn't happened this time around and instead valuations are near all-time highs," added the fund manager.

"Meanwhile, volatility is at an all-time low amid one of the longest economic expansions on record, at the same time that central bank accommodations are waning."

Equity bulls hold strong in Europe but favour U.S. stocks

By Claire Milhench

Strong company earnings and the revival of U.S. tax reform expectations encouraged European fund managers to boost equity holdings to nine-month highs in October, a Reuters poll showed on Tuesday.

The survey of 19 chief investment offices and wealth managers was carried out between Oct. 16-27, a period in which U.S. tax cut plans passed a key legislative hurdle , reviving expectations that corporate America would reap the benefits.

In the poll, investors raised their U.S. stocks allocation to 37.2 percent of global equity portfolios, the highest level since April.

Overall equity allocations rose by 2 percentage points to 46.1 percent of global portfolios, the highest since January, while cash was cut to 6.7 percent, a four-month low.

U.S. stocks hit record highs in October, lifted by better-than-expected company earnings and upbeat third quarter U.S. GDP data. The Nasdaq looks set to end the month up over 3 percent, whilst the Dow Jones is up 4.2 percent.

Boris Willems, a strategist at UBS Asset Management, said U.S. equities looked fully valued relative to history, but valuations were not so stretched as to rule out further upside.

"Supported by continued earnings growth and the prospect of a more stable economic backdrop, we believe equity valuations have scope to expand further," Willems said.

Investors also raised Japanese equity holdings by 2.1 percentage points to 10.2 percent, the highest since May 2015.

The Nikkei posted its longest daily winning streak in over 50 years in October, advancing more than 5 percent over 14 days ahead of a general election.

It is set to end the month up around 8 percent. Antoinette Valraud, head of third party portfolio management at Generali Investments, said Japanese markets should benefit from the improving economy and favourable politics.
Japanese Prime Minister Shinzo Abe is expected to order his cabinet to compile an extra budget by year-end to give impetus to his economic agenda after his ruling bloc's strong election win.
On the debt side, investors cut their eurozone bond holdings by 4.3 percentage points to 50.9 percent, the lowest since August 2016, and their U.S. bond allocation by 2.6 percentage points to 18.5 percent, the lowest since March 2015.
The U.S. Federal Reserve will likely raise rates again this year, while the European Central Bank (ECB) pledged on Oct. 26 to halve its bond purchases from January. However, it extended the programme until the end of next September.

TIGHTENING DILEMMA

Uncertainty over ECB policy, and the Bank of England's (BoE) dilemma as it struggles to balance sluggish growth with inflation, meant just 41 percent of poll participants who answered a question on the Fed, ECB and BoE thought all three would be tightening monetary policy by year-end.
Robeco strategist Peter van der Welle said BoE Governor Mark Carney was "really caught between a rock and a hard place".
"From the viewpoint of credibility, a rate hike after the recent hawkish rhetoric would be justified, but the economic reality of a vulnerable household sector and cooling housing market suggests the BoE must hold the trigger," he said.
Poll participants were similarly split on whether a new German finance minister would loosen the country's fiscal policy, with only 50 percent expecting this.
Last month Wolfgang Schaeuble stepped aside as finance minister, clearing the way for another party to take the job as part of negotiations to forge a new coalition government.
"We expect that (German Chancellor Angela) Merkel will have to accept some looser fiscal policy to build the coalition," said Francois Savary, chief investment officer at Prime Partners.
But he expects Merkel to point towards German inflation data as a reason to ensure such loosening is limited.

Wary of c.banks, share prices, UK funds ease off on equities

By Sujata Rao

British fund managers have taken equity allocations down from two-year highs, having grown especially wary of pricier U.S. shares as Western central banks prepare to wind down their super-easy credit policies.
Reuters' latest monthly asset allocation poll was carried out between Oct. 16-27, a time when world stocks surged to new record highs against a background of robust economic data.
But with economic growth accelerating or inflation rising, hawkish central bank action is becoming more likely.
This week, the Bank of England (BoE) is seen delivering its first interest rate rise in over a decade while the European Central Bank (ECB) pledged at its Oct. 26 meeting to halve bond purchases from early 2018.
The survey of 15 money managers found equity exposure had been cut by 3.5 percentage points to 49.9 percent, the lowest since July, with U.S. allocations slashed by 4.3 percentage points to a 14-month low of 28.5 percent.
Mark Robinson, chief investment officer at wealth manager Bordier & Cie (UK), said global growth - still fragile - could take a hit should central banks mishandle the transition to a tighter monetary policy.
So far, world stocks are unruffled, scoring successive all-time highs, and heading for a record 12-month long winning streak. The U.S. S&P 500 index is up 15 percent and tech stocks have soared 24 percent this year.
But Robinson said that at current elevated levels, markets faced barriers in the form of "tighter monetary conditions, squeezed consumers, stretched equity valuations, compressed bond yields, escalating debt levels and geopolitical tensions".
While markets could ignore these issues for the rest of the year, "the outlook beyond this does look much more uncertain," he added.
Around 40 percent of the poll participants who answered a special question on the subject predicted the U.S. Federal Reserve, the BoE and the ECB would be in policy-tightening mode by

A newspaper advertising board heralds the Bank of England's decision to raise in interest in central London, Britain, November 2, 2017. REUTERS/Toby Melville

end-2017, albeit in different ways.
Some of the responses were received before the ECB meeting.
"Barring a crisis, it is very unlikely that any of the three central banks will miss an opportunity to act with a seemingly docile and acquiescent market," said David Vickers, senior portfolio manager at Russell Investments.
While euro zone stock holdings stayed at 17 percent - about 5 percentage points above end-

2016 levels - many investors saw the market as better value than Wall Street. Investment bank UBS said this week it had revised up European earnings estimates for the first time in a decade, while cutting U.S. forecasts.

Larry Hatheway, head of GAM Investment Solutions, noted ECB policy tightening would commence only next year. He saw a sudden unexpected rise in inflation as the biggest risk, simultaneously hitting both bond and equity prices.

"Barring that outcome, the best opportunities are in European and emerging equities, where earnings growth rates are best supported by the cyclical improvement in the world economy," he said.

European shares could also benefit from a new German finance minister to replace Wolfgang Schaeuble, a leading advocate of austerity programmes for Greece and the rest of the euro zone.

The 75-year old Schaeuble has been elected speaker of the German parliament's lower house, while the Greens, potential coalition allies of Germany's Christian Democrats, will demand higher budget spending.

About 40 percent of those who replied to a special question on whether a new finance minister would loosen German fiscal policy, replied in the affirmative.

"Fiscal policy stances are being loosened in many regions and Germany looks set to follow suit. Likely coalition partners for Merkel will push for looser policy and this is aided by the removal of Schaeuble as finance minister," Hatheway added.

The allocation to UK shares rose one percentage point to 24.7 percent, the highest since January. But this possibly reflects the market's exposure to the world economy, rather than to domestic finances which are under strain from Britain's decision to exit the European Union.

Ratings agencies have stripped Britain of its gold-plated AAA score and warn that the absence of a clear British position and the lack of time before its scheduled March 2019 exit date make a "hard Brexit" more likely - crashing out of the EU without a trade deal in place.

Two-thirds of fund managers, in response to a special question, said the current impasse in talks with the EU made a hard Brexit more likely.

"The clock is ticking down and the negotiation process looks to be deadlocked. A lack of exit deal would lead to greater unknowns for businesses," said Oliver Blackbourn, multi-asset analyst at Janus Henderson Investors.

Japan fund managers increase North American stocks in October

Japanese fund managers increased their exposure to North American stocks in October, a month when Wall Street shares marked a succession of record highs, a Reuters poll showed.

The survey of five Japan-based fund managers conducted between Oct. 16 and 25 showed respondents on average wanted to allocate 38.0 percent of their overall stock holdings in their model portfolios to North American equities in October, from 25.5 percent in September.

They trimmed their exposure to Japanese stocks to 41.3 percent in October from 43.8 percent in September and reduced euro zone equity holdings to 8.3 percent from 10.8 percent.

The Dow, the S&P 500 and the Nasdaq all advanced to record highs this month.

"U.S. equities continue to perform strongly on a robust economy, the information technology sector's solid earnings, gradually-paced monetary policy normalisation and tax reform hopes," wrote strategists at Sumitomo Mitsui Asset Management.

"Japanese stocks are now beginning to move in tandem with U.S. stocks."

Japan's Nikkei advanced to a 21-year high in October, during which it marked a record 16 straight sessions of gains. The Nikkei has risen 14.8 percent so far this year, and while impressive, the Dow has gained even more, advancing 18.4 percent

The respondents cut Asia excluding Japan stocks to 4.2 percent from 9.2 percent.

Their total exposure to stocks was at 37.3 percent in October, unchanged from September.

The fund managers slightly increased the weighting of their overall bond holdings to 57.5 percent in October from 57.3 percent in September.

A man stands in front of electronic boards showing stock prices and exchange rate between Japanese Yen and U.S dollar outside a brokerage in Tokyo, Japan, January 20. REUTERS/Kim Kyung-Hoon

China funds boost equity exposure to 7-month high, cut cash

Chinese fund managers boosted their suggested equity exposure for the next three months to the highest level in seven months, as recent economic data helped lift expectations for the world's second largest economy, a monthly Reuters poll showed.
The fund managers raised their suggested equity allocations to 78.8 percent, from 73.8 percent a month earlier, according to a poll of eight China-based fund managers conducted this week.
The fund managers have cut their suggested bond allocations for the coming three months to 8.1 percent from 10 percent last month.
They have also reduced recommended cash allocations to 13.1 percent for the next three months, from 16.3 percent the previous month.
"Expectations for domestic liquidity improved thanks to the central bank's targeted reserve requirement rate cut, while better-than-expected PMI in September will continue to lift expectations for economic fundamentals," a Shanghai-based fund manager pointed out, adding those factors along with solid profit growth from listed firms underpinned the stock market rally this year.
China's central bank in end-September cut the amount of cash that some banks must hold as reserves for the first time since February 2016, in a bid to encourage more lending to struggling smaller firms and energize its lacklustre private sector.
The PBOC said in a statement that the targeted RRR cut did not constitute a change to its prudent and neutral monetary policy.
Market participants also expect the targeted cut to support the real economy rather than the financial markets.
China's manufacturing activity grew faster than expected in September as factories cranked up production to take advantage of strong demand and high prices fuelled by a year-long building boom. However, some fund managers were not that optimistic about the stock market in coming months.
Quite a few institutional investors could take profits as the year-end nears, while a potential seasonal fall in fourth quarter economic data could put major stock indexes under pressure, a South China-based fund manager said.
The fund managers surveyed held mixed views on asset allocations for the next month, with two suggesting a cut and two signalling an increase, while four recommended the same level of equity exposure.
According to the poll, average recommended allocations to consumer shares jumped, while those to cyclical firms including automobile, metals and energy stocks were lowered.
"We favour liquor makers, furniture & home appliance makers and insurers, as China's spending power continues to improve as a whole, in particular in third and fourth-tier cities, with consumer sector contributing more to the country's economic growth," another Shanghai-based fund manager said.
Average recommended allocations to consumer shares were raised to a seven-month peak of 30.1 percent from 24.5 percent last month, while those to metals stocks were cut to 5 percent from 5.6 percent, according to the poll.

An illuminated cube bearing the Chinese flag is seen in the entrance foyer of the London Stock Exchange in London, Britain November 10, 2016. REUTERS/Peter Nicholls

Trump & the Modernization of US Infrastructure

Obsolescence & Fiscal Stimulus, the next catalysts

October 23rd, 2017

SESAME FINANCIAL GROUP

for Prime Partners

Table of contents

TRUMP & INFRASTRUCTURE MODERNIZATION

Trump & Infrastructure | Key economic measures

Trump's Key economic measures & Budget impact

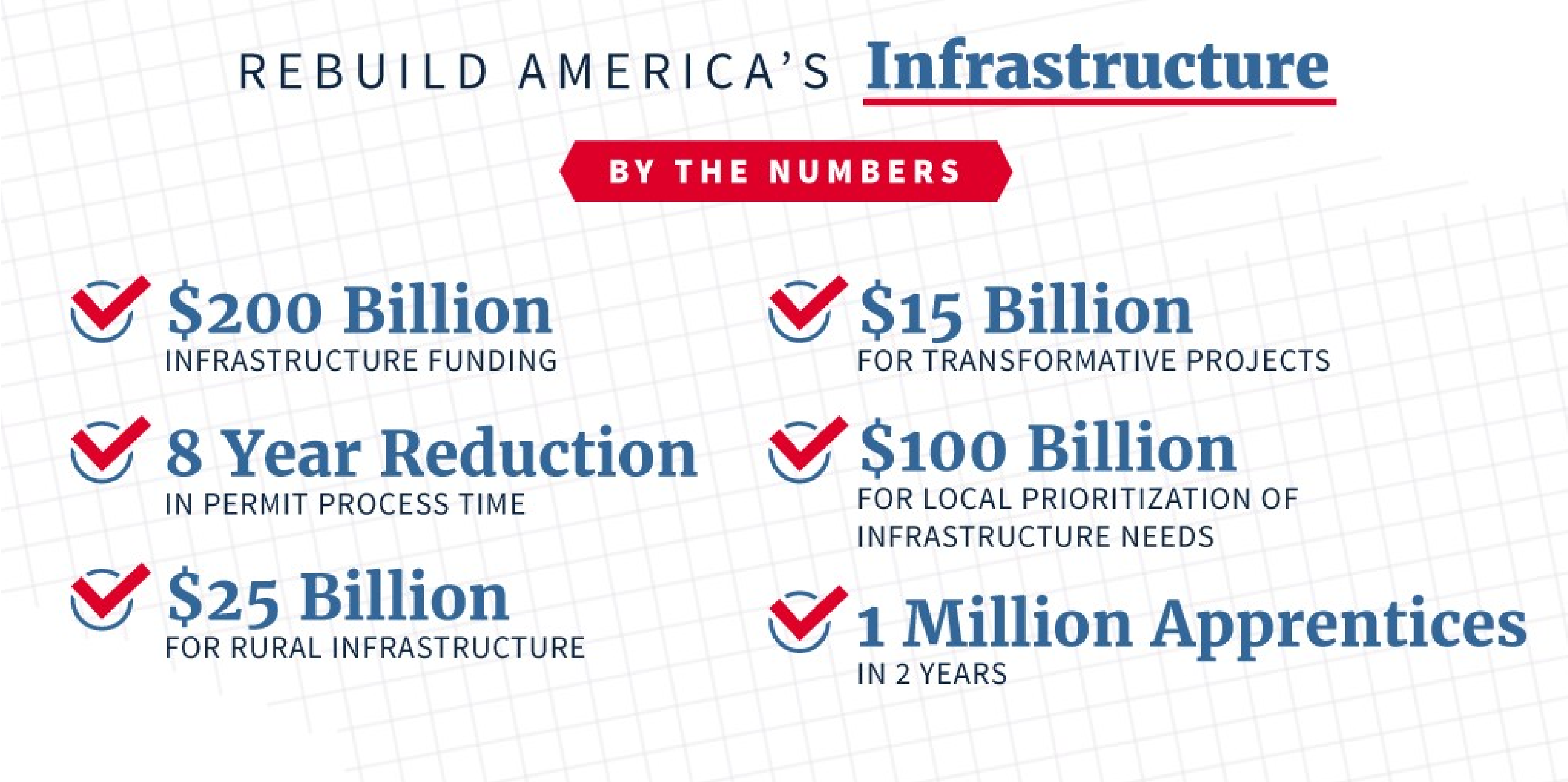
The first year could be marked by individual and corporate tax cuts as well as infrastructure spending boosts.

Taxes	• Complete reform of the General Tax Code • Reduction of personal tax rates (maximum marginal rate down to 25% from 39.6%) and corporate tax rates (corporate tax rate down to 15% from 35%)
Spending	• Increased spending for veterans • **Boosting spending on infrastructure ($500 bn to $1 Trn invested over the next decade)**, military and veterans • Building of a wall between the US and Mexico
Spending	• Renegotiate/withdraw from NAFTA, TPP and WTO • Identify anti-US trading abuses and impose tariffs to stop companies shipping jobs abroad
Budget impact *(Moody's)*	• Debt-to-GDP ratio at 90.5% in 2026 vs 75.9% in 2016 • Budget deficit at 5.3% in 2026 vs 3.5% in 2016

Trump & Infrastructure | Rebuild America Highlights

$200 Bn Federal spending, leveraged to reach $1 Trn spending

- Only 1/5 of infrastructure spending comes from the Federal Government, the vast majority comes from states, localities, and the private sector



Source: https://www.whitehouse.gov/blog/2017/06/08/president-trumps-plan-rebuild-americas-infrastructure

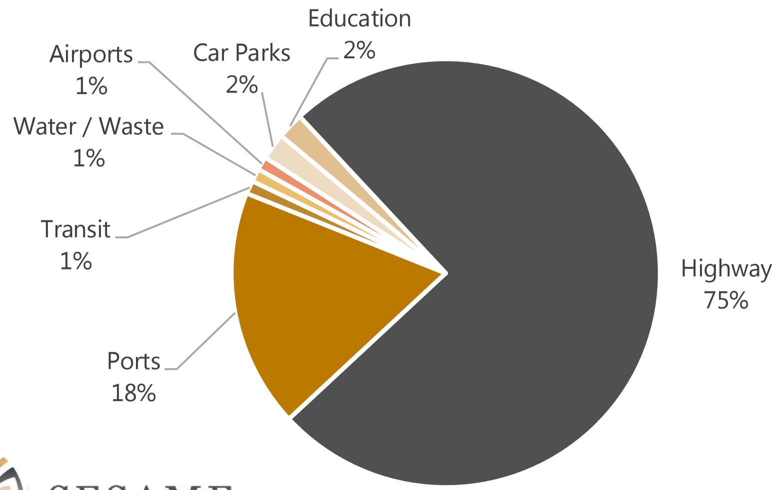
Trump & Infrastructure | P3 investments – the right way

Fed Government can't invest alone: P3 are crucial and Trump is on the right path

- **President Trump seems to be on the right way with its public-private-partnerships (*PPP* or *P3*) initiative** ($200 bn fed spending in order to reach a total of $1 trn infrastructure spending). This is also backed by prior bipartisan support to P3 projects.
  - **P3** deals take different forms, but they generally involve private investors accepting risk and responsibility for design, construction and operation of a project in return for a revenue stream made up of tolls, user fees or regular tax incentives. Financing from States/Governments generally take the form of a mix debt, government funding/loan guarantees, equity…
  - US P3 investment in 2016 reached $9 bn only vs $6 bn in Colombia, despite a GDP that is only 2% of the US (Source: Goldman Sachs)
  - US spends 74% less on P3 infrastructure investment (0.05%) than the median country when evaluated as a % of GDP (Source: Goldman Sachs)
  - Eg of lag: Federal gas tax, which could directly be invested into infrastructure, has remained flat for the past 20 years (not linked to inflation!)

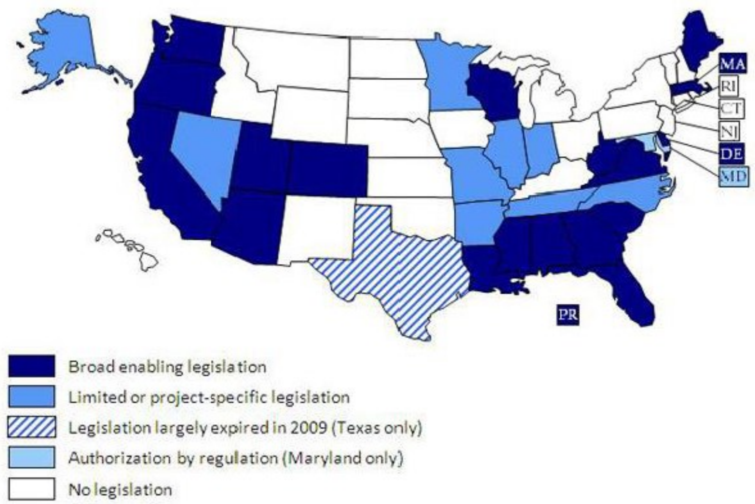
US P3: Priority to Highways

Range of projects financed by P3 in the US as of 2016 (highways usually receive ¾ of investments)



Many states do not have P3 legislation yet

In 2010, 29 states and Puerto Rico had legislated an authorization framework for transportation PPPs



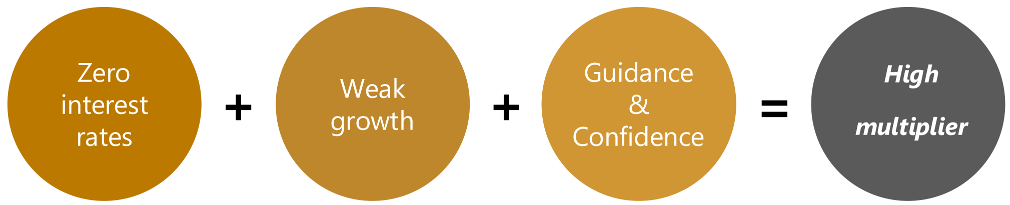
Source: National Conference of State Legislators

THE MAIN BENEFICIARIES OF INFRASTRUCTURE MODERNIZATION

Fiscal Stimulus | Taking over the QE

Fiscal stimulus is even more powerful when growth is low and interest rates are close to 0 (*ZLB*)

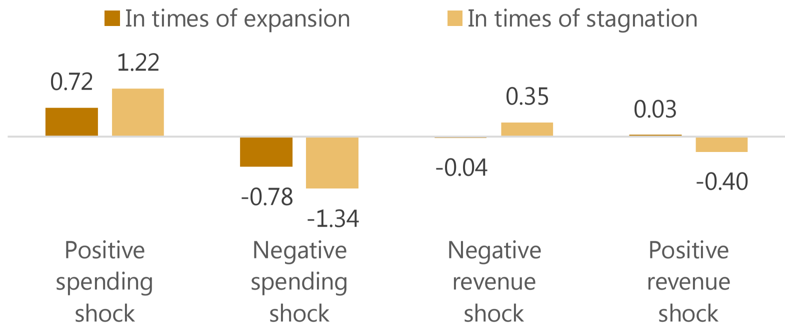
Increase in public spending / decrease in taxes would lead to an even higher multiplier in the current environment :



Fed, ECB: increasing calls for a fiscal stimulus in order to support growth

- Janet Yellen highlighted that **fiscal policies, because of concerns about debt and deficits, « did not act as a support »** in many parts of the world where central banks have been accommodative (June 2016).
- The message is clearer in Europe, with repetitive calls from Mario Draghi : « **fiscal policy should work with, not against, monetary policy,** and the aggregate fiscal stance in the euro area is now slightly expansionary. (…) **So we should not see fiscal policy as solely a macroeconomic tool, which is only available to countries with strong public finances. We should also see it as a microeconomic policy tool that can enhance growth even when public finances need to be consolidated** » (Brussels, June 9th 2016).

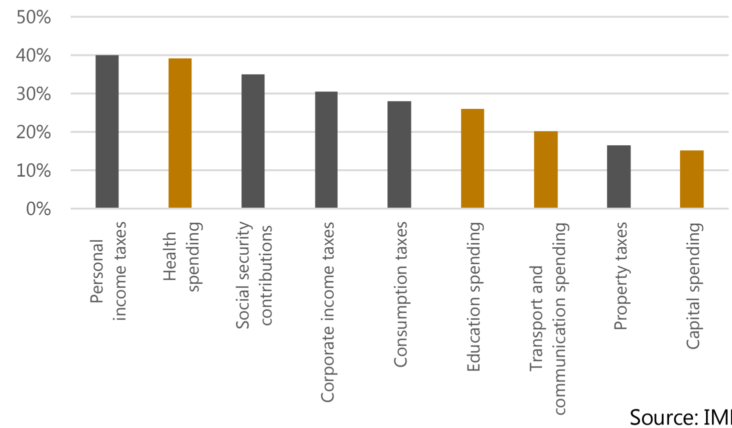
Fiscal multipliers within the G7



Source: FMI (standardized multipliers over 4 quarters)

Different types of fiscal stimulus

% of fiscal reforms that led to a growth acceleration in developed countries over a period of 5 years

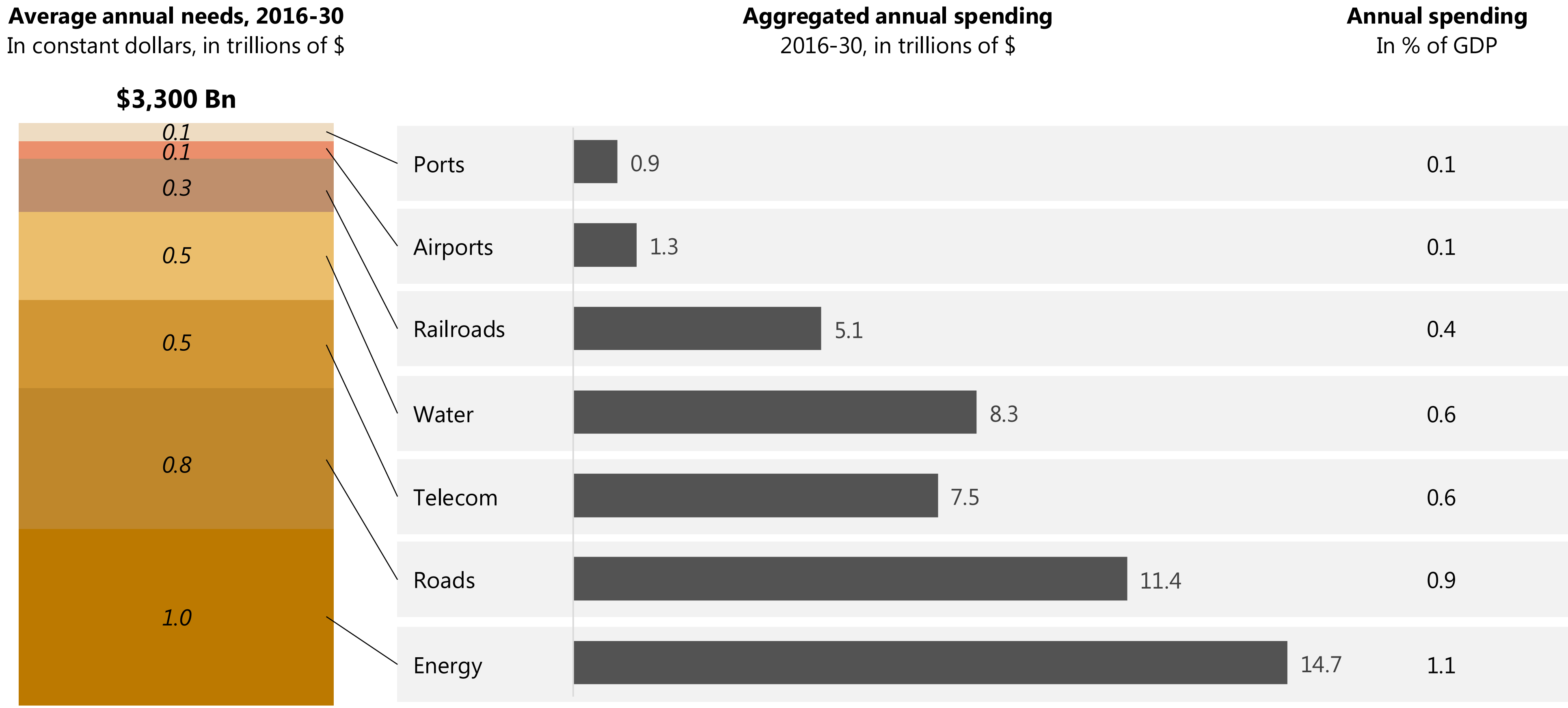


Source: IMF

Source: Christiano, Eichenbaum and Rebelo (2011), Eggertsson (2010), Braun and Korber (2010), Braun and Korber (2010), DeLong and Summers (2012)

Infrastructure | A global issue

$3,300 Bn of investments per year into infrastructure are necessary by 2030 globally, i.e. 3.8% of the global annual GDP



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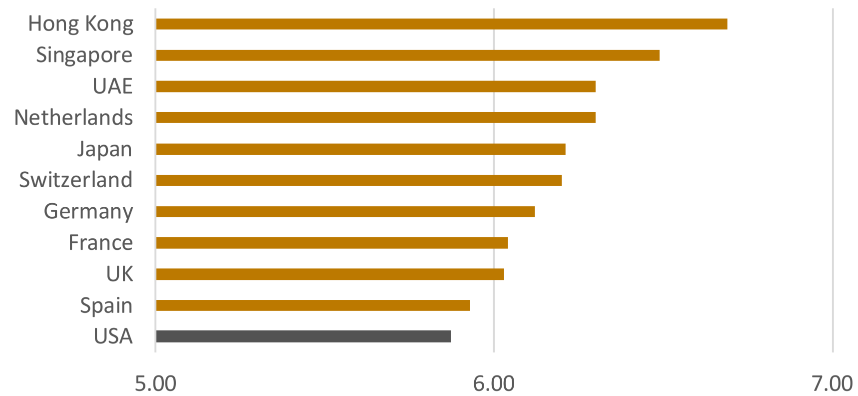
Source: McKinsey

US Infrastructure | Transports: getting old and defective

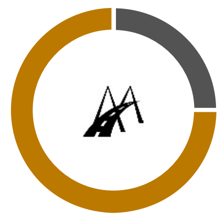
The US only rank 11th for the quality of infrastructure

Infrastructure quality (ranging from 1 to 7)



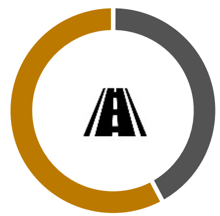
Source: World Economic Forum, Global Competitiveness Report 2015-2016

US transport infrastructure (highways) are deficient…



1 bridge out of 4

of the US highway network is structurally deficient or functionally obsolete



42%

of the main US highways are overloaded

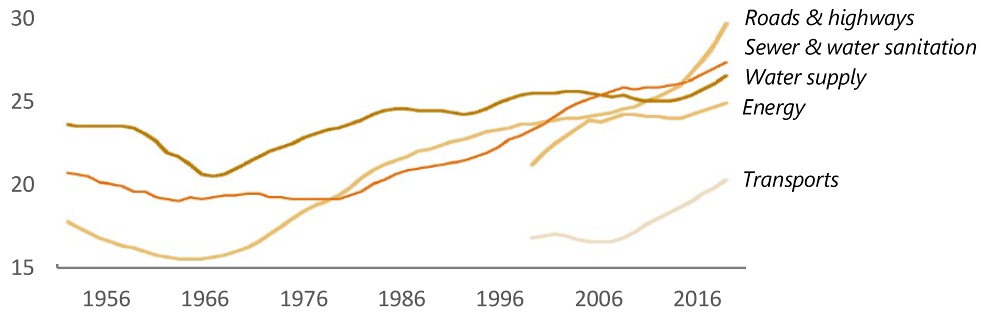
Source: American Society of Civil Engineers, Federal Highway Administration

The enormous costs of US transport network congestion

- **Highways and Bridges**: $120 Bn in 2011
- **Waterways and Ports**: $33 Bn in 2010
- **Airports**: $24 Bn in 2012

Source: Texas A&M Transportation Institute, Department of Transportation, American Society of Civil Engineers

…and infrastructure are getting old



Source: Bureau of Economic Analysis

US Infrastructure | Transports: stocks selection

Even though Donald Trump's program should directly support infrastructure ($500 Bn to $1 Trn invested over the next decade), another catalyst just came into effect: the **FAST Act** (which was signed in December 2015).

Result of a bipartite agreement, it consists of a $305 Bn financing plan from 2016 to 2020 to improve road infrastructure. $287 Bn will be dedicated to roads and highways.

Public infrastructure builders as well as construction aggregate producers that will build / maintain roads are direct beneficiaries of these catalysts.

Vulcan Materials, 1st producer of crushed stone in the US

- **Biggest producer of construction aggregate (crushed stone, sand, gravel) and road aggregate (asphalt and ready mix concrete). 45 to 55% of aggregate deliveries are meant to public projects (highways, airports, federal buildings).**
- In spite of higher deliveries (+8% annualized over 3 years), the consumption per capita within its covered markets (mostly the Sun Belt) is well below average over 40 years.
- Over a year as of August 2016, Vulcan's revenues were already up 14% vs August 2015. The profit for each metric ton of aggregate is by the way experiencing an increase over the last years ($4.77 as of Q2 2016 vs $2.55 as of Q2 2013).

Granite Construction, public infrastructure builder and aggregate producer

- Public infrastructure builder (streets, roads, highways, transports, airports, tunnels, power stations, water treatment plants) and building materials producer (aggregate, asphalt).
- 4th biggest construction company in the US according to *Construction Equipment Magazine*, Granite operates through 47 aggregate plants, 69 asphalt plants and 25 concrete plants across the country.
- Expects to participate in requests for proposal amounting to $17 Bn linked to high-level construction projects (building of the Bay Aera Rapid Transit in San Francisco, replacement of the I-59/20 bridge in Alabama, Grand Parkway road network in Texas, …).
- The firm announced a backlog of $3.8 Bn as of mid-2016 (+25% vs 2015). It expects a single-digit increase in revenues in 2016, and an EBITDA margin of 6-8%.

US Infrastructure | Airports: declining investments

Passenger Facility Charge tax review and implementation of *NextGen* in order to modernize US airports

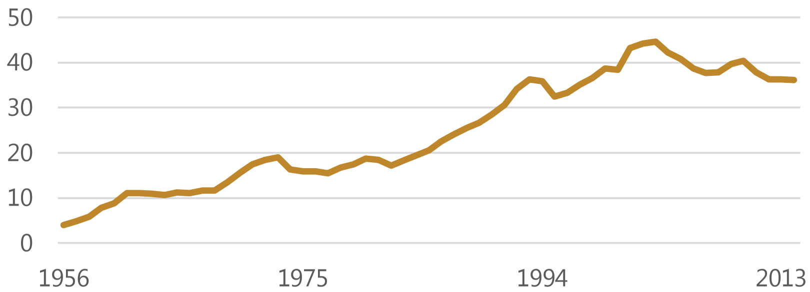
- The civil aviation industry is vital for the US economy (5.4% of GDP in 2012 vs 3.5% globally), providing 11.8 million jobs. The Federal Aviation Administration expects an increase in annual flights of around 2.6% until 2030. 895 million passengers traveled on US lines (domestic and foreign) in 2015 (+5% vs 2014).
- **Although traffic is increasing, public spending – excluding maintenance – is decreasing**: $13 Bn in 2014 vs 21 Bn in 2004 (-39%).
- The airports privatization process is lagging behind in the US. Public airports still benefit from tax exemptions, in particular concerning bond issuances, which represent a barrier to entry and thus lead to a lack of competition.
- **Making the *Passenger Facility Charge* more flexible could be a catalyst since airports could increase it in order to finance investment programs.**
- According to the US Travel Association, air traffic control systems date back to World War II – future satellite technologies (*NextGen* program) could help relieve congestion in air traffic (estimated cost of $24 Bn in 2012).

Growing US air traffic …

Number of passengers on US flights (domestic and foreign), in millions

… but declining investments

Sum of federal, state, and local expenditure for aviation (in Bn of $)



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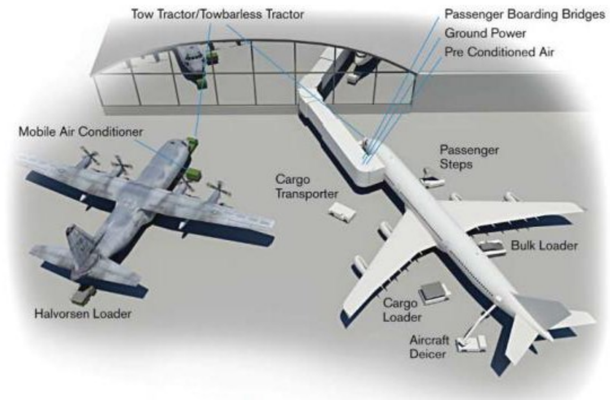
Source: Bureau of Transportation Statistics

US Infrastructure | Airports: stocks selection

John Bean Technologies, ground support and gate equipment

- **Provides airports, airlines (Delta, British Airways, Air France-KLM, Swiss, … covering >75% of US passengers) and delivery services companies (DHL, FedEx) with a full range of equipment,** enhancing their efficiency (cost reduction and rotation speed).
- Installs and manages ground support equipment (cargo loaders and transporters, aircraft deicers, plane tractors, passenger steps), gate equipment (boarding bridges) or inside airports (baggage claim and reclaim devices, sortation systems, control systems, fire alarms, plumbing, lighting, …).
- The firm boosted its revenues as of mid-June 2016 (+29% vs 2015) and capitalized on that to increase its guidance, targeting earnings per share of \$2.00 - \$2.10 for the end of the year, versus \$1.90 - \$2.05 before.



OSI Systems, security equipment for ports and airports

- **Rapiscan is one of the biggest departments of OSI Systems and is the main provider of security equipment for ports and airports** (inside/outside and/or light/heavy infrastructure).
- The firm provides infrastructure that allows to detect threats and enables to improve transit speed and efficiency (baggage inspection, parcel inspection, people screening, vehicles screening, weapons/explosives and narcotics detection, radiation detection, smuggled goods detection).
- Revenues up 6% in 2015 vs 2014. OSI Systems capitalized on its latest results to increase its earnings per share target in 2016 (\$2.60 - \$2.90, whereas analysts were expecting \$2.57).

Example of airport equipment provided by OSI Systems

Radiation detection

Explosives detection

Baggage inspection

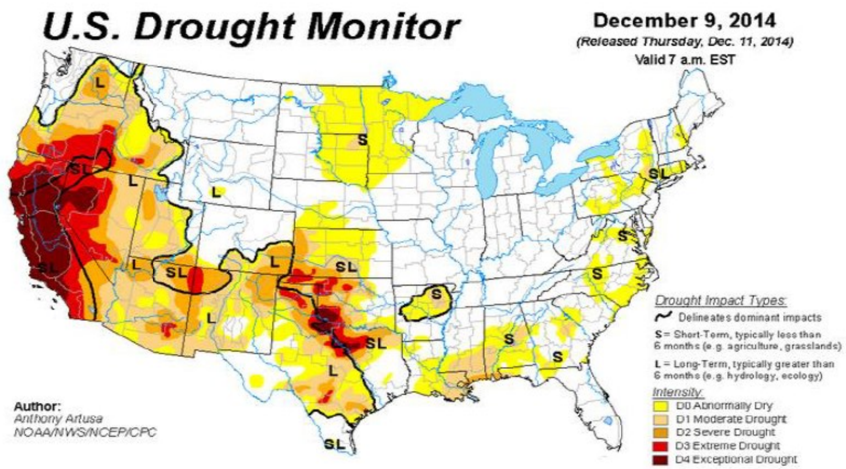
People screening

US Infrastructure | Water: fighting emergency

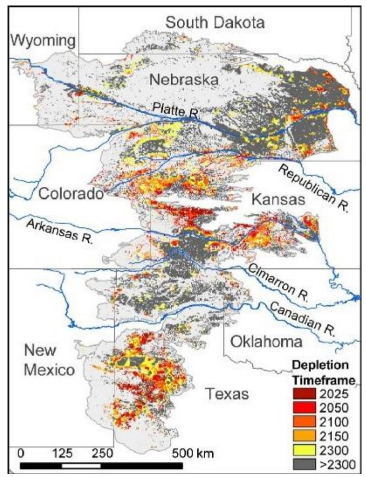
A critical situation in the richest States of the Union

- California and Texas (respectively 1st and 2nd states in terms of GDP) already suffered from multiannual droughts whereas their population is expected to grow by 20% by 2020.
- In California, which enters into a sixth consecutive year of extraordinary drought, authorities imposed strict restrictions on water consumption in 2015. The reduction of the Sierra Nevada snowpack is a direct threat to agriculture, as 40% of irrigation is provided by water channeled from the mountains.
- In Texas, the amount of water used for hydro fracturing should double within 5 years, threatening the Ogallala water table, located across 8 different states.
- According to Ault, Mankin, Cook, and Smerdon, the Southwest of the US is **threatened by a « mega-drought »** during the 21st century, that is to say periods of severe drought that last more than 30 years.

A drought, even during the winter



Depletion pace of the Ogallala aquifer



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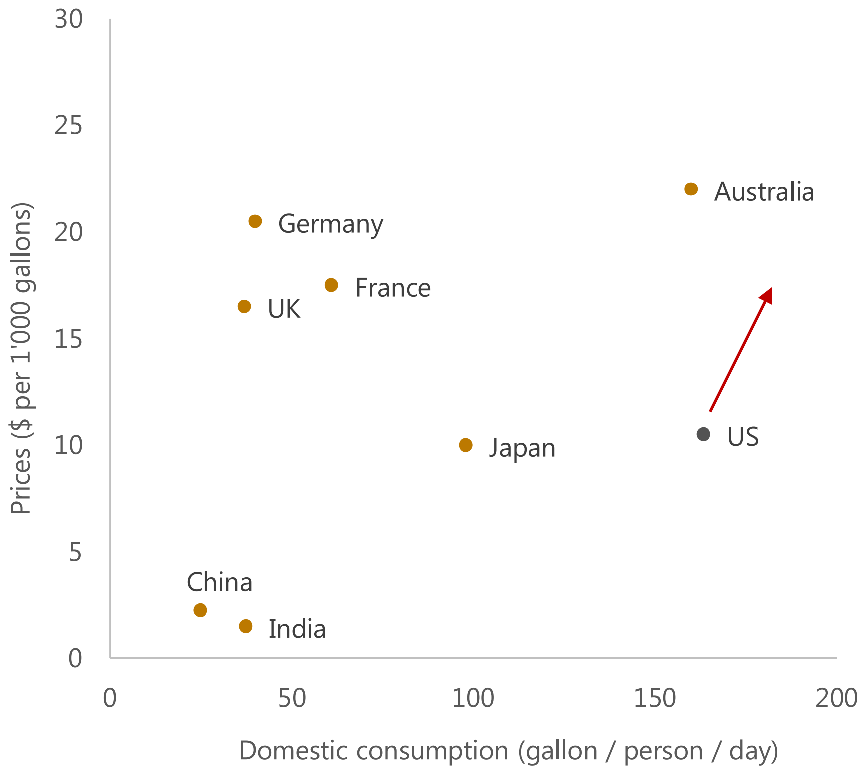
US Infrastructure | Water: repricing, M&A, Venture Capital

Repricing cannot be avoided: high consumption and increasing prices

Water prices increased more in the US than in any other developed country over the last few years: +6.4% in 2012, while global water prices surged by 3.6%.



An industry prone to M&A to generate economies of scale

- Mergers and acquisitions have increased. In 2011, they reached $12.7 Bn (55 deals), versus $900 Mn in 2010 (40 deals).
- **Given regulated margins, water companies head for M&A to find growth drivers (economies of scale).**
- The ongoing consolidation of water companies in the US goes beyond the water supply sector: for instance acquisitions multiplied in the water treatment sector for the shale gas industry or with new technologies developed to build smart water meters.

Venture Capital started to dive in the sector

Lack of public spending led US venture capital firms to look closely at the water industry. Venture capital firms only invested $120 Mn in such companies in 2012 (0.4% of the total amount invested by venture capital firms). **These new entrants increase innovation requirements and profitability expectations.**

- *Example of new investors: Element Partners, Emerald Technology, Ventures, Energy Technology Ventures, Liberation Capital, Meidlinger Partners, Draper Fisher Jurvetson, Chrysalix Energy Venture Capital*

Source: Global Water Intelligence, Ernst & Young

US Infrastructure | Water: stocks selection

Firms operating in the water infrastructure industry are involved in treatment plants building, pipes, pumps and valves making… Transmission and distribution account for 2/3 of the market, treatment and storage account for the other third.

On top of additional orders from the Government, the transmission of a fiscal stimulus for water infrastructure may be done through different means linked to regulation: authorize price increases in order to foster the replacement of outdated facilities, authorize higher spending, increase flexibility about periods to which prices apply, etc.

Mueller Water, leader enjoying the rebound in building and decreasing steel/brass prices

- Manufactures valves, pumps and pipes that deliver water, maintains existing facilities, and detects water leaks. Geographical focus on the United States and EBITDA margin in excess of 15%.
- Besides the necessary replacement of water installations in the US, the rebound in home building is a catalyst for the firm (new developments, more monthly subscriptions, …). Mueller benefited from price increases 21 out of the 22 past years.
- Mueller also experienced an increase in its margin thanks to falling commodity prices: -16% vs 2014 for the average steel price per metric ton, -14% for brass.

American Water Works, defensive growth

- Production, distribution and treatment of water with a strong organic growth and a good control of CAPEX. Decent dividend distribution and long-term contracts.
- Predictable growth and limited risk because of the defensive nature of American Water's operations: 86% of the firm's revenues come from regulated operations.
- Operates in 16 States. Strong geographical coverage which allows the firm to diversify its risks (local regulations, weather conditions, economic activity).

US Infrastructure | Water: stocks selection

Xylem, strong growth over the whole water value chain & digging into the premium segment

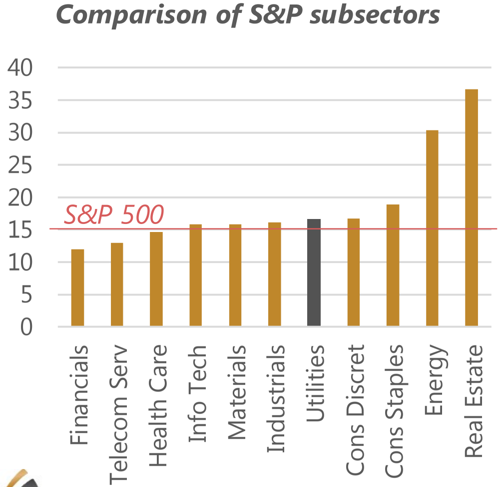
- Present at each stage of the water value chain from water transport to treatment and analysis for the industrial, agricultural, and housing sectors. Company born from the split of ITT Corporation in 2011.
- Strong growth: recently published sales higher by 22% Year-on-Year for the second consecutive quarter at Q2.
- Xylem expects an earnings per share compound annual growth rate from 4 to 7% until 2020 and a revenues growth from 3 to 5%, that is to say 1.5 times the expected market growth over the same period.
- The acquisition of Sensus for $1.7 Bn during the Summer 2016 confirms Xylem’s position on high technologies, in particular on smart water meters.

US Infrastructure | Energy utilities: to be renewed

Utilities under pressure (regulated prices, rising rates), but need for less disruptions

- Pressure on decreasing authorized returns (ROE) coupled with rising interest rates penalize the US Utilities industry. However, good visibility on cash flows and generous dividend policies keep on attracting investors (in particular in Transmission & Distribution).
- **The national cost of disruptions on the electrical grid is estimated at $80 Bn per year**. For instance 70% of lines are at end of life.
- **New renewable energies capacities** will remain the driver of M&A in the US over the coming year (while decreasing tax credits favor less wind power, solar power is taking over). While California was the leader so far in terms of development, other States such as North Carolina, Florida, Kentucky and Nevada also started building plants and facilities.
- **Integrated Utilities firms tend to sell their power generation activities**, in order to reduce their exposure to natural gas volatility. The Midwest experienced the bulk of the sales of non-regulated companies (Edison International, Ameren Corp, Duke Energy, American Electric Power, PPL Corp).

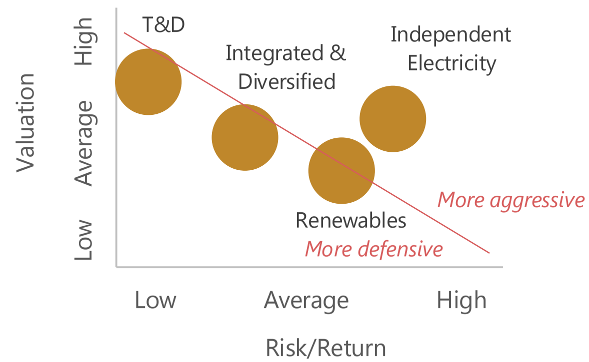
Utilities 2017 P/E forward trades at a fair level



Main growth catalysts of US Utilities by subsector

Transmission & Distribution (T&D)	• 450,000 miles of high voltage cables • $879 Bn of investments expected over the period 2010-2030 vs $327 Bn between 1989 and 2009 • 70% of transmission lines are more than 25 years old and are at end of life
Independent Electricity Producers (IEP)	• Commodities prices recovery should support producers • Some regions are facing critical under-capacity problems (Texas, Midwest)
Integrated and Diversified Utilities (IDU)	• Integrated Utilities get rid of low-growth assets • Under pressure because of distribution improvement, energy-saving schemes and storage facilities expansion
Renewable Energies (RE)	• Solar power is taking over wind power • Environmental ambitions (eg: COP21) support the sector

Valuation vs risk/return



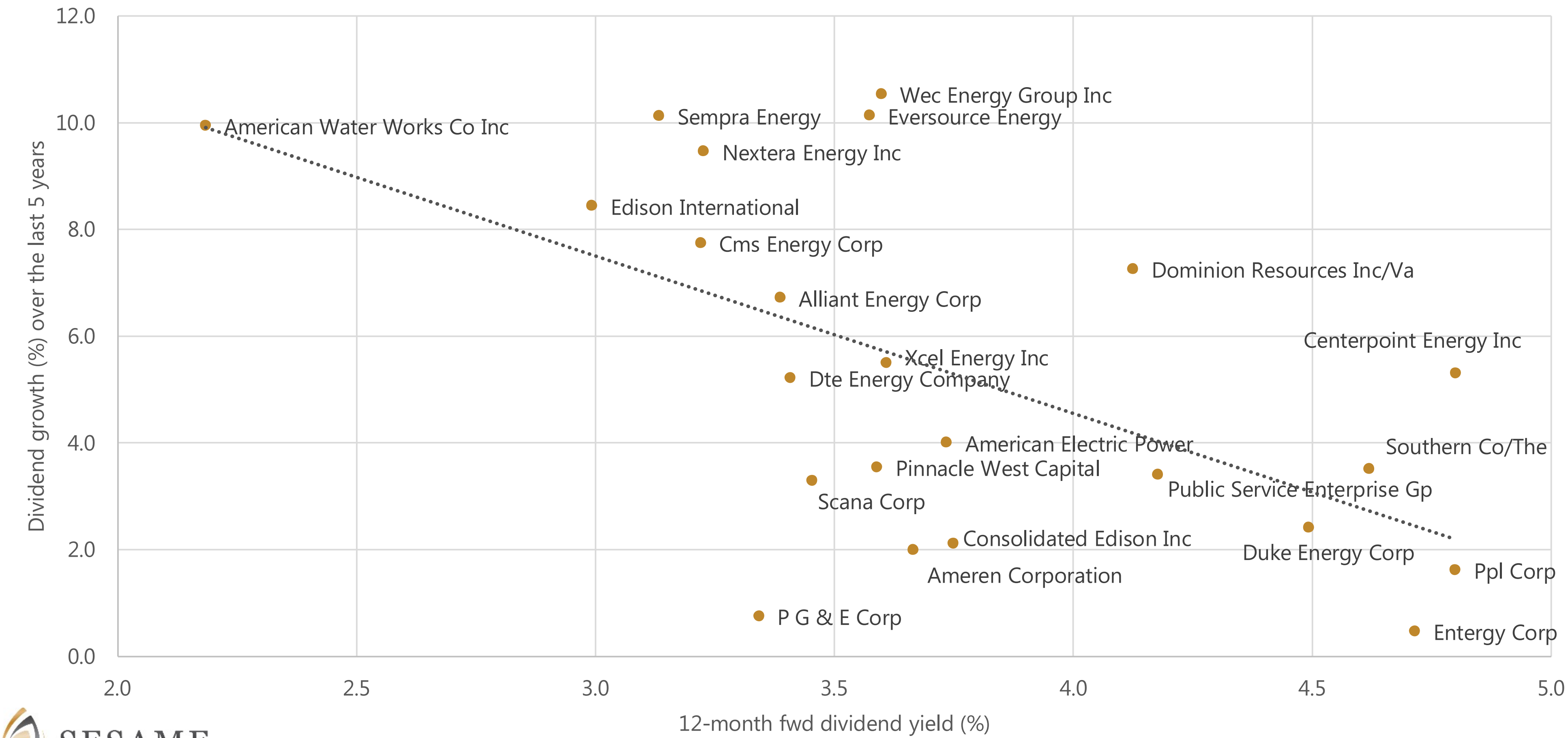
- *Valuation: current prices by subsectors vs historical prices (P/E ratio or EV/EBITDA depending on the sector)*
- *Risk/Return: earnings volatility vs subsector risk*

Source: E&Y, US Department of Energy

US Infrastructure | Energy utilities: strong dividends

Generous dividend policies: one of the attractive features of Energy services companies

12-month dividend yield vs 2011-16 dividend growth



Source: Bloomberg

US Infrastructure | Energy utilities: stocks selection

The positive impact of the fiscal multiplier and the extraordinary low-rates environment resulting from the monetary easing are clear catalysts for the financing of US infrastructure, in particular for electricity production public services, which infrastructure is getting old and defective. The even tighter control on carbon dioxide emissions also contributes to this long-term trend.

The US government has several instruments available to further support the (re)development of Utilities: tax exemptions, subsidies & tax credits, regulatory softening regarding price grids for customers, easing of service access…

General Electric, diversified leader (geographically, customer base & segments)

- **Diversified sources of revenues in 2015:** 18% power generation, 5% renewable energy, 14% oil & natural gas, 6% power management, 7% lighting systems, 5% transport infrastructure…
- Global leader in turbines manufacturing (gas turbines, wind turbines, steam turbines, …).
- GE recently managed to have its financial services subsidiary GE Capital removed from the list of systemically important financial institutions. It will reduce its capital requirements and could speed up its stock buyback program ($100 Bn of buybacks and dividends have been announced for the 2015-2018 period).
- For 2016, the firm targets an organic growth from 2 to 4% (vs +5% on average over the past 5 years, twice the figure of its peers).

American Electric Power, Transmission & Distribution subsector (T&D) boosted by new capacities

- 224,000 miles of distribution lines for 5.4 million US clients, and 40,000 miles of transmission lines that account for the major part of the electricity network on the East Coast.
- **One of the biggest electricity producers in the US, with around 32,000 megawatts distributed through 3 Regional Transportation Authorities.**
- **AEP is heading towards a more regulated business model in order to stabilize its revenues** (see sale of 4 merchant power plants in the Midwest for $2.17 Bn in September 2016).

US Infrastructure | Energy utilities: stocks selection

NextEra Energy, diversified renewable energies & regulated prices

- Production capacity of 45,000 megawatts. The firm is split into two activities:
  - ***Florida Power & Light*, active in electricity transmission and distribution, with regulated prices** (4.8 million clients in Florida). Next price review by the Civil Service Commission expected for January 2017.
  - ***NextEra Energy Resources* expects to generate 2,500 more megawatts through new projects in 2016**, and from 2,800 to 5,400 more megawatts over the period 2017-2018 (which 2,400 to 3,800 megawatts will come from US wind power and 400 to 1,300 megawatts from US solar power).
- **US tax authorities confirmed recently that all wind power projects implemented over the next 4 years (against only 2 years before) will keep on benefiting from tax credits**, which is good news for the industry.
- The firm expects to increase its earnings per share to a range from $6.60 to $7.10 by 2018 (vs $5.85-6.35 in 2016, $5.65 in 2015).

First Solar, global leader in solar panel manufacturing

- **Global leader in solar panel manufacturing** (global production capacity in excess of 13.5 gigawatts thanks to 155 million modules installed worldwide), but also offers monitoring systems, advisory and maintenance services. First Solar provides and manages solar photovoltaic farms.
- The firm delivered 2.5 gigawatts in 2015 (+36% vs the previous year). It expects to deliver 2.9-3.0 gigawatts in 2016 and recently announced that it was working on some opportunities that could deliver a total of 24 gigawatts.

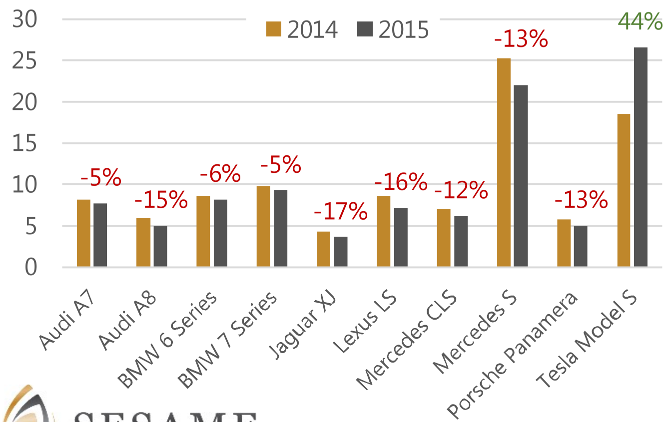
US Infrastructure | Electric vehicles: developing the network

Electric vehicles: less than 1% of global sales, but outstanding growth

- The US government has already invested $5 Bn to support electric vehicles, through loans granted to car makers and power pack producers, or through consumer subsidies (up to $7,500 federal aid). The goal is to reach 1 Mn of electric vehicles (vs 404k in 2015, i.e. 0.7% of the market).
- **In addition to increasing mileage per charge, the key catalyst of the US market is the development of Level-2 and Level-3 power stations** (Level 1 = 8-12h charge time mostly used for overnight / home charging, Level 2 = 4-6h charge time mostly used for home / professional charging).
- **Opportunities in chargers development, still unequally spread:** in May 2015, the US had only 900 high power public stations and 9,000 Level 2 public stations. Costs remain substantial (L2 station = $6,5k, high power public station = $90k).
- Some Utilities firms start to step into this breach (Southern California Edison - $355 Mn invested to build 30k stations in California, Pacific Gas & Electric - $654 Mn invested to build 25k stations in California).

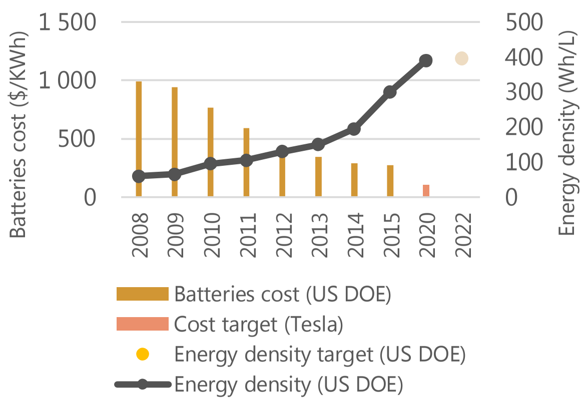
Tesla Model S in the US: increasing sales in a luxury sedan market that decreases

Annual US sales, in tenth of thousands



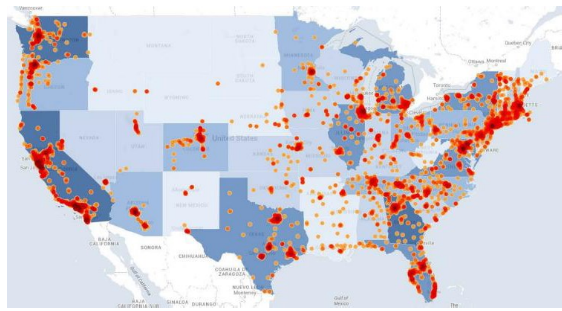
Key catalysts: decreasing costs & increasing energy density

Goal: exceed 300 km per charge



Level 2 stations remain unequally spread

High concentration in major cities



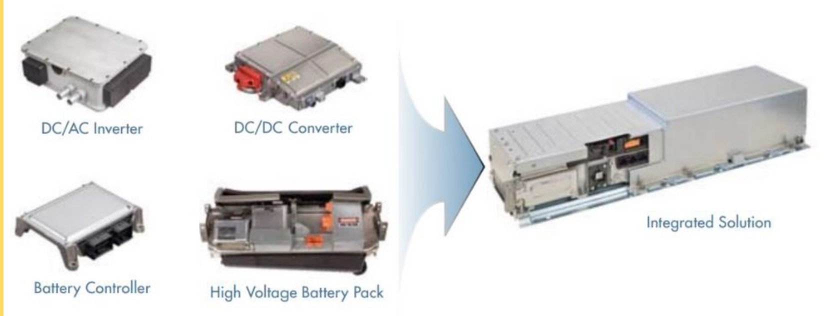
Source: AutoData, US Department of Energy, IEA, NASEO, C2ES

US Infrastructure | Electric vehicles: stocks selection

Delphi, large range of products for hybrid and electric vehicles

- **Main equipment manufacturer in the US, more and more focused on electric products** through a range of dedicated products (converters, inverters, controllers, battery packs, coolers, connectors, power stations, chargers, …).
- **High EBITDA margin (>17%)**, which should strengthen thanks to products on which Delphi is well positioned: active safety systems, advanced driver assistance systems, fuel saving, connected onboard infotainment systems, electric charge and distribution.

Example of Delphi's integrated solutions for batteries



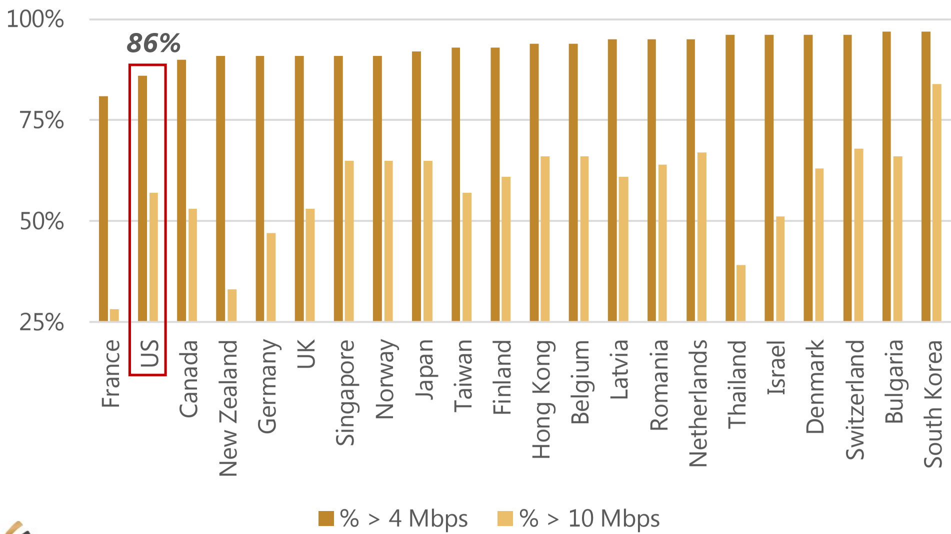
US Infrastructure | Broadband: backwardness & inequalities

$1,400 Bn of private investments between 1996 and 2014, a strong engine for the US economy

- The fastest broadbands are 660 times faster than they were in 2002, but nominal prices remain about the same. 75% of the American now benefit from a high-speed connection (vs 3% in 2000), with some substantial geographical divergences (see map below). Despite this progress, the US lag behind some other countries in terms of broadband development over the territory.
- **Between 1996 and 2014, $1,400 Bn have been invested by US internet service providers into infrastructure, providing 11 million jobs.**
- The ConnectED initiative launched by Obama in 2013 aims at, among other things, spreading broadband to 99% of US students by 2018.
- **Broadband changes the use of TV**: 24% of US adults are « *cord cutters* » i.e. they do not have a subscription to cable/satellite for TV. Among those 24%, two thirds use their online connection or streaming services to watch content.

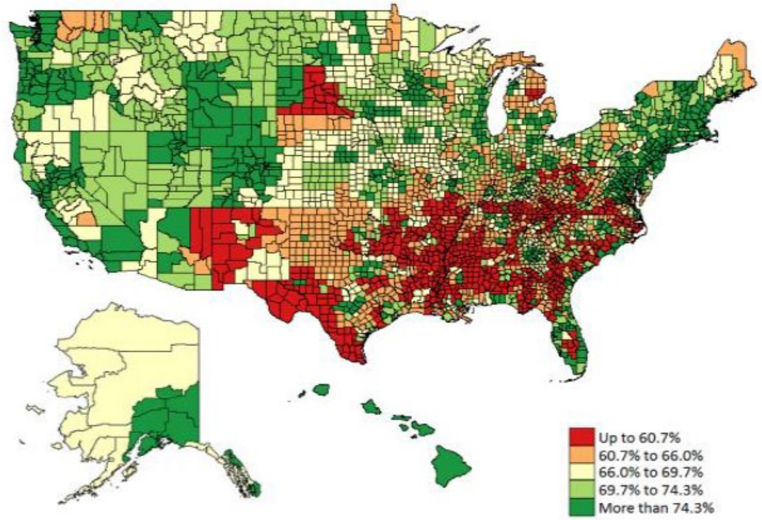
Still some room for improvement …

Broadband adoption rate by country (%)



… and a remaining geographical divide

Broadband adoption rate by US region (%): the Northern Great Plains, Montana, Wyoming, North Dakota, Colorado lag behind



Source: Akamai, Broadband for America, Pew Research Center

US Infrastructure | Broadband: getting ready for 5G

US infrastructure must start getting ready for 5G deployment

- **The implementation of 5G networks is expected to happen within 5 years.** Its standards still need to be pinpointed but should be centered on protocols and technologies able to manage and transfer data flows of several gigabytes per second (around 100 times faster than the actual 4G), through all types of connected devices, while limiting battery consumption.
- The global need for investments into 5G infrastructure by 2020 amounts to $4 trillion.

1G	2G	3G	4G	5G
✓ Basic voice service ✓ Analog based protocols	✓ Designed for voice ✓ Improved coverage and capacity ✓ Digital standards (GSM, CDMA) ✓ Date for mobile (SMS, MMS)	✓ Designed for voice with some data consideration (Multimedia, Next Internet) ✓ First mobile broadband	✓ Designed primarily for high data transmission ✓ IP based protocols (LTE) ✓ High mobile broadband	✓ High data transmission ✓ Lower battery consumption ✓ Higher versatility and scalability (more connected devices, with different needs) ✓ Converged fiber-wireless network
2.4 kbps	64 kpbs	2,000 kbps	100,000 kpbs	
1979-81	1991	2001	2011	2021

Source: Telefonica, Boston Consulting Group

US Infrastructure | Broadband: stocks selection

Zayo, main provider of fiber in North America, well positioned on 5G infrastructure

- Zayo is one of the main providers of bandwidth connectivity infrastructure services in North America. The company provides telecoms operators, telephone operators, content providers, financial groups and healthcare companies with a network of fiber infrastructure and datacenters (181,000 kilometers of cables, 14 million kilometers of fiber, 61 datacenters in the US and in Europe).
- **Thanks to investments in drawing towers and black fiber making, Zayo already started to position itself on 5G infrastructure (expected arrival in 5 years) rented to operators, in order to benefit from the first mover advantage.**
- The firm enjoys a 27th consecutive quarter of increasing revenues (+7% quarter-on-quarter as of mid-2016).

Crown Castle, rental of cell towers/roof equipment for mobile phone operators

- **Biggest provider of infrastructure such as cell towers & roof equipment in the US (40,000 towers)**. The firm rents its equipment to big US phone operators, but also offers to building owners, home owners and schools to rent some of their physical space.
- The rental yield of towers that are more than 10 years old is 14%, and the rental yield of towers that are less than 10 years old is 7%.

AMC PRIME PARTNERS & SESAME FINANCIAL INFRASTRUCTURE

AMC Infrastructure | Our stocks selection

Subsector	Company name	PE 2018e	Consensus Buy / Hold / Sell	Strike* (USD AMC)	Current price	Perf. since last reb.	Rank 1 to 14	Consensus (Bloomberg)	Potential return	3M Realized Volatility
Construction Concretes & Aggregates	Eagle Materials Inc	17.0	7 / 3 / 0	107.6	110.0	▲ 2.3%	5	117.7	7%	26.5
	Granite Construction Inc	19.4	9 / 2 / 0	59.7	57.8	▼ -3.1%	13	65.4	13%	31.8
	Summit Materials Inc	18.8	10 / 3 / 0	31.7	31.8	▲ 0.3%	8	34.5	9%	28.6
	Martin Marietta Mat. Inc	22.1	11 / 4 / 0	206.7	216.2	▲ 4.6%	2	245.7	14%	29.6
	Vulcan Materials Co	26.2	12 / 3 / 0	120.3	121.6	▲ 1.1%	7	141.4	16%	26.2
Engineering Services	Jacobs Engineering Inc	17.0	4 / 12 / 2	58.8	58.8	◄► 0.0%	9	59.0	0%	17.2
Industrial Tools	Kennametal Inc	16.4	6 / 5 / 1	40.5	42.8	▲ 5.6%	1 *(best)*	45.2	6%	26.8
Equipment rental	United Rentals Inc	12.2	9 / 9 / 2	142.1	144.4	▲ 1.6%	6	152.8	6%	25.8
Airports	OSI Systems Inc	23.0	6 / 0 / 0	95.3	93.8	▼ -1.5%	11	97.5	4%	19.4
Water	Xylem Inc	23.4	10 / 8 / 0	64.5	64.2	▼ -0.5%	10	66.2	3%	16.9
Energy Services	American Electric Power	19.1	5 / 13 / 0	71.4	74.0	▲ 3.6%	4	73.2	-1%	10.5
	NextEra Energy Inc	21.3	13 / 3 / 0	147.4	154.2	▲ 4.6%	3	156.4	1%	10.6
Vehicles	Delphi Automotive Plc	13.5	20 / 6 / 1	100.8	96.8	▼ -3.9%	14 *(worst)*	108.3	12%	18.4
Diversified	Macquarie Infrastructure	29.1	7 / 1 / 0	72.6	70.9	▼ -2.4%	12	91.4	29%	12.4

SESAME FINANCIAL GROUP

Strike is as of inception date (October 2nd, 2017)

Source: Bloomberg (as of 20 October 2017), Sesame Research. Past performance is not an indicator of future results.