

Longer Term Investments

The economics behind long-term themes

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- Population growth, aging, and urbanization are trends that UBS believes will endure over the coming decade.
- Those secular trends can be exploited for long-term investing as they are robust and will endure both an economic cycle and a period of political uncertainty.
- These trends will also be influenced but not deterred by disruptive forces of technological advancement, societal changes, and resource constraints.
- Selected identified investment themes are expected to benefit from those trends and offer superior growth over time.
- Diversification – whether within a single identified theme or across multiple themes – is key for success when investing through a cycle. Also, investment discipline matters in thematic investing, too.



Source: istock

Introduction to the Longer Term Investments (LTI) series

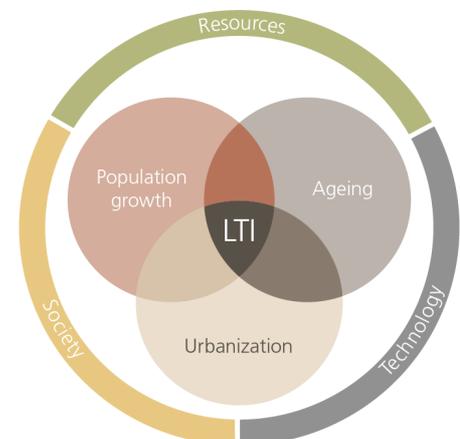
- The Longer Term Investments (LTI) series contains thematic investment ideas based on long term structural developments.
- Secular trends such as population growth, ageing, and increased urbanization create a variety of longer term investment opportunities.
- These investment opportunities are influenced by the interplay of technological advancement, resource scarcity, and the societal changes.
- Investors willing to invest over multiple business cycles can benefit from potential mispricings created by the typically shorter term focus of stock markets.

Introduction

Investing with a view to the long term is always a daunting prospect. Humans are constantly changing. Political and economic trends are constantly changing. No one, not even an economist, can claim to predict the future with certainty. John Maynard Keynes famously predicted in 1930 that the working week would drop to 15 hours, and the challenge would be how to fill all the resulting leisure time.

Long-term investing today seems even more challenging than normal. The world economy stands on the brink of significant structural upheaval – what the World Economic Forum has labeled “The Fourth Industrial Revolution”. Robotics, artificial intelligence and the virtual economy will change how we work and where we work. Environmental constraints are visibly affecting economic performance as the consequences of the environmental credit crunch make themselves felt. With this much structural change ahead, can one safely invest for the long term? Past periods of economic revolution and upheaval have tended to cause social tensions and anxiety – encouraging anti-establishment politics, protectionism and prejudice.

Technology, resource constraints and social pressures are all potentially disruptive forces for investors. They constitute, perhaps, “known unknowns”. We know that there will be disruption, but we are not necessarily certain about the details of the disruption. There are some identifiable trends that will run through this period of upheaval. These “known knowns”, or relative certainties, can be a foundation for long-term investing.



There are three trends or "known knowns" that UBS believes will endure over the coming decade, alongside these disruptive forces. Two – the aging of populations and the increase in global population – are derived from basic demographic trends that are already in place. The third – urbanization in emerging markets – is a trend that is also already under way but which has further to run in our view.

By identifying these foundations it is possible to build a framework to think about investment strategies that are robust over the course of an economic cycle (a seven- to ten-year period). The fact that this framework is built on trends with a great deal of certainty helps investors identify (broadly) areas of future growth. Of course, the details of such strategies will need to adapt to changing conditions produced by the disruptive trends. However the point of a long term investment framework is to identify where to focus attention in a world of change.

Given the importance of those three disruptive (known unknown) and three enduring (known known) trends as a basis for longer-term investments, we elaborate on them in the following sections and highlight in the appendix the affected CIO themes we published on separately.

Technology – disruptive

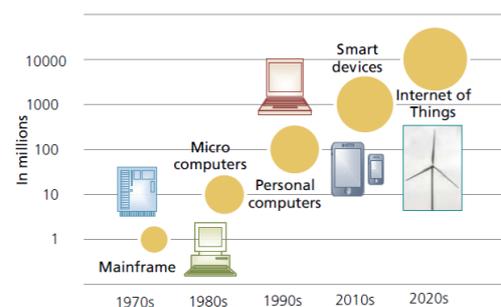
Technological change is likely to be extremely disruptive in the coming years. In many ways the economics of technology is not about the technology itself, but about the changes technology brings to society. "Enabling technology" will change or enhance what people can do. Changes in communication, computer power and robotics are all enabling technology. Technology will make existing tasks more efficient. Technology will create new economic opportunities (doing things we have never dreamed of before). Efficiency and novelty are trends that are certain. The details and the way society restructures in response are what are uncertain.

The disruption that technology brings will affect the context of all of our long-term themes. Enabling technology has the potential to offset some of the economic effects of an aging workforce. Robotics can increase the productivity of older workers, and substitute for lost workers if population declines.

Technology has significant implications for the urban landscape. Working from home using modern technology changes the demand for office space and transport. Technology will change the economic *necessity* of urbanization. Technology can help the world absorb a larger population, by making consumption of commodities more efficient. This also affects the disruptive trend of resource use, of course.

Technology has social implications. This was true in the first industrial revolution. This is just as true in the fourth industrial revolution. Any disruptive trend will create losses as well as gains. The role of technology in disrupting labor markets makes that disruption even more important.

Fig. 1: Non-linear developments in IT
Exponential growth in computing power drives solid growth for IT



Source: UBS, as of May 2017

Efficiency is all about doing more with fewer inputs – but for the labor market "fewer inputs" means unemployment.

Novelty means that new jobs are created. The challenge is to make sure that those who suffer as a result of efficiency are able to benefit from the results of novelty. It is estimated that between 10% and 15% of existing jobs will be lost as a result of technological change in the next twenty years. However, half of today's jobs will change as a result of technology.

Technological change, as a disruptive change, is hard to invest in directly. What is important is that long-term investments have the flexibility to adapt to the consequences of technological change.

Resources – disruptive

The world is using non-renewable and renewable resources at an unsustainable pace. Today's standard of living is created by one and a half planet's worth of resources each year. This is depleting the resources available for future generations – it is like borrowing on credit card for half one's household spending. As with any other form of credit, at some point the bill falls due. For environmental credit that bill is falling due now.

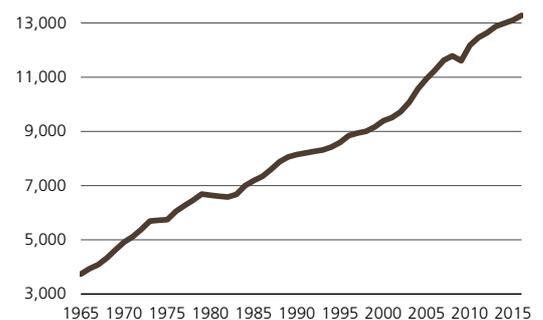
If nothing changes, population growth will only increase the demands on current resources. There are two possible outcomes. Global living standards might decline as resource limits limit growth. Alternatively the world may become more efficient in using resources.

Environmental constraints are already limiting growth. This is something humans have not had to face for many years. To take just one aspect, that of water scarcity; drought periodically wreaks havoc with agriculture, while power plants are idling for want of water for cooling. It takes forty-five bathtubs of water to produce an eight ounce beefsteak; a growing population with growing demands for calories will mean growing demands on already stretched water resources.

China has experienced dramatic economic gains in the past quarter century. In 1990 China made up 1.5% of the world economy. In 2015 it was 15%. These gains have relied on the use of environmental credit. Water shortages in China are limiting electricity generation. Pollution in China is contributing to declining life expectancy. The risk is that if resource constraints produce declining living standards there will be an increased politicization of resources. China has water disputes with every land neighbor it has. Elsewhere, past periods of food drought have produced price increases that have led to governments putting the needs of their country first, with export bans and similar policies.

The more optimistic scenario is that the world becomes more efficient, and reduces resource waste. Roughly half all food in the US is never eaten. Roughly half all food in India is never eaten. The waste occurs at different points in the supply chain. Reducing that waste could solve some of the resource challenges. Technology can help reduce that waste. Robotics make local food processing easier – "in store" bakeries in convenience stores, for instance. Local baking

Fig. 2: World primary energy consumption
In million tonnes oil equivalent; includes Coal, Oil, Natural gas, Nuclear energy, Hydro, Renewables



Source: BP, UBS

cuts waste by reacting more quickly to local changes in demand. Better data use can cut supply chain waste.

Modern communication can help improve education for farmers, cutting waste earlier in the supply chain. This is not a new idea – the UK BBC Radio soap opera "The Archers" was launched in the 1950s to educate farmers and raise efficiency.

Traditionally, limits on resource supply have not been important to investors. The price consequences of supply constraints have mattered, but few investment strategies have considered what might happen if supplies are exhausted. As the potential damage from an environmental credit crunch becomes more obvious, so investor interest in sustainable investing has grown.

Society - disruptive

Both disruptive and enduring trends have implications for society. Social norms are challenged as people live longer, and change where they want to live. Technology challenges social hierarchies and will cause some job losses.

There are three related aspects of social change that matter for investors: those who are unable to adapt; the policies and politics of those that fail to adapt; those that succeed in a world of change. Most focus, rightly, is on those "left behind" by change. This group will tend to be older, less well educated, and lower paid. There is also a tendency for this group to be rural rather than urban. In many cases the problems arise not because of an absolute decline in living standards, but because of a relative decline in living standards. "Left behind" can just mean that your neighbors are doing noticeably better than you are doing.

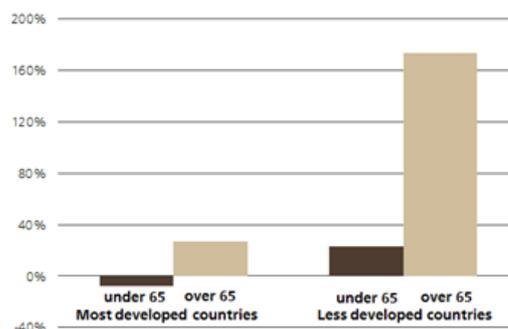
Those who fail to adapt to the changing world are economically unproductive. This group may also become politically and socially disruptive – either by using their political voice, or by dropping out of legitimate society.

This then raises the policy implications of social change. In a world of change, living standards will diverge. It will be for society to choose what level of relative poverty is acceptable. Having made that choice, redistributive policies will be put in place to achieve the desired social goal. Taxation and public spending patterns are certain to change as levels of relative poverty change.

Policy choices may create a conflict between generations. Income redistribution will tend to favor the elderly, and be paid for by millennials and younger workers. This is particularly the case if social security payments are deficit financed. Debt is the burden of the young. Wealth redistribution will tend to fall more heavily on older generations (although some millennials may miss out on their expected inheritance). Uncertainty about what policy choices will be made may create a sense of insecurity. Loss aversion means that fear of losing relative income, wealth or social status can be a powerful economic force.

It is also worth remembering that a period of disruption will create positive outcomes for some in society. The conventional assumption

Fig. 3: Projected % change per population group 2015–2050



Source: United Nations World Population Prospects, as of 2017

is that higher skilled workers will benefit. This is, perhaps, a little simplistic. Changing consumption patterns will place different values on different skills. A YouTube broadcaster may be considered low-skilled by the conventions of the baby boomer generation. A YouTube broadcaster can be very successful in a world where notions of what constitutes media, information and entertainment have changed. This is disruptive. Existing social norms and existing social relationships are turned upside down. Social institutions need to adapt to absorb these adjustments. Deference to the *ancient regime* is unlikely to survive the rise of the *nouveau riches* of the fourth industrial revolution.

Aging - enduring

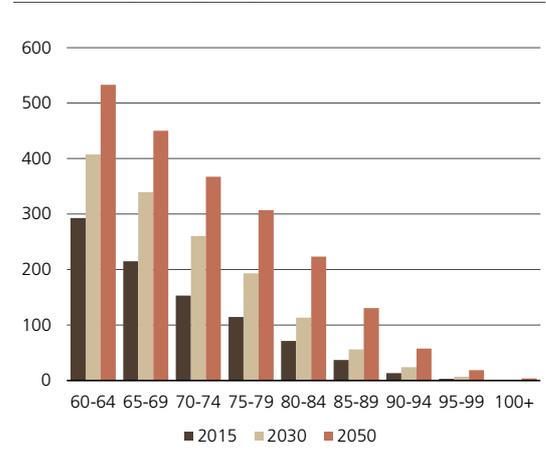
The aging of societies is one of the easiest predictions to make about the future. Barring war or disease, the trends in aging are readily identified. In little more than a decade, the number of people in developed economies aged over sixty will be larger than the number under the age of twenty five. Despite the near inevitability of aging, governments have not tended to be terribly good at preparing for this population shift. The changes in a society's age structure are gradual, and the issues outlast any election cycle. Politicians therefore have an incentive to postpone making difficult policy decisions.

Some of the issues of an aging society are artificial problems. The idea of a "declining workforce" is exaggerated by the idea that people over sixty or sixty-five years of age should not work. Japan, as a leading aging society, has shown that people will ignore the artificial constraint of official retirement and continue to work. Being able to retire at sixty five may be a fleeting opportunity enjoyed by baby boomers alone. Worrying about the number of workers may be a waste of effort, therefore.

It is also worth bearing in mind that just because a society could age, it may "choose" not to. Life expectancy has been declining in the US. Drug use, obesity-related health issues and gun crime have an impact on life expectancy. These can be thought of as specific forms of the caveats of war (gun violence) and disease (obesity, addiction). The global trend towards aging is not necessarily universal across all economies.

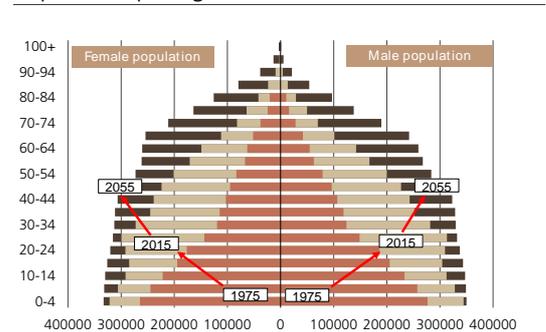
Investors considering aging as a long-term investment trend should look to other consequences of a greying society. The growth of robotics is an obvious area – supplementing human intellectual capacity with mechanical physical capacity is a complement to an aging society. The wide sphere of medical treatment, prevention and old age care is also important – everything from oncology to nursing. An aging society gives older people increased power in the market and at the ballot box. Older groups will have increased spending power relative to younger groups, and increased political influence relative to younger groups, which means that issues like medical care are bound to have increased market and political prominence.

Fig. 4: Increasing life expectancy
Estimated millions of global citizens falling into different age ranges by 2050



Source: United Nations, UBS, data as of 2015

Fig. 5: Demographic pyramid over time
Population per age bucket, in 1,000



Source: UN World Population Prospects, 2012. Medium fertility assumed for forecasts.

The political and economic importance of older generations presents challenges as well as opportunities. Younger generations may feel ignored in the democratic process, and may be disenchanted with traditional hierarchy-based working environments. Indirectly this may encourage alternative ways of working; either younger workers chose more flexible employment (like self-employment and contract working), or firms and society at large may have to reconsider seniority biased structures.

Population growth - enduring

While the world's population is getting older, it is also getting larger. The fact that people are generally living longer means that the global population is expected to grow to almost ten billion people by 2050. That is an increase of over a third from today's level. This population growth presents the world with a stark set of problems, because it coincides with an environmental credit crunch. Every six weeks the world has to feed an *extra* eight and a half million people – the equivalent of the population of London.

The combination of the environmental credit crunch with the further increase in the global population threatens current living standards. Indeed, without remedy some kind of economic "Dark Age" is possible, with an abrupt decline in GDP per person. This is an extreme scenario, however. Humans have become adept at doing more with less (what economists call "productivity"), and this is where private investment opportunities are likely to arise. Energy efficiency and agricultural efficiency are likely to be two critical areas of focus.

Productivity and innovation depend on human ingenuity. Ingenuity needs a good education system, and demands on education are likely to increase. Education will need to be flexible, however – rote learning is unlikely to produce the right results for a period of economic change. Productivity enhancement will require efficiency in all factors of production. This includes human capital. Societies will need to minimize prejudice and discrimination, which unnecessarily and irrationally wastes human potential. The challenge is to foster equality at a time when increasing numbers of people are competing for increasingly scarce resources. The private sector may be well placed to encourage the right investment as diversity and equality is generally accepted to be profit maximizing.

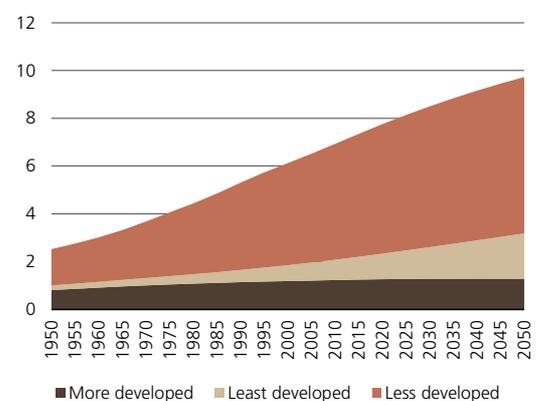
Urbanization - enduring

The gravitational pull of towns and cities has nearly always accompanied economic development. In part this is a push and pull effect: people move to cities, meaning there are fewer people in the countryside; agriculture is forced to become more labor efficient, so there are fewer jobs in farming, so rural workers move to cities in search of work. The need for agricultural efficiency as the global population increases is likely to feed into further urbanization.

The urbanization story is likely to be concentrated in emerging economies rather than developed economies. Urban populations in emerging markets are expected to rise 78% by 2050.

Fig. 6: World population breaches nine billion by 2050

Number of people (in billions, medium variant)



Source: United Nations Population Division, UBS, data as of 2015

Fig. 7: Urbanization transforms skylines
Dubai as an example for emerging cities



Source: iStock

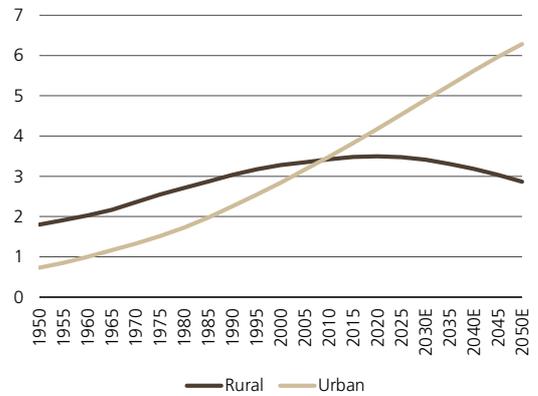
The cycle of rural labor efficiency pushing people to cities has largely run its course in developed economies. Developed economies are likely to see a more balanced approach to urban and rural growth, as technology and changing working patterns in aging societies make urban living a choice rather than a necessity.

In emerging economies changing living standards and a changing balance between agriculture and manufacturing and services still argues for urbanization. This population shift changes demand for housing, food processing and transport, shifts water use patterns, alters transport demands and communication links, and has implications for healthcare, education and public infrastructure.

The concentration of people that urbanization implies inevitably raises questions about environmental sustainability. Longer term investment themes often cross one another, and urbanization and population growth meet at this junction. Indeed, it is economies with rapidly growing populations that seem most likely to experience the continued urbanization trend.

Fig. 8: Increasing urbanization

In billions of people



Source: United Nations, The Urbanization Prospects, data as of 2014

Table 1: Overview of CIO Longer Term Investment themes

| sorted alphabetically | | Key Drivers | | Sustainability | Impact | Other Tags | | | | | Short description of the theme | | | | |
|---|--|--------------|-------------------|----------------|-----------------------|-------------|--------|------------|-------------------|--------|--------------------------------|------------|-----------|----------------|--|
| | | Urbanization | Population growth | Ageing | Sustainable Investing | Environment | Social | Governance | Impact Investing* | Health | | Technology | Resources | Infrastructure | Regulation |
|  | Agricultural yield | ✓ | ✓ | | ✓ | | | | ✓ | ✓ | ✓ | | ✓ | | 200'000 additional people populate the world per day. Calorie intake is rising even for countries where food shortages are unknown; and the land available per capita trends lower. The use of "engineered tools" increase agricultural yield and is a growing area. |
|  | Automation and robotics | | | ✓ | ✓ | ✓ | | | ✓ | ✓ | | | ✓ | | Another industry revolution is underway (Industry 4.0) that we believe will transform the future of manufacturing. Rising wages and challenging demographic developments will pressure costs of manufacturing companies in emerging markets, driving automation investments. |
|  | Clean air and carbon reduction | ✓ | ✓ | | ✓ | ✓ | | | ✓ | ✓ | | | ✓ | ✓ | The December 2015 climate conference achieved the first global, legally binding climate deal. This agreement coupled with stricter regulations set the tone for reducing the global carbon footprint long term, and support the adoption of clean-air and carbon-reduction technologies. |
|  | Digital data | ✓ | ✓ | | | | | | | ✓ | | | | ✓ | Digital data is enjoying exponential growth, with the global digital universe expected to cross 44 zettabytes by 2020, an increase of more than 50-fold from 2010, according to IDC providing steady growth for data enablers and infrastructure companies as significant capex investments are required to support the surge in digital data. |
|  | E-commerce | ✓ | ✓ | | | | | | | ✓ | | ✓ | | | Population growth combined with a rising middle class in EM drives E-commerce. We expect around 15-20% growth of E-commerce annually in the next 10 years due to rising smartphone and internet penetration, an advance in technology and improving consumer convenience. |
|  | Educational services | ✓ | ✓ | | ✓ | | ✓ | | ✓ | | | | | ✓ | A growing middle class in emerging markets and increased urbanization offer attractive growth drivers for institutions providing education services. People seek educational opportunities for themselves and their children to improve their prospects. We estimate the market to grow high single-digits. |
|  | Emerging market healthcare | ✓ | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ | | | ✓ | ✓ | Emerging markets' 65-year plus demographic will rise by 50% by 2030. With healthcare expenditure of this age group at over 8% of GDP, double that of 30-40 group, public healthcare investment in EM needs to grow sharply to prevent an impending healthcare crisis. |
|  | Emerging market tourism | ✓ | ✓ | | | | | | | ✓ | | ✓ | ✓ | ✓ | Over half of revenues per kilometer flown globally are now generated from EM travelers compared to one third over a decade ago. A boom in EM tourism is driving this trend with over two thirds of inbound tourists in EM from other EM countries. |
|  | Emerging market infrastructure | ✓ | ✓ | | ✓ | ✓ | | | ✓ | | ✓ | ✓ | ✓ | | Growing urbanization and the expansion of megacities in emerging markets are driving demand for infrastructure investment. As a result Emerging Market infrastructure spending will comprise two-thirds of global infra spending by 2025. |
|  | Energy efficiency | ✓ | ✓ | | ✓ | ✓ | | | ✓ | ✓ | ✓ | | ✓ | | Energy efficiency helps end-users reduce power demand at source, cutting CO2 emissions and saving resources, making efficiency a key business factor for companies and consumers. The IEA expects the demand for energy-efficient products to grow by 7-8% annually. |
|  | Frontier markets | | ✓ | ✓ | | | | | ✓ | | | | | ✓ | Frontier markets comprise one-third of the world's population, 4% of the world's GDP. Yet, their market capitalization is less than 1% of the world's. We expect the demographics and rising urbanization in frontier markets to support higher medium-term growth potential relative to other emerging economies and the world. |
|  | Generics | | ✓ | ✓ | ✓ | | ✓ | | | ✓ | | | | ✓ | Generics are a vital pillar of affordable healthcare. Demand for generics is supported by demographic trends and budget constraints: aging and population growth drive greater healthcare utilization, while health spend as a share of GDP is rising. Health systems are focusing more on value for money, supporting generic drug demand |
|  | Mass transit rail | ✓ | ✓ | | ✓ | ✓ | | | | | | ✓ | | | By 2025 migration will drive a two-fold rise in the population of Asian megacities. With Asian vehicle ownership doubling every five years, Asian governments are investing billions in MTR systems to combat congestion and sharply rising CO2 emissions. |
|  | Medical devices | | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ | | | | | The aging population and growth of the over-65s will create new opportunities for companies selling medical devices. Other drivers include rising per-capita GDP and improved infrastructure in EMs, and growing prevalence of "lifestyle diseases" like obesity. |
|  | Middle east - prosperity beyond oil | ✓ | ✓ | | | | | | | | ✓ | ✓ | ✓ | | The decline of hydrocarbon prices increased the need for economic diversification and reforms that will foster growth in areas, such as tourism and other service industries. We think these developments create investment opportunities for Investors with a longer term investment horizon. |

Source: UBS. * Exposure to certain long-term investment themes can also be achieved through impact investments, which generally involve illiquid private markets vehicles and necessitate tolerance for significant illiquidity.

Table 1 (continued): Overview of CIO Longer Term Investment themes

| sorted alphabetically | | Key Drivers | | Sustainability | Impact | Other Tags | | | | | Short description of the theme | | | | | |
|---|---------------------------------------|--------------|-------------------|----------------|-----------------------|-------------|--------|------------|-------------------|--------|--------------------------------|-----------|----------------|------------|----------|---|
| | | Urbanization | Population growth | Ageing | Sustainable Investing | Environment | Social | Governance | Impact Investing* | Health | Technology | Resources | Infrastructure | Regulation | EM Focus | |
|  | Obesity | ✓ | | | ✓ | ✓ | | | ✓ | ✓ | | | | | | Urbanization and rising EM per-capita GDP will lead to higher obesity rates. Companies in the food and beverage industry and the healthcare sector can benefit from this trend. We see medium-to-high single-digit growth rates across most related markets. |
|  | Oncology | | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ | | | | | As we age our cells mutate in new ways that can cause cancer. As life expectancy rises the number of new cancer patients will outpace population and GDP growth. Improvements in treatment should drive above-GDP sales growth for relevant companies. |
|  | Protein consumption | ✓ | ✓ | | | | | | ✓ | ✓ | ✓ | | | ✓ | | Increasing wealth and urbanization are leading to higher living standards and the consumption of more protein-rich food. This is particularly true for meat intake. Dairy and seafood are following similar trends. We believe producers that benefit from rising protein intake around the world should grow faster than GDP but at fairly low earnings variability. |
|  | Renewable energy | ✓ | ✓ | | ✓ | ✓ | | | ✓ | | ✓ | ✓ | ✓ | ✓ | | We believe the interaction of the following factors will make it increasingly compelling to invest in renewable energies: A) increasing urbanization and population growth which will lead to higher electricity demand, B) technological progress with relative cost advantages for renewable energies, and C) improved regulatory environment (social / political support). |
|  | Retirement homes | ✓ | | ✓ | ✓ | ✓ | | | | ✓ | | | | ✓ | | As people age the probability of needing to rely on living assistance increases sharply. With nuclear families on the rise and reduced number of children taking care of their elders, demand for assisted living and care facilities is expected to grow fast in coming years. |
|  | Retirement planning | | ✓ | ✓ | ✓ | ✓ | | | | | | | | ✓ | | Asset gatherers and life insurers benefit from increasing longevity and an aging society, as it leads to increasing savings gaps. A growing middle class in emerging markets and rising number of high net worth individuals provide additional impetus for the theme. |
|  | Safety and security | ✓ | | | ✓ | ✓ | | | | ✓ | ✓ | | | ✓ | | The global security and safety market benefits not only from structural trends such as rising cyberattacks but from threats to the global food chain and to air, water and soil quality. We estimate its overall size at USD 500bn in 2014, and think it will exceed USD 700bn by 2020. |
|  | Silver Spending | | ✓ | ✓ | | | | | | ✓ | | | | | | We expect the spending power of the older age categories to become increasingly important in the years to come as the weighting of the older population rises. These "silver spenders" tend allocate more of their disposable income to leisure (particularly cruises) and personal care & beauty products (specifically anti-aging products). |
|  | Smart Mobility | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | | | | | Regulatory changes and technological advances will lead to greater electrification of cars, autonomous driving, and new car-sharing mobility concepts. This will reshape the way we experience and consume individual mobility. We see an annual addressable market of around USD 400 billion by 2025, or 10 times today's size. |
|  | Waste management and recycling | ✓ | ✓ | | ✓ | ✓ | ✓ | | | | ✓ | ✓ | ✓ | ✓ | ✓ | By 2050, 3 bn people will belong to the middle class. They will have sufficient disposable income to purchase products in a way comparable to people in high-income countries today. By 2050 waste volumes are expected to more than double. |
|  | Water scarcity | ✓ | ✓ | | ✓ | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | Global warming represents an influential force on our planet, impacting water supply, in particular quality, quantity and timing aspects. An inadequate water supply threatens the viability of the global economy, the environment, and human life. |

Source: UBS. * Exposure to certain long-term investment themes can also be achieved through impact investments, which generally involve illiquid private markets vehicles and necessitate tolerance for significant illiquidity.

Appendix

Terms and Abbreviations

| Term / Abbreviation | Description / Definition | Term / Abbreviation | Description / Definition |
|---------------------|--|---------------------|--|
| A | actual i.e. 2010A | bp or bps | Basis point or basis points (100 bps = 1 percentage point) |
| COM | Common shares | E | expected i.e. 2011E |
| GDP | Gross domestic product | 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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