CREDIT SUISSE

2017 Global Megatrends Conference

The Future. Now

Contents

Editorial

For the last four years, Credit Suisse specialists have worked with recognized industry and opinion leaders to identify profound multi-year societal trends with far-reaching investment implications. Demographics, socio-economic and political developments as well as technological and scientific progress have always played a key role in determining such long-term trends.

This year we focus on one of the most meaningful current societal trends in Western countries: the very apparent wave of discontent that drives people to vote for political change. At the surface, the discontent is rooted in the perceived or real failure of political establishments to deal effectively with immigration and integration, security and terrorism as well as the threatening aspects of technological progress and trade. But deeper below we believe it is the squeeze of the middle class, rising inequalities within Western countries and the lack of perspective of several social cohorts from low skilled middle-aged workers to the unemployed youth that are giving rise to the electorate's demand for change. In a busy electoral year this will bring to the fore governments from the establishment or outside with strong mandates for a policy more oriented to support the domestic economy, create jobs at home and address some of the pain points of the Western middle class. National champions and brands as well as security and defense and the emerging market consumer as a response to a more self-centered period of growth will likely come into the limelight as policy priorities and also multi-year investment themes.

Infrastructure scores very highly on so many fronts in that context that it makes considerable sense to continue taking investment exposure: a powerful job creation machine where jobs are needed at all levels of qualifications and skills, a powerful economic multiplier leading to productivity gains and at a time when real rates across the world are still low, an ideal environment to fund infrastructure projects. The difficulty with infrastructure investments is that direct access to commercial infrastructure projects may not be straightforward and require specialist knowledge. Understanding the geography and sector focus of planned infrastructure projects is hence of paramount importance. While much focus has been given since the US elections to the transport infrastructure, we highlight affordable housing and energy infrastructure as areas with particular potential for investors.

Technological and scientific progress have always held the promise of higher productivity, better quality of and security at work, a longer healthier life and a cleaner environment, in short a better and happier world. These are prospects particularly important to the new generation of Millenials and Generation Z, who according to specialist surveys are deeply worried about all these and simultaneously want to drive change to the better. We hence focus on the technology at the service of humans, from robotics to artificial intelligence, the interaction of nutrition and longevity as well as the opportunities of clean energy.

Dr. Nannette Hechler-Fayd'herbe
Head Investment Strategy and Research

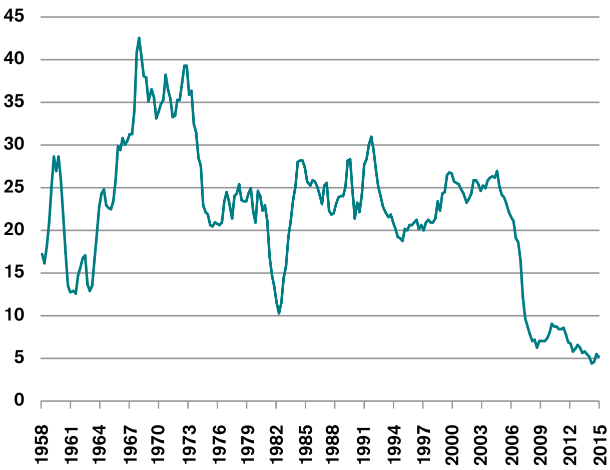
CHAPTER 1

Angry societies – Multipolar world

Disenchanted Western middle class

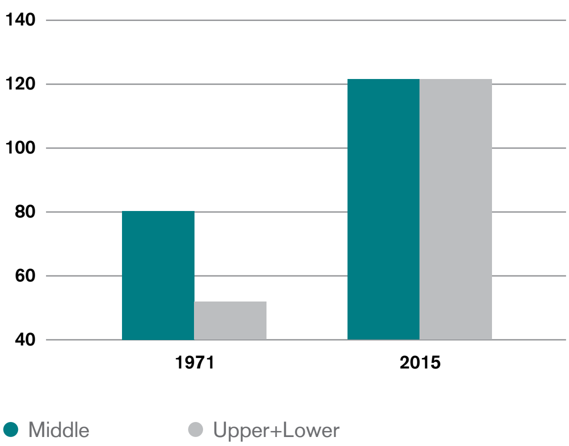
Since the financial crisis of 2008, inequalities have grown in the world, not so much across countries but within them, and especially in developed countries. The economic policy mix of fiscal austerity and very loose monetary policy chosen by most developed economies to face the crisis, as they were constrained by too much public debt, proved particularly detrimental to the Western middle class. Tough labor markets, with persistently high unemployment and stagnating labor income that resulted from the economic recession and exacerbated by hyper-globalization and disruptive technologies, have left many middle class households permanently worse off after the crisis. This contrasted markedly with the staggering accumulation of wealth at the same time of the top 1% income households, and has led to a broad perception among the Western middle class that it was the great loser of the last eight years.

Figure 2: Per person income growth weakest in decades in the USA
% change in real US GDP per capita from a decade earlier



Source: FRED Economic Data, Credit Suisse
Last data point: Q4 2016

Figure 1: Middle class no longer in majority
Adult population by income tier (in million)



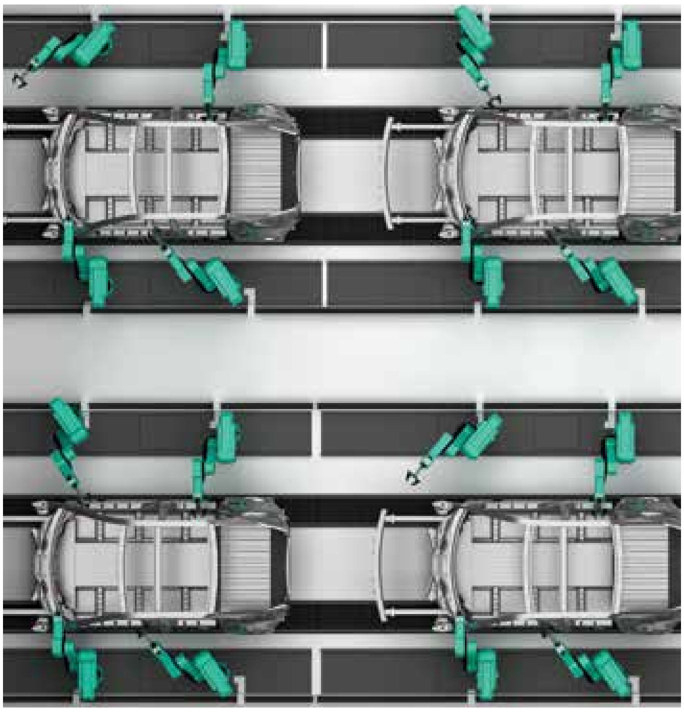
Source: Bureau of Economic Analysis, Datastream, Credit Suisse

Additional frustration about the incapacity of the political establishment to deal with daily problems of this left-behind middle class related to seemingly uncontrolled migration, unsuccessful integration, rise of insecurity and terrorism and feeling of loss of sovereignty have eventually mobilized citizens and voters across developed countries to drive political change.

In the UK, a majority of voters decided to vote for the exit from an estranged European Union. In the USA, voters chose a political outsider to break with political traditions. In the Eurozone, there is increased support for political leaders that are ready to look the current economic and societal problems in the eye and actively work to solve them. New governments formed after elections against such a societal backdrop have strong popular mandates and can be expected to endeavor keeping their electoral promises of change. Therefore, economic policy measures appeasing the Western middle class can be expected in developed markets over the current electoral cycle of the next 4-7 years.

Themes important to the Western middle class

The middle class generically attaches a strong weight to security: job security, as well as simply individual security. Middle class households often are families that feel bad when they cannot support their dependents, offer opportunities to the next generation or guarantee security of family members in their daily tasks. Therefore, we believe that the strengthening of Western domestic economies through domestic job creation, encouragement of wage increases as the preferred way to raise the purchasing power of domestic households over a fall in prices that can put domestic jobs at threat instead and potentially regulation or taxation of job-killing sectors or industries will be center-stage for the new governments coming to power. New governments will endeavor to restore middle class' prosperity, invest in security and defense and stimulate domestic private consumption with higher participation to the labor market again. Investors can expect sectors and companies that benefit from such policies to see an upswing in their sales and revenues, as well as market valuations.



National champions and brands

National champions tend to be large cap companies that are in the public spotlight. These companies can be the object of soft mercantilist measures like government incentives to build factories at home rather than abroad, or public shaming of companies who outsource their production to foreign countries, reduction or suspension of corporate taxes for companies who invest domestically to help develop specific regions within countries but more importantly, they provide leadership for smaller businesses in an effort to create new jobs domestically. These large companies have an inherent multiplier effect that politicians can use to drive their agenda. National champions further have a large workforce in their home country, i.e., they are major employers. Having a large workforce in their home country reduces the vulnerability of these businesses from protectionist measures and a reduction in globally integrated manufacturing processes. Finally, national champions generally have strategic interests for their home country.

Strategically important industries in the present context are industries that are likely to create jobs for low-skilled workers as these are the forgotten group in Western societies. Such industries include the general manufacturing or construction sector and also telecom equipment or IT manufacturing. A second important group of companies that are national champions are manufacturers of cars or airplanes that employ a large number of the domestic workforce. Beneficiaries of "buy local" initiatives in different countries can be found in the materials sector, as well as retail and wholesale industries. Healthcare in Europe is a future job creation machine for more educated young workers considering the demographic trends (population ageing) of the continent.

National brands are an extension of national champions. These brands are well recognized with a global reach and recognition while being associated with a company that qualifies as a national champion. National brands distribute their products and services globally and thus, have diverse revenue streams and – due to their brand recognition – a loyal customer base that is inclined to stick with the brand even if protectionist measures increase the prize an end consumer has to pay. While national brands have a global reach, they are politically important because they are protected by politicians in their home country and enjoy the benefits of political lobbying to broaden their global reach. Brand recognition and awareness are typically more important for consumers so it is no wonder that national brands can mostly be found in the consumer sectors.

Security and defense

Defense companies are naturally in the spotlight of politicians since they are the main recipients of government grants for defense contracts. There is however, a second driver for increased defense spending that goes beyond domestically oriented job creation policies. As geopolitical uncertainties and tensions between military heavyweights rise, the balance of power continues to shift. After the end of the cold war, the world enjoyed more than 30 years of "Pax Americana" with one dominating military superpower and a major demilitarization of European NATO countries. European NATO countries' defense spending today is at just 1.5% of GDP compared to 3.6% for the United States, 2.1% in China and 4.5% in Russia. As part of the shift to a more multipolar world, in recent years, regional powers have become increasingly assertive in their desire to increase military influence in areas that these countries consider strategically or politically important. The new US administration is now reacting with the following:

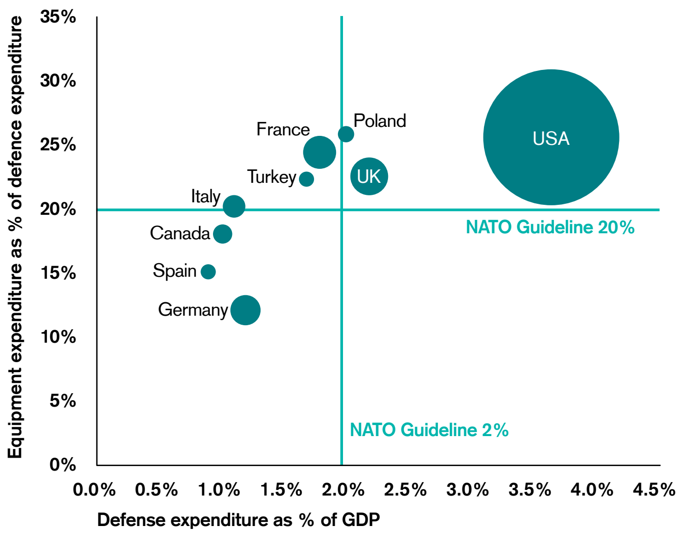
1. Increased US defense spending. In his first draft of a US budget, President Donald Trump significantly shifted spending away from civil sources towards military spending. The defense budget is supposed to grow in 2018 by USD 52.3 billion – an increase of 10% and about as much as the entire annual defense budget of Russia. Within the defense budget, the biggest spending increases are proposed for aircraft procurement (+11.6%), conventional weapon systems for the army (tanks, trucks, etc.), as well as for research and development of new weapon systems. Additional funds have been earmarked for the fight against ISIS.
2. This increase in defense spending is topped off by an increase of an additional 11.3% or USD 1.4 billion for the National Nuclear Security Administration (NNSA) in the Department of Energy. The NNSA maintains the nuclear arsenal of the United States and the additional funds should be used for research and development, as well as life extension for existing nuclear warheads.
3. Increased pressure on NATO allies to fulfill the NATO target of defense spending at or above 2% of GDP and equipment spending at or above 20% of defense spending.

The proposed budget expansion of the Department of Defense and the Department of Energy's NNSA is heavily geared towards the fight against terrorism in Iraq, Syria, as well as globally. This on the one hand requires the procurement of airplanes, helicopters and drones. But additional beneficiaries of the increased spending are suppliers focused on research and development, as well as cyber security.

In Europe, NATO guidelines call for a minimum 2% of GDP defense spending. Of the biggest European NATO members only the UK and Poland currently meet this target while in particular Germany, Canada and Spain spend much less on defense (typically around 1% to 1.5% of GDP). Germany and France, two nations that have increased need for defense spending and have already pledged to increase their defense budget in the coming years to meet NATO targets account for about 5% of all defense spending by NATO nations. The growth in defense spending of these two countries will likely be the driving force of European defense companies' earnings.

We also expect technology to be increasingly used for civil security. In this regard, urban safety, safety of traffic and economic units and of course protection of health and human lives are of the utmost priority. The market for homeland security technology is expected to grow rapidly. Detecting explosives, protecting infrastructure, surveillance of public places, body cameras, database surveillance are all fields of applications for IT hardware and software, such as drones, robotics, artificial intelligence algorithms or big data visualization. The progress in processing power on cheap semis and the expansion of the Internet of Things are providing new means for protecting individuals and more broadly the society against the new security threats. According to MarketsandMarkets, the security information market will grow to USD 170 billion from USD 70 billion today.

Figure 3: NATO defense spending by nation



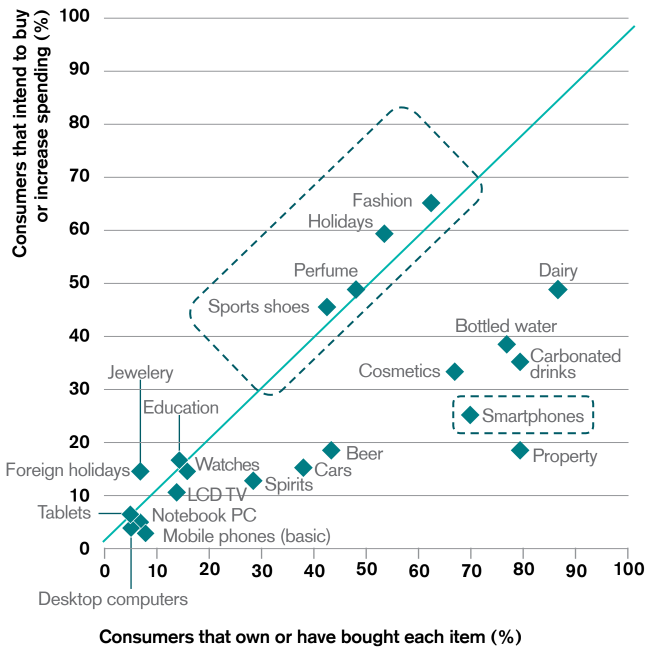
Source: NATO, Credit Suisse

Implications for Emerging Markets: Focus on Emerging Markets consumers

It is often assumed that because emerging markets (EM) were the big beneficiaries of the last decade of hyper-globalization, they will automatically suffer if and when the world moves to a multipolar world with more bilateral or regional trade agreements. But we believe this ignores the fact that emerging markets are not as exposed to international trade as generally perceived. While some countries, like Korea, Argentina or Malaysia, have exports that comprise more than 50% of GDP (much like Switzerland or Germany have), a majority of emerging market countries only has a third or less of its GDP in exports. Furthermore, emerging markets have a powerful domestic growth driver: their own consumers. With predominantly young populations and a growing middle class (in contrast to developed economies), many emerging economies are now at a stage of development, where they can – like China decisively does – transform into more consumer- and services-driven economies. We expect the emerging market consumers to be absolutely at the heart of emerging market policy focus in the future. We at Credit Suisse have for years invested in researching around the trends and developments of emerging market consumers. The key findings of our latest Emerging Market Consumer Survey can be summarized as follows:

1. **Improving consumer sentiment in EM:** Consumers' responses reveal that there is more optimism when it comes to personal finances, the possibility of a major purchase and the outlook for inflation. Economies in Asia are currently the best positioned in terms of expectations of improvement in personal finances, as well as the possibility of a major purchase. India recorded a significant improvement in personal finance expectations while China has been on a slightly downward trend. India, Indonesia and China lead when all sentiment indicators are aggregated. This trend is however also notable in commodity exporting nations, such as Brazil, South Africa, and Russia.
2. **Pick-up of discretionary spending:** This is already visible in vehicle sales, which have picked up in recent months, and are growing at an annual pace exceeding 20%. Responses from the survey suggest that the outlook for discretionary spending remains positive, as these categories have the strongest intentions, including holidays, fashion items, personal care products and sports shoes. Holidays in particular have strong spending intentions, although this is based on domestic rather than foreign holidays (Figure 3).

Figure 4: Purchase intentions this year versus consumption in the last year
% change in real US GDP per capita from a decade earlier

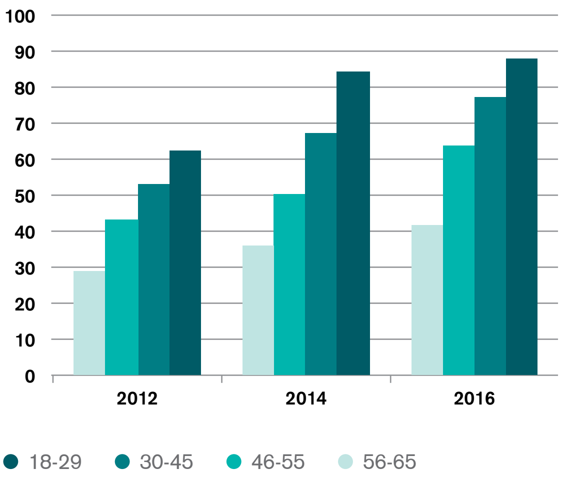


Source: Emerging Consumer Survey 2017

3. **Consumers turning to domestic brands as dollar strengthens:** The US economy has already been in an expansion phase for nearly eight years and the US Federal Reserve has started to tighten monetary policy, putting upward pressure on the US dollar and downward pressure on commodity prices, which are the primary exports of many emerging economies. Overcapacity and lackluster demand are also hurting some exporters. As a result, the terms of trade for emerging markets have tended to deteriorate. Domestically produced items are therefore becoming more attractive. National consumer champions will likely benefit from this trend. Indian consumers, for example, report a strong and growing preference for domestically produced auto brands. Domestic vehicle brands in China show increasing reliability and have also become popular in China. This is true for other branded products like smartphones. The strength of domestic brands is not just down to increasing reliability and lower price, but at times also due to regulation. In Brazil, for example, the pharmaceutical market is dominated by domestic players. This is a result of the absence of drug patent regulation in the 90s, but also due to the stringent regulatory requirements, which protects the market from imports.

4. **Healthier and more connected:** More affluent lifestyles and demographic changes are giving rise to another trend in emerging economies: healthy living. Consumers surveyed this year are reporting strong willingness to spend on skincare, good food, sportswear and using car-sharing services rather than owning vehicles. The falling consumption of unhealthy products is not an age-specific trend but appears to be broad-based. Consumption of alcohol, cigarettes is down year-on-year across most of the countries covered in the survey. Consumers also report switching to healthier options. In addition to having a preference for a healthier lifestyle, consumers are increasingly connected. In Brazil, 91% of those surveyed have internet access. 57% of low-income consumers had internet access last year, compared to just 36% in 2012. Younger generations, including millennials, are significantly more likely to be connected (Figure 4). In addition, nearly a third of consumers shop online, a share that has more than doubled since 2011.

Figure 5: Percentage of consumers with internet access by age – growth across all cohorts



Source: Emerging Consumer Survey, 2017

Conclusion

After years of hyper-globalization, which helped reduce inequalities across countries but raised inequalities within countries and eventually led to the social disenchantment that is now driving political changes in many Western countries, we expect a period of economic policy that is targeted more toward supporting domestic consumers (and voters) worldwide. Although it is not entirely clear what the overall macroeconomic effects of a more self-centered growth period will be, redistribution of growth more toward households and sectors with high domestic employment seems certain. This will likely bring the national champions and brands to the fore, as well as defense and security, and the emerging market consumer as multi-year investment themes.

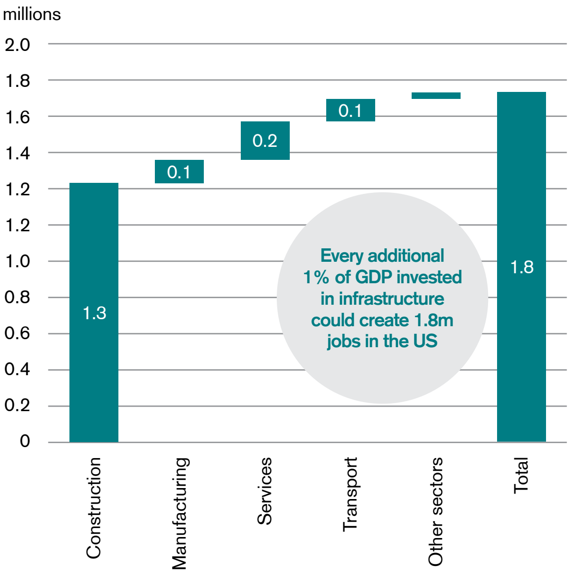
CHAPTER 2

Infrastructure – Investors need increased focus to benefit from infrastructure spending

Benefitting from infrastructure spending

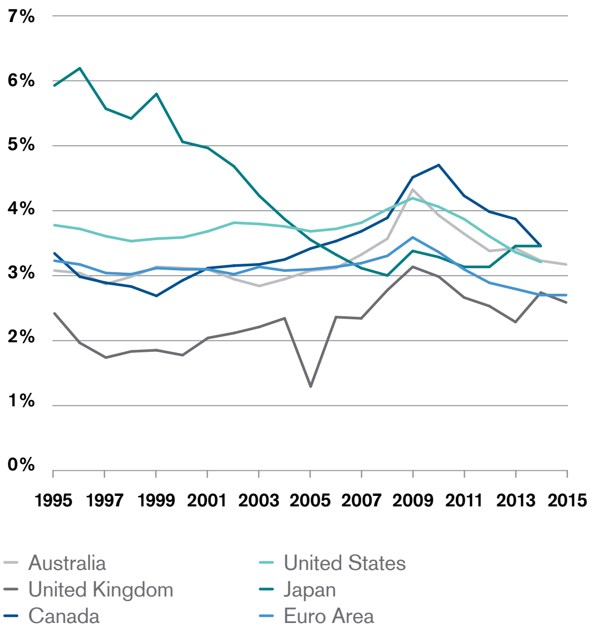
In August 2016, we identified infrastructure as an investment theme, which we believed would garner increasing attention from capital markets. The rationale was that unconventional monetary policy was wearing off and there was an increasing consensus around that a mix between expansive monetary policy and fiscal policy was needed to get out of the global gloom trap. Infrastructure investments were scoring on so many fronts that it made sense to advise our clients to take investment exposure: a powerful job creation machine where jobs are needed at all levels of qualifications and skills, a strong economic multiplier leading to productivity gains and at a time when real rates across the world were negative, an ideal environment to fund infrastructure projects. According to MGI estimates, increasing infrastructure investment by 1% of GDP could generate additional 3.4 million direct and indirect jobs in India, 1.5 million in the United States (1.8 mn as per US Bureau of Economic analysis), 1.3 million in Brazil, and 700,000 in Indonesia.

Figure 1: Job creation opportunities



Source: US Bureau of Economic Analysis

Figure 2: Infrastructure spending as % of GDP
(showing decline in investments)

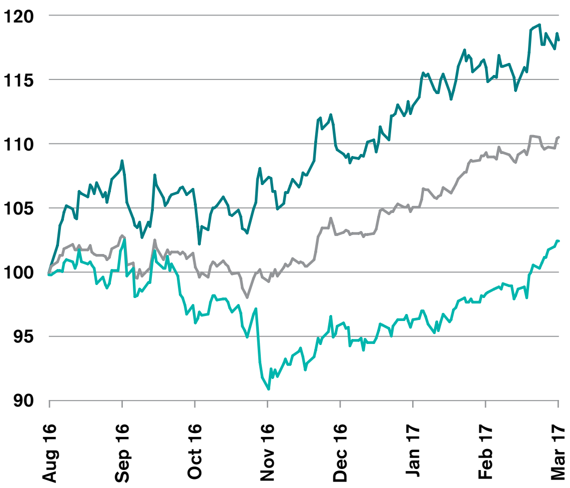


Source: IMF

There are multiple ways to gain exposure to infrastructure investments depending on the risk appetite and tolerance to illiquidity. The most straightforward route for private investors, and a promising one in terms of quick returns is to identify sectors and companies that would benefit from a policy focus on infrastructure, screen them against the company fundamentals and our analyst ratings and then recommend investing in the stocks. This strategy has worked well. One of the first words that newly elected US president, Donald Trump, spoke in his acceptance speech on the election night was "infrastructure", and since then his administration's pro-growth policy measures have provided all infrastructure-related equities a material boost. The selection of stocks with earnings exposure to infrastructure spending that we actively manage is up 18% in USD since our first publication on the theme in August.

Now that infrastructure is in every media and high up on everybody's interest, let us revisit and sharpen our thoughts around this investment topic. We continue to believe that infrastructure investments in listed equities remain interesting and we also like to remind investors that the USA is only one small part of a global trend. China for example spends around CNY 9 trillion (USD 1.3 trn) per year on infrastructure. However, most equities exposed to infrastructure spending now largely capture that in their valuations and further investing requires a more focused approach and careful examination on further valuation potential. Below, we review the potential for various types of infrastructure spending and highlight affordable housing and energy infrastructure as areas with potential for investors. We see direct equity participation in commercial infrastructure projects as particularly interesting for long-term institutional investors like pension funds. Of course, access to such projects is much more challenging. Infrastructure project pipelines are often slow and complex. Risks are numerous both politically, as well as from a regulatory standpoint. Specialist knowledge is key in this area.

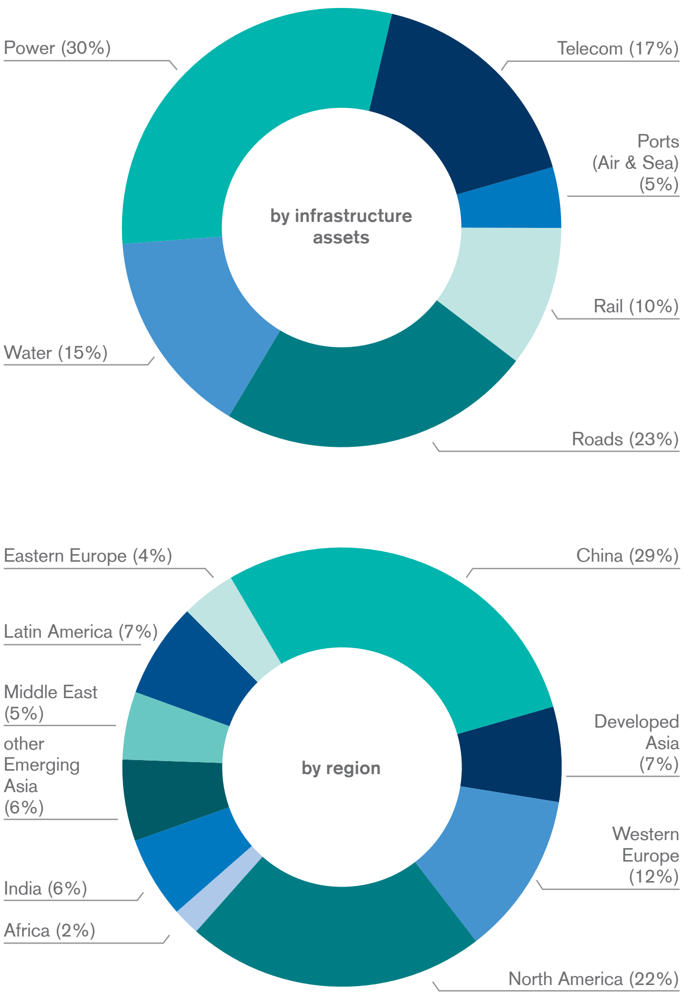
Figure 3: CS infrastructure investments: Performance of stock selection
CS Infrastructure Investments equity list: total returns (in USD)



– CS Infrastructure investments selection
– MSCI AC world index
– MSCI Global Infrastructure fund index

Source: Thomson Reuters, Credit Suisse

Figure 4 & 5: Breakdown of global aggregate spending needs



Source: McKinsey Global Institute analysis

Historical performance indications and financial market scenarios are not reliable indicators of current or future performance.

Figure 6: Various infrastructure spending initiatives

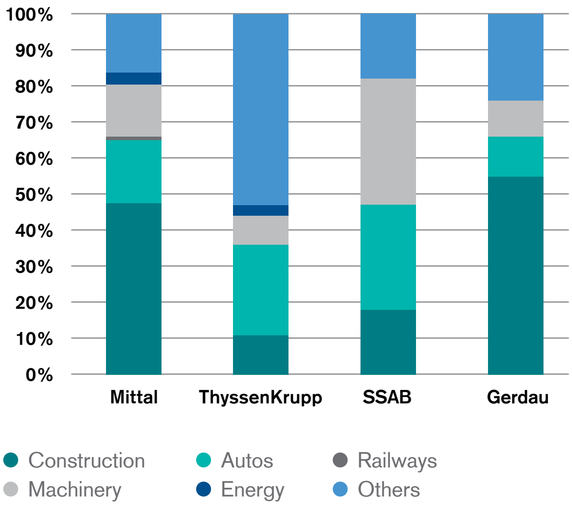
	Transport Infrastructure	Energy & Water Infrastructure	Affordable Housing
United States	US congress has already passed the USD 300 billion "FAST" act under President Obama for road and transport infrastructure and spending has started out of this program.	ASCE estimates that an average of 14-18% of clean water is wasted due to aging and leaking pipes in the US. Upgrading existing water systems and meeting the drinking water infrastructure needs of a growing population will require at least USD 1 trillion over next 25 years.	
China	China targets to build 2,830 kilometers (km) of new railway tracks by 2018. Further, as per Bloomberg Intelligence estimates China's total railway investment required during 13th five year plans is at least USD 300 billion (CNY 2 trillion).	China currently plans to invest ~USD 330 billion on water infrastructure under environmental protection and pollution control initiatives in their 13th five year plan.	China's affordable housing gap equates to about USD 180 billion per year, or about 2 percent of GDP. China to spend ~USD 100 billion each year on construction to close China's affordable housing gap by 2025.
India	Govt. has announced USD 380 billion (INR 25 trillion) investments in infrastructure over the next three years and nearly USD 1.5 trillion over the next decade.	The Indian power sector has an investment potential of US 250 billion in the next 4-5 years as India's per capital electricity consumption is just 1000Kw compared to the developed nation average of 15,000KW and China of 4000KW.	India is facing a shortage of ~19 million household units in urban areas. To address this issue government launched "Housing for All" scheme which aims to build ~22 million low-cost homes across all urban areas by 2022.
Canada	Govt. announced USD 35.4 billion in building transportation infrastructure over next 11 years.	Govt. announced USD 22 billion over 11 years on Green infrastructure to provide clean air and water.	Govt. announced USD 11.2 billion for affordable housing and additional USD 2.1 billion for homelessness initiatives over the next decade.
United Kingdom	Govt. is fully committed to GBP 46 billion for the HS2 project, linking London to Birmingham. Further, a new runway at Heathrow was approved by the government and is expected to cost around GBP 16 billion.	UK's nuclear regulators has granted consent to start GBP 18 billion Hinkley nuclear power plant project.	Govt. has issued a green paper highlighting plans that include a GBP 2.3 billion housing-infrastructure fund as part of a new industrial strategy with a further GBP 1.4 billion released for affordable housing.

Source: Credit Suisse

Transport infrastructure

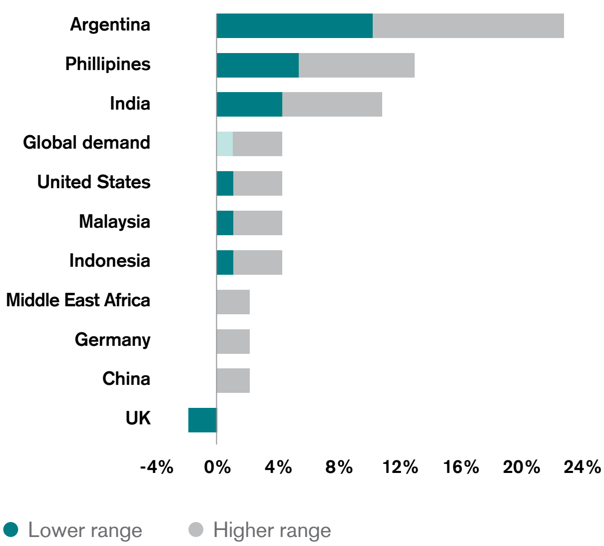
Most infrastructure programs around the world have transport infrastructure as their first priority. While developed markets are focusing on road repair, emerging economies are expanding their road, rail, ports and airports infrastructure. Germany's Federal Ministry of Transport and Digital Infrastructure has adopted a plan to spend EUR 290 billion on the construction and modernization of roads, bridges, railways and waterways by 2030 while the US Congress has already passed the USD 300 billion "FAST" act under President Barack Obama for road and transport infrastructure and spending has already started under this program. A further USD 201 billion was passed via local spending initiatives during the last presidential election with spending likely to commence before the end of the year. Apart from the USD 500 billion which has already been approved, the Congress is now discussing the US Administration's proposed spend of USD 1 trillion on infrastructure. Meanwhile in Asia, China targets to build 2,830 kilometers (km) of new railway tracks by 2018, and 30,000 km of roads over the next five years. India is building over 3,000 km of commercial rail network called the Dedicated Freight Corridor and aims to construct 50,000 km of roads over the next five years in an attempt to decongest road transport traffic and move freight traffic to railways. Completing infrastructure programs of this size will require large amounts of steel, cement, industrial metals and building materials. These projects will also require engineering services, planning and industrial equipment for construction. With this in mind, we have been recommending companies that operate in these end-markets and which we believe should benefit from significant growth in earnings. In the meantime, many companies now have market valuations that reflect the opportunities available. Valuations, especially within the industrials sector, are full in our view and while there are still opportunities within materials and industrials, we have decided to refine our exposure by shifting our focus towards other areas of infrastructure spending.

Figure 7: Exposure of steel companies by end-markets



Source: Company data, Credit Suisse

Figure 8: Cement consumption growth forecasts for 2017



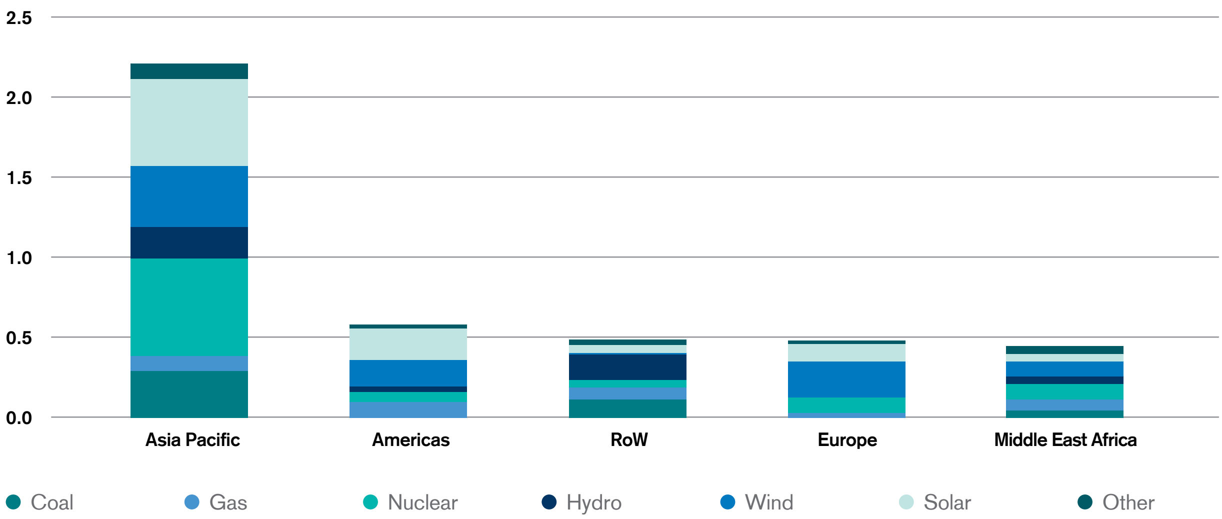
Source: LafargeHolcim, Heidelberg, Cemex, Credit Suisse

Water and energy

The energy sector has undergone major transformation in recent years due to new regulations, including those focused on environmental impact with an increased focus on clean energy. According to Bloomberg New Energy Finance (BNEF), globally nearly USD 4.4 trillion will be invested in new power generating capacity over the next ten years, of which ~USD 2.3 trillion will be in Asia with the lion's share to be invested in renewables. The increased use of renewable energy should drive a need for more spending on improving electricity grid infrastructure and interconnection, and also provide opportunities for battery storage. The European Commission, for example, aims to connect European energy networks, increase security of energy supply, and contribute to sustainable development by integrating renewable energy sources across the EU, and has allocated EUR 5.4 billion to the Trans-European energy infrastructure project through 2020.

Meanwhile, Africa – which is estimated to hold 10% of the world's hydrocarbon resources – offers significant potential for the oil industry, but remains relatively underexplored and may invest USD 42 billion over the next ten years to lift refining capacity by 1.7 mbpd, based on analysis by Bloomberg. In the USA, President Trump has signed executive orders to advance the USD 3.7 billion Keystone XL and Dakota access pipelines. Energy infrastructure in the USA is receiving increased investment due to increased demand, capacity bottlenecks and aging equipment. However, the American Society of Civil Engineers (ASCE) estimates that there is still a significant funding gap of USD 177 billion to meet the nation's energy infrastructure needs through 2025. The Trump administration's efforts to deregulate the energy industry should be a key catalyst for future spending, in our view.

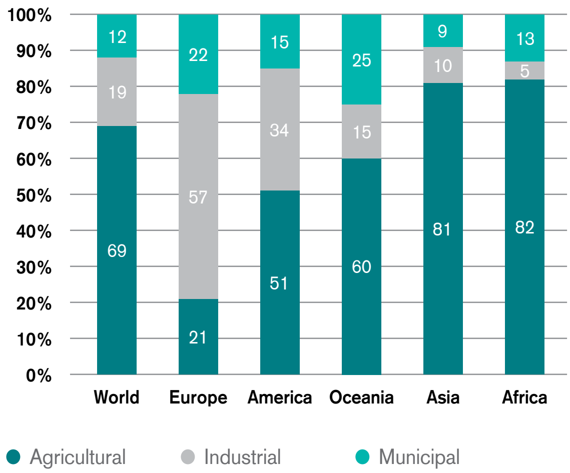
Figure 9: Capital investments in power generation 2016-25
Capital investments in power generation (USD billion)



Source: Bloomberg New Energy Finance, Credit Suisse

Water is a further critical infrastructure resource used by every household and industry globally, underpinning economic growth, as well as people's livelihood. Agriculture, as an industry remains the largest consumer of (69%) of water, followed by industrial (19%) and municipal corporations (12%), according to the Food and Agriculture Organization of the United Nations. With a growing global population, water sanitation and scarcity problems continue to rise. According to the OECD, the number of people living in areas seriously affected by supply shortages will likely rise to 4 billion by 2050. Based on estimates from the International Food Policy Research Institute, nearly 49% of global grain production could be at risk by 2050. While water supply problems pose a serious challenge globally, it can also be seen as a huge investment opportunity to build an extensive water distribution network. Utility companies along with government organizations will increasingly be called upon to build a sustainable water infrastructure, in our view. China currently plans to invest ~USD 330 billion on water infrastructure under environmental protection and pollution control initiatives in their 13th five year plan. Meanwhile in the USA, the ASCE estimates that an average of 14%-18% of clean water is wasted due to aging and leaking pipes in the USA. Upgrading existing water systems and meeting drinking water infrastructure needs of a growing population will require at least USD 1 trillion over the next 25 years, according to the ASCE. We have identified companies that offer solutions in energy and water infrastructure that we believe will benefit from a meaningful earnings lift through infrastructure spending.

Figure 10: Water withdrawals by sector

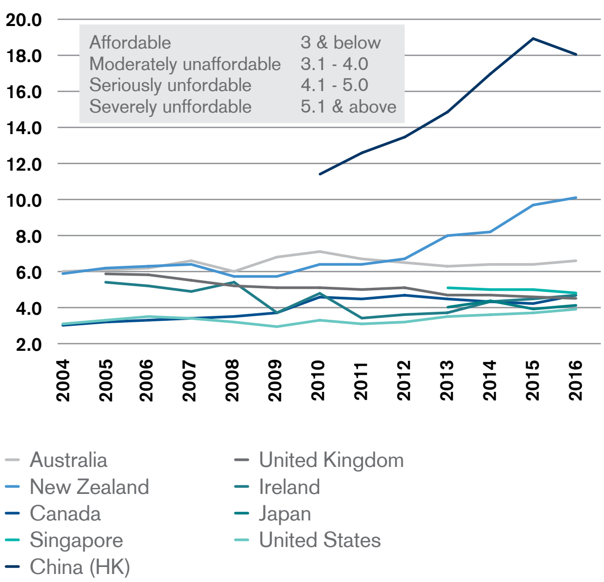


Source: Food and Agriculture Organization of the United Nations

Affordable housing

A further development need which has received scant attention from investors so far however is public housing. This is despite a clear need for housing spends across the world. The definition of affordable housing varies, but usually denotes the housing needs of lower and middle income groups. Affordable housing refers to housing units that are affordable and provide basic needs like access to schools, healthcare facilities and transportation to employment. Financially, in many economies, affordability is defined as cost of housing that does not exceed 30%-40% of household income.

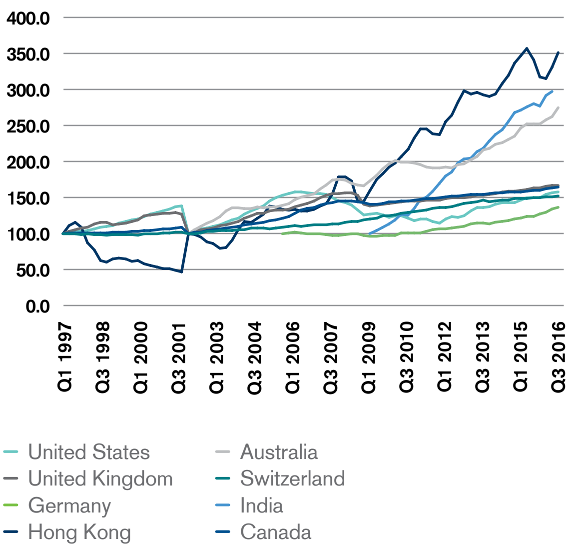
Figure 11: House affordability (house price to income ratios) (in USD billion)



Source: Demographia International Housing Affordability Survey

Urbanization is amplifying the issue as an estimated 54.5% of the world's population currently lives in urban areas and, by 2030, urban areas are projected to house ~60%, according to the United Nations. The overcrowding of cities has helped drive property prices higher, making it unaffordable for the lower and middle income groups. According to the McKinsey Global Institute (MGI), if current trends continue, the number of households that occupy unsafe and inadequate housing or are financially stretched by housing costs could reach 440 million (or ~1.6 bn people) by 2025. In China, the situation is acute, 60% of households in cities of more than 7 million cannot afford basic housing at market rates. China needs to spend ~USD 100 billion each year on construction to close the affordable housing gap by 2025, according to MGI, for example. However, the unaffordability issue remains global. The World Bank and the United Nations define affordability of housing as a function of the median house price divided by the median household income. Any housing market with a median multiple of above three is defined as unaffordable, ranging in categories from moderately to severely unaffordable.

Figure 12: House price index
(rebased to 100)



Source: Thomson Reuters

According to the Demographia International Housing Affordability Survey 2017, there was a reduction in the number of affordable major housing markets from 13 to 11 in 2016. At the same time, the number of severely unaffordable major housing markets rose from 26 to 29. The USA has a moderately unaffordable median multiple of 3.9. Major housing markets with seriously unaffordable ratings include Japan with an average multiple of 4.1, the United Kingdom (4.5), Canada (4.7) Ireland (4.7), and Singapore (4.8). There are three severely unaffordable major housing markets with median multiples of 5.1 or above which includes China (Hong Kong), with a multiple of 18.1, New Zealand (10.1) and Australia (96.6).

Governments are aware of the issue and have started to respond. The UK has announced plans for a GBP 2.3 billion housing-infrastructure fund to unlock land for housing and a further GBP 1.4 billion which will be released for the construction of affordable housing. Canada has dedicated USD 11.6 billion for affordable housing over the next decade, while Australia plans to spend close to USD 11 billion a year on affordable and social housing. Meanwhile, the Indian government has launched the "Housing for All" scheme which aims to build ~22 million low-cost homes across all urban areas by 2022.

Conclusion

The need for all kinds of infrastructure spending is unambiguous, the political will to spend tangible amounts of public budgets on infrastructure projects is clear, and investors are evidently ready to allocate capital toward infrastructure spending. However, it is becoming increasingly complex for investors to find ways to benefit from opportunities related to infrastructure spending. We continue to maintain a list of equities related to infrastructure spending, but as the first wave of direct beneficiaries from transport infrastructure has seen their equity values price-in heady expectations for future earnings growth, we increasingly turn our attention to housing and energy infrastructure as the next wave of beneficiaries. Direct participation in infrastructure projects or investments in infrastructure funds are the other alternatives for investors.

CHAPTER 3

Technology, healthcare, oil & gas – pioneering change and disruption

They say the only constant in life is change; and it is no more evident than in the field of applied technology. Across the business world, innovation has always been a relentless force. Some are able to embrace and exploit its disruptive power, while others cling to established business models, hoping the change will dissipate, go away, or reverse. It rarely does.

In the following comment, we examine three areas of pioneering change and disruption that are opening up new and compelling investment opportunities. We caution that by definition, these investment themes are secular in nature, and almost certainly, investors will need to navigate short-term volatilities. However, the scope and potential reach that investments in technology can offer is breathtaking, and worthy of careful consideration.

- Digitalization – the use of IT innovation to disrupt or build new businesses – is a rising force that challenges traditional markets in almost all sectors via its inherent ability to provide competitive advantage. We explore the likely impact of the three main driving forces of digitalization: virtual & augmented reality, artificial intelligence, and robotics.

- Healthcare – technological and scientific breakthroughs – coupled with seismic shifts in the age composition of global populations – create a compelling set of investment considerations for the healthcare industry, increasingly driven and shaped by innovations in immunotherapy, fertility, and gene therapy.

- Energy – nowhere has the influence of technological disruption been as strong and as evident as the energy sector, particularly over the past four years. The extraordinary volatility in the price of oil since 2014 has largely been a response and reaction by OPEC – to new entrants – the US shale producers. And as output in the renewables market also accelerates, challenges facing the established producers will unlikely change anytime soon.

Technology

Digitalization – expanding and strengthening…

Digitalization is a rising force that challenges traditional markets in almost all sectors on various fronts with its inherent capability to provide a competitive advantage. Digitalization, which is expected to maintain a solid momentum over the next three to five years at least, should benefit companies ("digitizers") that use IT innovation to disrupt or build new business cases around them. In a low-growth environment, "digitizers" can offer both above-market average sales growth and rising operating margins owing to economies of scale and efficiency.

IP companies will be major beneficiaries of this theme as they continue to innovate to cater to the structural shift towards more enriching online experiences. A gradual shift from offline to online advertising is also expected to bolster growth for web advertising agencies (see Figure 1). Companies, which are creating new ecosystems based on Internet of Things (IoT), cloud computing or are involved in providing cybersecurity should also gain in the long term.

Digitalization will have equally appealing opportunities in the non-IT sectors due to the need to innovate and bring operational efficiency.

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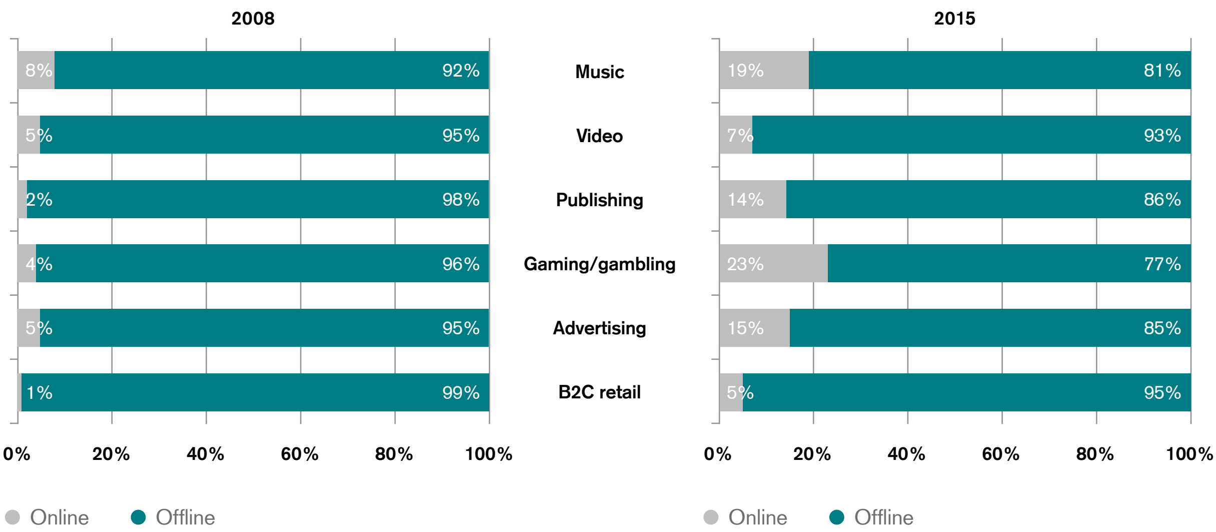
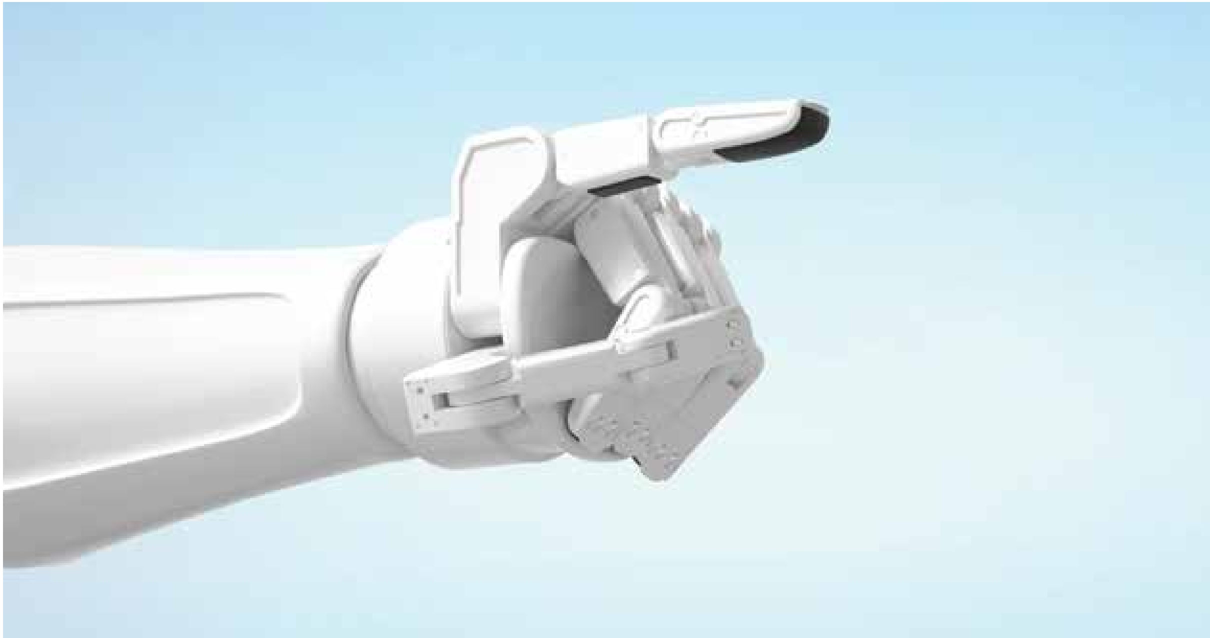
While the theme is well positioned for the long term, stocks exposed to this theme may be prone to corrections due to its heavy weightage to the IT sector where valuations seem elevated. Growth prospects are also highly dependent on incremental investments that companies make to digitalize. Any weakness in such investments due to the macroeconomic environment could pose a risk for incremental returns.

Figure 1: Growing benefits of shifting from offline to online



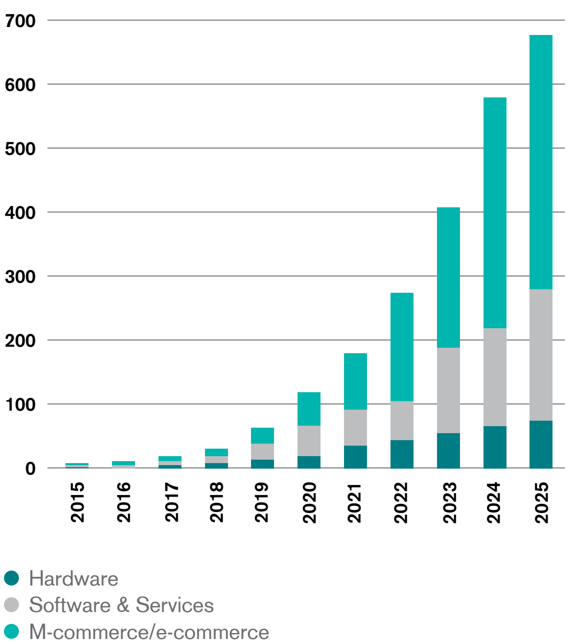
Source: A.T. Kearney, Credit Suisse



The Virtual Reality/Augmented Reality growth is accelerating

We expect Virtual Reality/Augmented Reality (VR/AR) to become a multi-billion dollar market by 2020, but investors need to be patient until more concrete business opportunities arise in 2018 and beyond, and revenues become more noticeable at companies. The tremendous success of Pokémon Go proved our thesis right; that the gaming industry is one of the first beneficiaries of VR. We continue to believe that the market for VR/AR hardware and software might increase to an even larger size than the current smartphone market (USD 600–700 bn; see Figure 2) and at the same pace that the latter witnessed during 2001–15. We believe the gaming market is just a catalyst and plenty of other applications should evolve in the next 10–15 years.

Figure 2: Expected growth in VR/AR market
(in USD billion)



Source: Gartner, Credit Suisse

The next big thing in IT: Artificial Intelligence

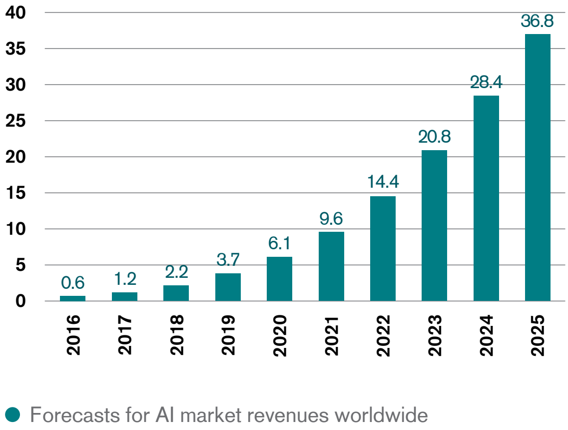
The disruptive force of artificial intelligence (AI) is at the heart of the new phase of digitalization, which the world is entering. The progress made by the IT industry in collecting, analyzing and managing structured and unstructured data in real time now enables us to make intelligent machines and computer programs, which can learn by themselves and solve problems in a manner which previously required human intelligence.

AI is expected to touch most industries in one way or another, as these solutions are believed to offer value by significantly improving productivity, cutting costs and providing a competitive advantage. According to Statista, worldwide AI revenue should record a CAGR 2016–25E of around 57% to USD 36.8 billion (see Figure 3). Tractica estimates the software & service segment to receive close to half of all AI revenue and among the sectors, financial services and healthcare should have most use cases.

Invest with a little help from robots

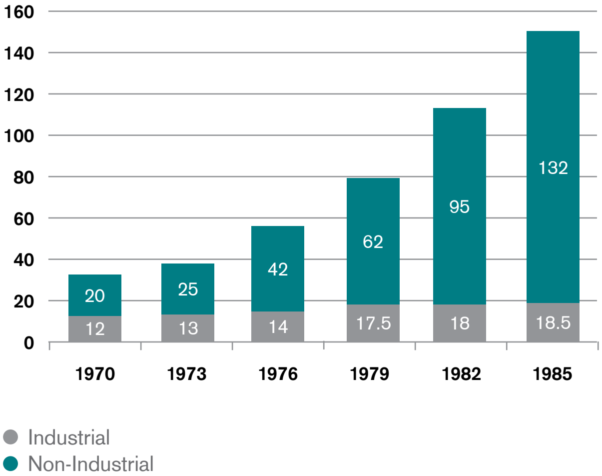
Growth in the field of applications for robots should be boosted by technological innovation in the IT sector. While industrial robots have a large and established market and the players are already well known, we expect the field of non-industrial robotics revenues to grow strongly and that this growth is probably underestimated. We see attractive potential in areas such as logistics & transport, agriculture, healthcare, commercial and consumer applications. According to the market research firm Tractica, revenues for non-industrial robots are expected to grow from about USD 12 billion in 2015 to USD 130 billion in 2020, while industrial robot market sales could almost double from USD 12 billion to USD 20 billion in the same period (see Figure 4). We suggest investors to get exposure to companies which are the most involved and thus, well positioned to benefit from rising demand for robots, automation, drones and applications for robot development.

Figure 3: AI market expected to grow significantly in the next ten years
Revenue in USD billion



Source: Statista, Credit Suisse

Figure 4: Total industrial and non-industrial robotics revenue world markets 2015-20
(in USD billion)



Source: Tractica, Credit Suisse

Healthcare

Scientific breakthroughs and demographic shifts – a compelling foundation for healthcare

Close to 15 years after the official completion date of the human genome project, the applications of the fundamental research insights generated at the time are coming to bloom. Biopharmaceutical companies at the forefront of applied research should be able to capitalize on the therapeutic promises heralded by solutions such as immunotherapy, gene therapy and others. At the same time, societies are going through seismic shifts with regard to their age composition. Global trends in life expectancy, partly driven by medical innovations, as well as trends in fertility, are causing the age composition of societies to change at an ever-increasing speed. In our view, these two fundamental factors provide a compelling backdrop for the healthcare sector.

Harvesting the human genome project's fruits

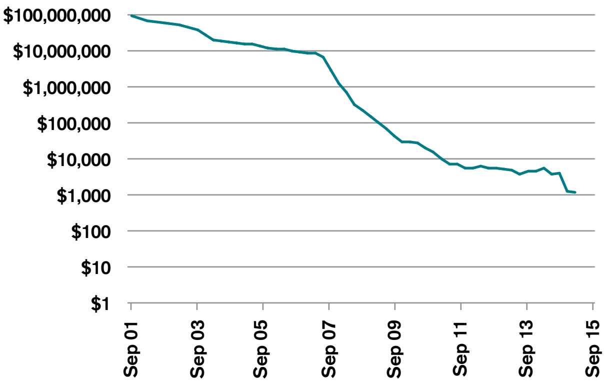
The era when deciphering a human genome used to cost hundreds of millions of dollars is long gone (see Figure 5). Today, with sequencing costs per genome – that is, to understand the full genetic makeup of a person – hovering around USD 1,000, the use of genomic data is unsurprisingly much more widespread. The most visible examples might be that anyone interested and willing to pay can gain insights into his ancestry or diabetes risk by sending in a cotton swab containing cells of the oral mucosa to a lab. However, it is not (yet) that the consumer-focused applications are the most impactful, in our view, but the applications that directly inform research and clinical decision-making.

Going from the understanding of the structure of the human genome to developing an effective therapy for a given disease is a tedious process that spans multiple years. From the genomic sequence, it needs

1 UN DESA: "World Population Prospects: The 2015 Revision"

to be understood how that sequence interacts with the biology of humans and then, with the biology of disease. This understanding will point to potential approaches to therapy, of which the most promising would then be further tested in pre-clinical and clinical testing, which could ultimately culminate in a new marketed drug. In our view, this end-to-end process spans well over a decade. With this decade since the completion of the Human Genome Project now in the rear mirror along with a mushrooming of genomic data and analyses, we thus think that the biopharmaceutical industry is entering an important period that could harbor significant innovations. With first gene therapies marketed, bispecific antibodies and a potential advent of mRNA therapeutics, to name a few examples, we believe the signs are there.

Figure 5: Sequencing cost per genome



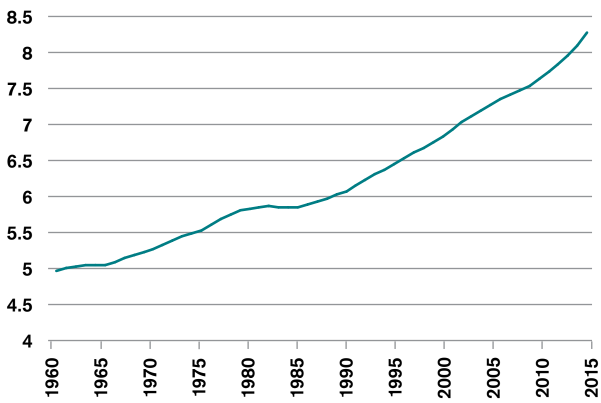
Source: National Human Genome Research Institute

An unrelenting demographic shift and its consequences

The other major fundamental in favor of the healthcare sector is ageing of the population. As of today, the world's population of people aged 65 and over is slightly over 600 million. This number is up about four-fold compared to 1960, driven by a doubling in the world's population along with – more importantly – a doubling in the proportion of 65-year olds, as per World Bank data (see Figure 6). Going forward, the picture is not going to change. Citing increasing longevity and decreasing fertility rates, the United Nations is expecting the population of elderly people to double by 2050 and to triple by 2100[1].

With disease prevalence of many chronic diseases such as arthritis, heart disease, cancer and Alzheimer's increasing with age, it is intuitively clear that a higher population of elderly is tied to a disproportionate rise in healthcare expenditure. A compounding effect comes in that co-morbidities – that is, concomitantly occurring diseases – are much more frequent in the elderly. The US Centers for Medicare and Medicaid Services estimate that the annual healthcare expenditure for a person in the 65-74 year age bracket amounts to slightly over USD 10,000. The same statistic for people of over 85 years of age shows average healthcare expenditures of close to USD 26,000 annually, an increase of over 138% (see Figure 7). It is certain that this observation will compound the effect of the unrelenting demographic shift on healthcare expenditures.

Figure 6: World population ages 65 and above (% of total)

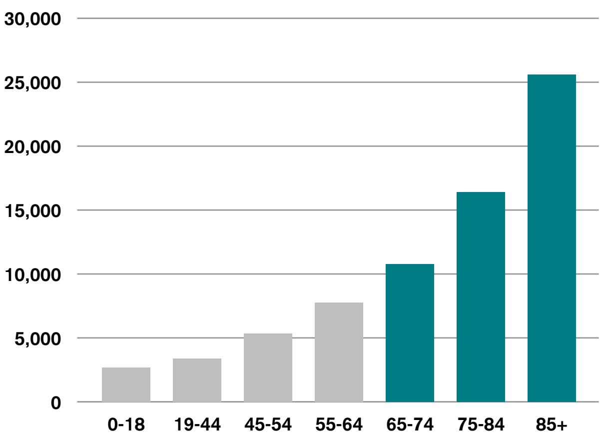


Source: World Bank

Keep an eye on the price, but general signs are positive

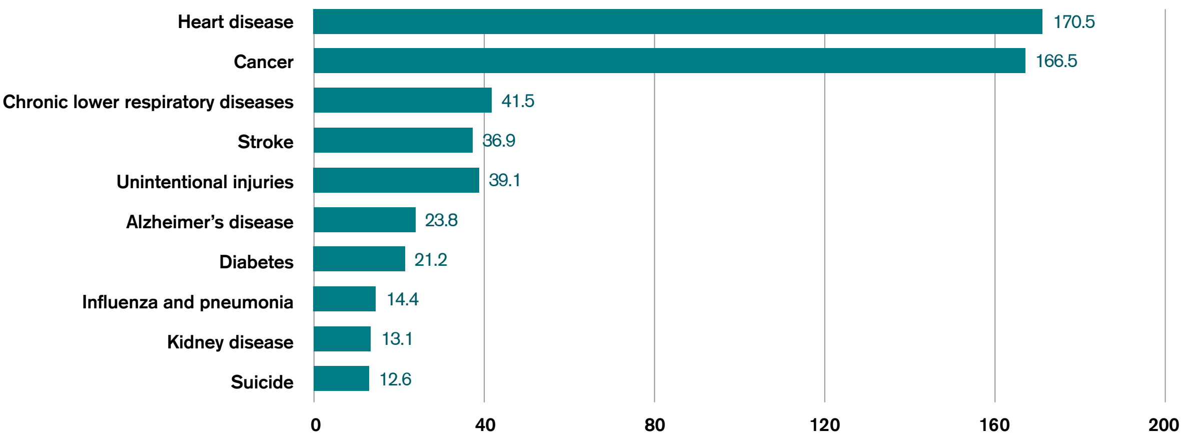
We are not oblivious to the increasing cost burden that ageing and therapy price increases pose. However, we argue that over longer timeframes, spending preference patterns have been shifting as societies and their characteristics change. Also, we do think that genuine innovation – better drug efficacy, higher convenience, less side effects – will for the foreseeable future confer pricing power to Biopharma companies. Taking into account the fundamental factors outlined above, we thus continue to see a very favorable backdrop for the healthcare sector.

Figure 7: Healthcare spending per capita and age band
Total healthcare spending per capita in USD



Source: Centers for Medicare and Medicaid Services, Credit Suisse

Figure 8: Age-adjusted death rates for ten leading causes of death in 2012: United States
Deaths per 100,000 standard population in 2012



Source: Centers for Disease Control and Prevention

Oil & gas

Nowhere has the influence of disruption been as strong and as evident as the energy sector, particularly over the past four years. The extraordinary volatility in the price of oil since 2014 was largely a response and reaction by established producers (such as OPEC) to new entrants (the US shale producers) and their threat and potential to upset the existing petroleum order, which was founded decades earlier by the OPEC.

As shale oil prices went into a tailspin, it sent crude oil from levels of over USD 115/barrel in June 2014 to USD 50/barrel by the end of that year. The USD 100/barrel, thought to be the optimum price to keep the oil market balanced, was suddenly halved, with no signs of picking up.

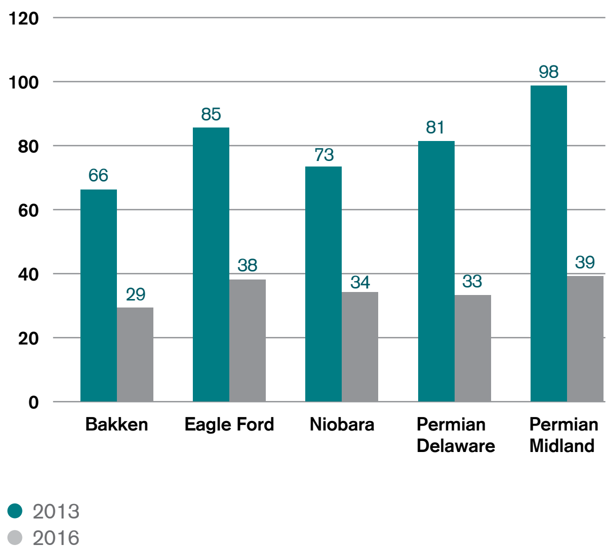
Contrary to market expectations of the OPEC stepping in and stabilizing the market, Saudi Arabia decided to boost output. The OPEC's crude oil output increased from 31.02 million barrels per day (mb/d) in 2014 to about 33.2 mb/d in 2016, further aggravating the oversupply in the market. The reasoning was to crowd out the new entrants, US shale producers, which were being blamed for the glut in supply. This offensive strategy by the OPEC resulted in oil prices touching multi-year lows of sub USD 30 in early 2016 and left a profound mark on the oil and gas industry.

Given the long-term development cycles of around 5–7 years for conventional oil, cost structures across major companies were slow to adjust to the new oil price reality. Thus, operating profits and cash flows collapsed, forcing companies across the industry to restructure their business. This prompted a significant cut in global exploration & production (E&P) spend, which the International Energy Agency (IEA) says dropped 25% YoY for 2015 and then another 20% YoY for 2016. Cost saving initiatives and big cuts in capex budgets resulted in job losses of more than 350,000, with oilfield services and equipment bearing the major brunt.

However, amid the unprecedented challenge, shale producers managed to stay in operation and surprised the industry by slashing their production costs quicker than most believed was realistically possible. Using techniques such as down spacing, that focuses on drilling several wells from a single location and using data analytics to improve drilling accuracy, US shale players achieved both opex and capex efficiency.

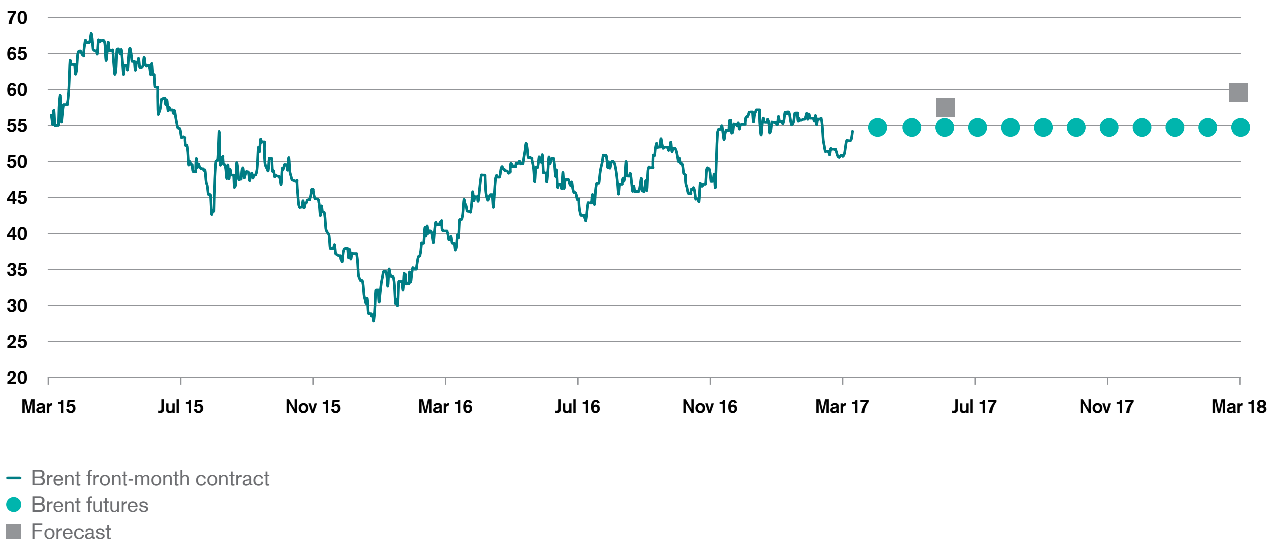
While overall volumes dropped, productivity increased significantly, with prolific regions such as the Permian witnessing productivity per rig rising 200% to about 600 b/d per rig from about 200 b/d per rig in 2014. At the same time, excess supply of rigs and other oilfield equipment created by a lack of demand, resulted in a strong decrease in equipment leasing costs. The cost deflation in the industry and technological advancement reduced the break-even prices for US shale notably, Rystad Energy currently estimates it at sub-USD 40/barrel from average levels of USD 80/barrel back in 2013.

Figure 9: Notable reduction in break-even oil prices across shale plays
USD/barrel



Source: Rystad Energy

Figure 10: Our 3M and 12M Brent oil forecasts are USD 57 and USD 60, respectively
USD/barrel



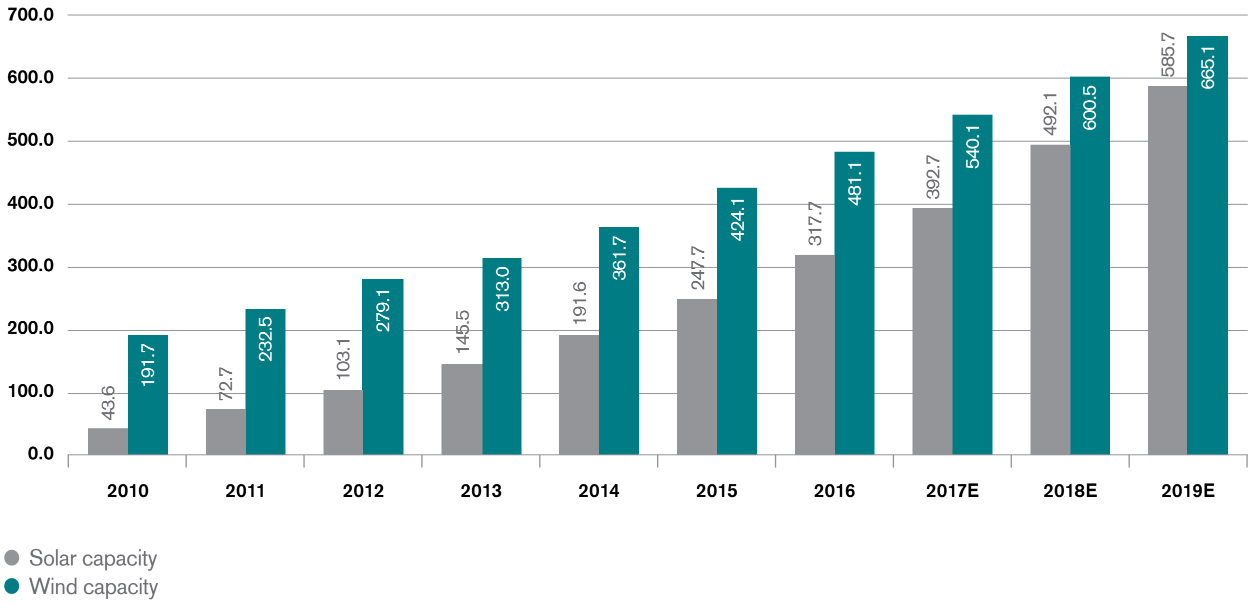
Source: Bloomberg, Credit Suisse/IDC

Global renewables market

Adding further pressure to the established energy market is the inexorable rise of the global renewables market. Unlike 2016 – which started on a positive note with the historical signing of the Paris climate agreement – 2017 is filled with uncertainty for the global renewables market. Foremost is the opposition of the Trump administration in the US for the clean energy pact, followed by political uncertainty in Europe (elections in key countries such as Germany and France), where government support has been the major driver of investments. While it is premature to consider the US as out of the Paris Agreement entirely, even if that happens, other major countries, such as China, have a clear political will to increase the share of renewables in the energy mix and drive the clean energy pact forward.

Volumes of wind and solar installations hit a new record high in 2016, with additions of 127 gigawatts (GW). The Chinese government has initiated a five-year target of clean energy spending of USD 360 billion over 2016 to 2020. According to Bloomberg New Energy Finance (BNEF), solar and wind installations will continue to rise, by 75 GW (2016: 70 GW) and 59 GW (2016: 57 GW), respectively, driven by growth in developing regions such as India, Brazil and Turkey. Global investments would be flat YoY in 2017 primarily on falling solar costs. In 2017, solar system costs are expected to fall by a further 10%, with module costs falling 25% YoY.

Figure 11: Solar and wind installations will continue to rise
GW



Source: BNEF, Credit Suisse

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Publisher
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Authors
Dr. Nannette Hechler-fayd'herbe
John Woods
Joachim Klement
Dan Scott
Uwe Neumann
Lorenzo Biasio
Antonios Koutsoukis

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Editorial & Publications
Uetlibergstrasse 231
P.O. Box 300
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E-Mail: publications.research@credit-suisse.com
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