Longer Term Investments

Obesity

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- Urbanization and rising per-capita GDP in emerging markets will contribute to a greater prevalence of obesity globally in the coming decades.
- Companies in the food and beverage, fitness, and sportswear industries (prevention), and the healthcare sector (treatment) can benefit from this long-term trend. We expect the most attractive and investable related markets to see medium- to high-single-digit growth rates. In the healthcare industry, we prefer investment opportunities in diabetes treatment and dialysis services, as drugs to treat obesity have thus far been relative commercial failures.
- The theme benefits from defensive growth with predictable volume trends, potentially high returns on capital, and growing dividends.
- We recommend investing in a diversified portfolio across the consumer and healthcare industries to take advantage of the obesity theme, while minimizing company-specific risks associated with the failure of drugs in development.

Today, 650 million people in the world are considered obese, out of nearly two billion considered overweight. Western economies are most associated with the obesity epidemic, but it is no longer just a rich-world problem. Rapidly urbanizing populations and increasing per-capita GDP are leading to ever-higher calorie consumption in emerging markets. We expect these economies to fuel the increase in the number of obese and overweight people in the next decade.

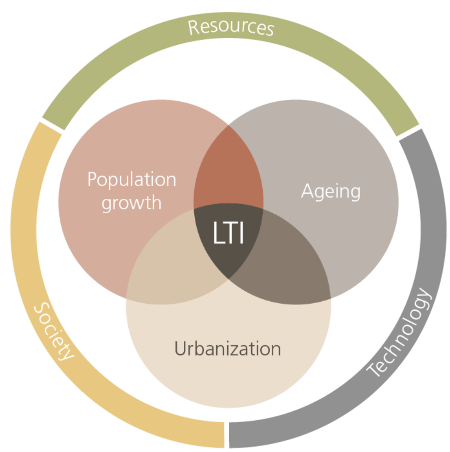
According to McKinsey, the economic cost of obesity approaches 3% of global GDP. Despite government policy responses and greater individual awareness, global obesity levels look set to keep rising. This creates a large and growing opportunity for companies that provide products to help prevent or reduce obesity and those that treat its consequences. We have identified investment opportunities related to obesity under two broad categories:

- **Prevention:** Companies that offer healthier food, fitness products, and sportswear, as well as the vitamin and supplement industry.
- **Treatment:** Companies that offer drugs, medical products, and services to reduce weight or treat obesity-related conditions such as diabetes.

Attractive investment opportunities lie in the health and wellness food industry, and those that treat diabetes and offer dialysis services.

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.



The theme benefits from volume growth rates forecast in the mid- to high-single-digits. It is defensive; displays stable earnings growth, potentially high returns on capital, and growing dividends; and is insensitive to the economic cycle, making it attractive for quality-focused growth investors.

The obesity epidemic

Obesity has reached epidemic proportions in many Western countries (see Fig. 1). According to the most recent World Health Organization (WHO) figures, in 2016 more than 1.9 billion adults were overweight, of which 650 million were obese. These figures are consistent with a landmark study published in the medical journal The Lancet in 2014, which found 671 million people were obese in 2013, out of a global overweight population of some 2.1 billion. This represents a more than doubling of the obese population since 1980.

More than 40% of the world could be overweight by 2030

Based on the latest WHO data, in 2016 13% of the global adult population were obese and 39% were overweight. Among children over 5 years old and adolescents, 18% were overweight. On current trends, the combined global prevalence of obesity and overweight could exceed 40% by 2030. Obesity is most prevalent in the developed world; for example, the Centers for Disease Control and Prevention (CDC) estimates that over 36% of US adults are obese, and no state has an obesity rate below 20%. While the rate of increase in US obesity rates has slowed, the trend over the past five years is still upwards (see Fig. 2).

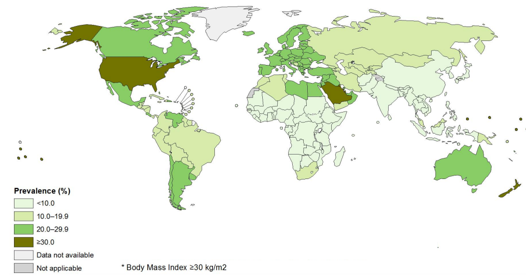
But obesity is not just a rich-world problem: we expect the emerging world to account for most of the increase in the number of obese people over the next two decades. The two most important drivers of rising emerging market (EM) obesity rates are increasing urbanization and rising per-capita GDP.

Urbanization and rising per capita GDP fuel EM obesity

The rising prevalence of obesity in emerging markets stems primarily from rapid urbanization, in our view. According to UN estimates, 70% of the world's population will live in cities by 2050 (see Fig. 3), and the urban lifestyle contributes to both of the primary causes of obesity: a more sedentary lifestyle and a more "Western" diet that includes higher amounts of fat, sugar, and protein (the so-called "nutrition transition"). City jobs are typically less labor-intensive than those in the country, and workers are less likely to walk to and from work, reducing physical exercise levels. Cities also provide more dietary temptations: easier access to fast food, restaurants, and bars. For example, in China the overall obesity rate is estimated at 7%, yet overweight and obesity rates in major coastal cities approach Western levels – a worrying leading indicator.

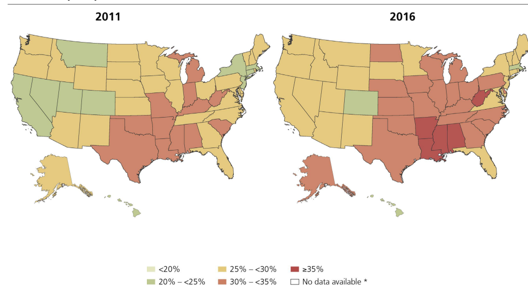
As per-capita GDP rises, calorie consumption increases (please refer to our most recent report *Longer Term Investments: Protein consumption*). The implication appears clear: EM obesity rates are likely to catch up to those in developed markets as EM populations migrate to the cities, their standards of living rise, and their exercise levels fall (see Fig. 4).

Fig. 1: Obesity prevalence globally
% of male population obese, 2016



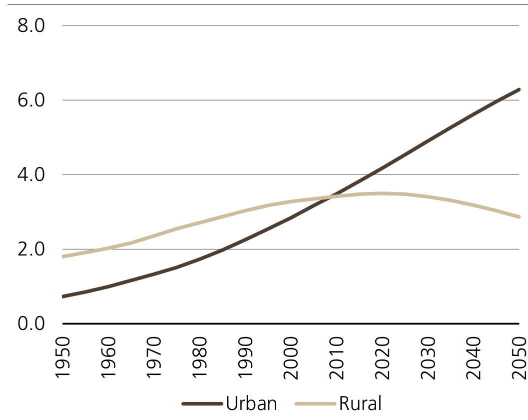
Source: WHO, as of May 2018

Fig. 2: US obesity rates continue to increase
% of population obese, 2011 & 2016



Source: CDC, as of May 2018. Note: prevalence of self-reported obesity. Not comparable to pre-2011 data due to methodology change.

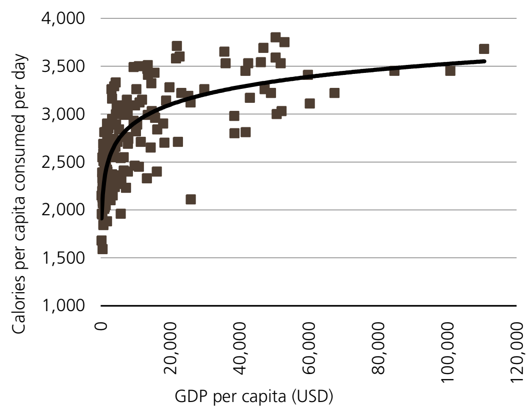
Fig. 3: Urban and rural populations
1950–2050E, in billions



Source: United Nations, UBS estimates, as of 2015

In developed markets, a greater emphasis on healthy diets at both the individual and societal level has led to some early positive signs, such as lower consumption of sugar and calories among millennials. However, habits are hard to change, and it is too soon to see a downward trend in obesity statistics. Obesity rates remain elevated in children: 18% of girls and 19% of boys aged 5–19 were estimated to be overweight in 2016, compared to rates below 5% in the 1970s. Even among the under-5s, the WHO estimates there were 41 million overweight toddlers in 2016. Evidence suggests that obese children become obese adults, so we can expect the current trends to continue as today's children age. All told, we anticipate a continued rise in the number of obese people, albeit at a slower rate than in the "catch-up" EM population.

Fig. 4: GDP per capita vs. calorie consumption



Source: FAO Statistics Division, World Development Indicators, Bernstein Analysis, as of 2013

Economic costs and public policy

Obesity imposes a significant cost on both the individual and society. An estimated 3.4 million people die each year as a result of being overweight or obese, making a high Body Mass Index (BMI) the fifth-highest risk factor for mortality globally (source: The Lancet).

The economic costs are significant and growing. A 2009 study noted that total healthcare costs for obese patients are 42% higher for obese and 81% higher for severely obese patients than for those with normal BMI (source: Health Affairs). The average annual expenses of an obese person on Medicare are USD 4,870 compared to USD 3,400 for an average-weight person. Direct costs alone, including diagnostics, treatment, and preventive services, have been estimated at 1–3% of healthcare costs for most countries, or 5–10% in the US, using OECD data. In the US, this translates into an estimated USD 200 billion of direct medical cost for managing obesity, according to the Campaign to End Obesity.

Healthcare budgets increasingly stretched

A widely discussed McKinsey study estimated the total economic cost of obesity-related conditions at nearly 3% of global GDP, including lost productivity due to disability or death. However, this may still underestimate the total cost since many medical costs that may ultimately stem from obesity are recorded as other problems at the point of care. The Campaign to End Obesity has argued that current estimates may underestimate eventual government spending on obesity by as much as 50%.

Given that healthcare budgets are increasingly stretched, such costs argue for a policy-based response to reduce the prevalence of obesity and to better treat it. Recognizing that obesity is preventable in principle, some governments have explored fiscal measures and regulations to reduce the consumption of sugar and fat, but early data suggest only a marginal impact on consumer behavior, and it is too soon to see any resulting changes in weight trends. The number of policies implemented to-date is small. At an individual level, there is increasing interest in healthier eating, although this has done little to reverse aggregate weight trends.

Fig. 5: Health and wellness, insulin, and dialysis the most investable opportunities

Market size in USD billions, annual growth rates 2017–22

Market opportunity	Current size (USD bn)	Long term growth	Investability
Obesity prevention			
Health & wellness food & beverage	800	Mid single digit	High
Athletic and apparel	300	Mid single digit	High
Vitamins, minerals & supplements	110	High single digit	Low
Fitness & health clubs	80	Mid single digit	Low
US Consumer weight-loss products	60 - 70	Mid single digit	Low
Obesity prevention			
Dialysis products & services	40	Mid single digit	High
Insulin & GLP-1	30	Mid single digit	High
Sleep apnea	5	Mid-high single digit	Medium
Bariatric surgery	1	Mid-high single digit	Low
Prescription weight-loss drugs	<1	Mid-high single digit	Low

Source: UBS estimates, as of May 2018

Obesity-related investment opportunities

We analyze investment opportunities related to obesity under two broad categories:

- **Prevention**: Companies offering healthier food, fitness products, and sportswear, as well as the vitamin and supplement industry.
- **Treatment**: Companies offering drugs, medical products, and services to reduce weight or treat obesity-related conditions such as diabetes.

We view the market for professional weight-loss companies as less attractive, due to low barriers to entry and the rise of do-it-yourself approaches to weight loss. Low barriers to entry also reduce the attractiveness of the fitness and health club market, in our view.

We are still taking a wait-and-see approach to the emerging pharma companies developing prescription drugs aimed at reducing weight. Historically, this market has failed to meet expectations due to side effects, poor patient compliance, and unfavorable insurance coverage. However, we recognize that the increasing acceptance of obesity as a medical condition could lead to increased acceptance of pharmacological treatment for weight loss, particularly among severely obese patients with other medical complications.

Balanced diet to avoid obesity

Unhealthy lifestyle

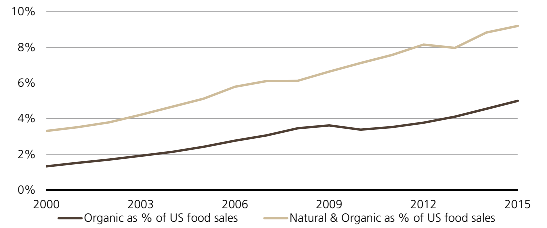
Unbalanced diets, combined with insufficient physical activity, are the key causes of obesity. Global calorie consumption has continuously increased, in particular in developed markets (see Fig. 4), due to increased food availability; cheaper food; and more sugar, processed-food, and fast-food consumption. This trend is likely to continue as the larger numbers of middle-class consumers in emerging countries adapt to Western lifestyles. Cities continue to expand as employees move in to take service industry jobs, leaving behind the more physical agricultural and manufacturing sectors. People get richer and take advantage of entertainment opportunities in the cities provided by cinemas, restaurants, and bars. As a result, people consume more calories than they burn through physical activity.

Food industry: Focus on better-for-you food

A balanced diet remains one of the key ways to reduce obesity. The global health and wellness food market is currently around USD 800bn, and is expected to grow by mid-single-digit rates according to a range of industry estimates. In our view, food producers and retailers need to be and are becoming part of the solution in the fight against obesity. They are doing so in the following four ways: First, they are expanding their product offering into healthier categories, such as fresh and organic food. Second, food producers are reformulating the nutritional profile of their products, reducing their fat and sodium content, among others. Reducing saturated and trans fats should mitigate the risk of obesity. Third, companies are disclosing more on the packaging of their products regarding ingredients. The labeling shows the percentage of fat, sugar, and calories as a percentage of a recommended daily diet the product contains. Fourth,

Fig. 6: US consumers buy more natural and organic products

Natural and organic sales as a % of US food sales



Source: US Department of Agriculture, UBS, as of February 2017 package sizes have been made smaller to reduce overconsumption. All four measures should help fight obesity and benefit food companies focusing on healthier food.

Beverage industry: Focus on reduced and non-calorie drinks
Soft-drink beverage companies have increased their offering of lower- and non-calorie drinks. Brewers have enhanced their portfolio with products offering reduced alcohol content. The "still" beverage categories are the fastest-growing in the industry. Spring water probably offers the highest "nutritional" effect. However, carbonated soft drinks remain the largest categories for the biggest beverage companies, PepsiCo and Coca-Cola. As increased sugar consumption leads to obesity, the emphasis on reduced and non-calorie offerings has increased. As they become more cautious about artificial sweeteners, consumers are demanding natural sweeteners. But those like Stevia are currently used mainly to limit calories. Their taste effect prevents them from fully replacing artificial sweeteners or regular sugar. Nevertheless, the latest additional Coca-Cola brands that reached USD 1bn of sales were non-carbonated beverages. In our view, lower sugar consumption in beverages should reduce obesity and benefit companies focused on low-calorie or natural or organic drinks. Better labeling should increase consumer awareness, and smaller package sizes should help consumers avoid overconsumption.

Regulations are only a part of the solution
As an example, Mexico, the country with the highest per-capita consumption of Coca-Cola, introduced a tax on sugar a few years ago. But government regulations can only serve as a part of the solution, in our view. Consumer behavior and demand adjustments will be key. Unlike with tobacco and alcohol, food and beverage consumption per se is not bad for your health; fats and sugar do fulfill a needed function. Obesity results from overconsumption and an unbalanced diet. Government regulations and taxes may increase awareness of obesity and put pressure on food and beverage companies to reduce calories. However, every consumer decides individually what and how much to consume.

Commercial weight-loss markets
Professional weight-loss companies like Weight Watchers combine products and services such as targeted nutrition (e.g. lower-calorie food replacements) and behavioral change (e.g. classes and clubs) to promote new eating habits and better-for-you lifestyle choices. The US market for this industry is currently estimated to be worth USD 60bn–70bn, according to industry estimates. However, several companies have been hit hard by lower consumer spending and the rise of do-it-yourself approaches. Although long-term trends should support market growth, barriers to entry are low due to increasing digitization. In particular, the number of fitness and diet apps has increased, although they could have limitations when it comes to motivating people. Nevertheless, while commercial weight-loss companies work to prevent obesity, low market barriers combined with increasing do-it-yourself dieters make it an unattractive investment market to us.

Physical activity to improve health

Several beneficiaries

Regular exercise such as walking, cycling, and swimming has significant health benefits. Physical activity, combined with a balanced diet, plays an important role in preventing and reducing obesity. Although such activity can be performed without any financial investment, fitness centers, sportswear and apparel companies, and the sports nutrition industry can, and do, benefit from the current desire and need to keep weight off.

Fitness and health clubs

We estimate that the global industry of fitness and health clubs generates around USD 80bn in annual sales. The market is fragmented, with numerous private and local operators. Barriers to entry are low and limit pricing opportunity. Therefore, it is not an attractive investment opportunity, in our view, although it can play an important role in preventing and reducing obesity.

Sportswear and apparel

Increasing health awareness is likely to result in growing numbers of people demanding affordable equipment and apparel to engage in physical activity or sports. We estimate the global athletic and apparel industry to generate annual revenues of around USD 300bn, although it is difficult to segregate between athletic and leisure. The industry is expanding markedly both in North America and emerging markets. Footwear is growing globally at a high-single-digit rate, apparel at a low- to mid-single-digit rate, and sporting equipment (e.g. golf) in the low-single-digit rates.

Supplement industry

The vitamin, mineral, and supplement industry also benefits indirectly from increased health awareness. We estimate it generates over USD 110bn in revenues annually, and the industry estimates it will grow at high-range single-digit rates. An increasingly health- and fitness-conscious consumer population supports long-term fundamentals. The biggest risk relates to medical studies questioning the effectiveness of supplements. High-growth areas include sports nutrition, meal replacement, and other specialty-product subsectors, which are not directly related to the fight against obesity.

Medical treatment of obesity

Obesity and being overweight are typically defined in terms of Body Mass Index (BMI), calculated as a patient's weight (in kilograms) divided by the square of the person's height (in meters). Patients with BMI equal to or greater than 25 are considered overweight, and those with BMI equal to or greater than 30 are considered medically obese (see Fig. 7).

Treatment for obesity begins with behavior and diet modification. For those unable to manage their weight through diet and exercise, an increasing number of medical options have become available. While the idea of a magic pill against obesity is attractive, the market for drugs to control weight has historically been a relative commercial failure. Despite the launch of several new drugs for obesity since 2012, this still appears to be the case.

The US prescription weight-loss market continues to disappoint

Given the size of the market for supplements that help patients fight weight gain, the market for prescription weight-loss drugs has historically failed to live up to expectations. Prior to 2012, only one drug, orlistat (commonly sold as Xenical as a prescription drug and Alli in the over-the-counter market), had been approved for prescription use to fight obesity. Sales disappointed and orlistat was eventually switched from prescription to over-the-counter (OTC) status. More recently, the FDA has approved four new drugs since 2012. In our opinion, sales have disappointed relative to early hopes. We estimate that the US market for prescription weight-loss drugs still only reached around USD 400 million in 2017, up from USD 100 million in 2014 (see Fig. 8). The international market remains small.

The increasing acceptance of obesity as a disease was expected to lead to a greater willingness on the part of insurance companies to pay for weight-loss drugs, reducing the sometimes significant out-of-pocket costs that patients had to bear. But both patient and doctor awareness of treatment options has remained low, resulting in low sales of the three oral drugs launched in the 2012–14 time frame. Another problem dating back to the earlier failure of orlistat is patient compliance, since the benefits of treatment take time to appear, with patients potentially having to tolerate unpleasant side-effects in the meantime. Despite improvements in treatment, these patient behavioral issues are difficult to change.

Since 2016, companies active in the space have increased efforts to build the market, including direct-to-consumer (DTC) marketing, where allowed. Results have been mixed: a more convenient once-daily version of Belviq launched in October 2016 appears to have done little to reignite the product's sales, and Qsymia remains in decline, but a new marketing campaign led to much increased sales of Contrave. However, in our view, the total market is still some way short of initial expectations.

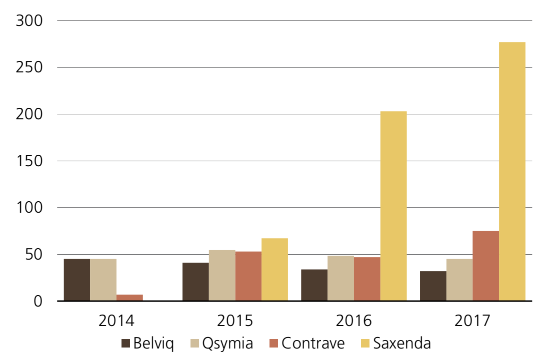
Launched in 2015, Saxenda is a different proposition. It is an injectable GLP-1 analogue (see below for a description of GLP-1 analogues in the treatment of diabetes) aimed at severely obese patients with BMI

Fig. 7: Obesity defined as BMI > 30
Classification of patients by BMI

Classification	BMI (kg/m^2)
Normal range	18.50 - 24.99
Overweight	≥25.00
- Pre-obese	25.00 - 29.99
Obese	≥30.00
- Obese Class I	30.00 - 34.99
- Obese Class II	35.00 - 39.99
- Obese Class III	≥40.00

Source: UBS

Fig. 8: US prescription obesity drug sales
US in-market revenues, in USD millions



Source: Company data, UBS estimates, as of May 2018. Xenical/Alli excluded as they were moved from prescription to OTC status in 2007.

greater than 35 and weight-related comorbidities. This positioning, at the severely-obese end of the spectrum, appears to have been more successful, with Saxenda selling more than all the other prescription weight-loss drugs put together in 2017, according to company data. We continue to view derivative industries as better ways to play the obesity theme within the pharmaceutical space.

Surgical solutions
Patients with BMI at or above 40 are candidates for bariatric surgery, which reduces the size of the stomach or restricts it to cut appetite and the ability to absorb food. We estimate a market in excess of USD 1bn annually, which we estimate could grow by a rate in the high-single-digits. However, the market leaders are diversified medical technology (medtech) companies, which makes it difficult to make a meaningful investment in this market, in our view.

Related conditions

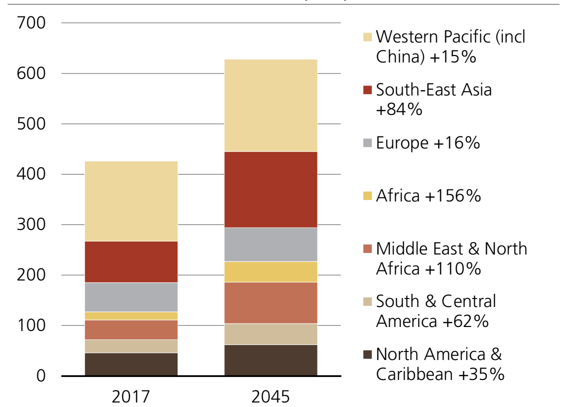
Type 2 diabetes
Type 2 diabetes is the disease most highly correlated with obesity. While the latest research suggests that the causal relationships between the two conditions, and effects of other endocrine-related disorders, are complex and multi-faceted, the global incidence of diabetes and obesity has risen in parallel. One meta-analysis of epidemiological studies found that a high BMI raises the risk of developing diabetes by a factor of 7 for men and 12 for women. We view diabetes as an attractive investment opportunity due to the availability of a number of relatively pure-play companies focused on diabetes drugs/insulin, and the oligopolistic nature of the insulin market.

Type 2 diabetes is a chronic, progressive, life-threatening disease that can be managed with treatment, but not cured. Treatment attempts to normalize the patient's blood sugar levels. Initial treatment focuses on oral drugs designed to increase the amount of insulin made in the pancreas, or increase the patient's sensitivity to insulin. Over time, these drugs lose effectiveness and the vast majority of patients will progress to insulin-dependency as their disease burden worsens. This creates predictable volume trends for insulin manufacturers.

We estimate that the global insulin market reached around USD 27bn in sales in 2017. We expect a near 3% compound annual growth rate (CAGR) to 2022, driven by a mid-single-digit growth rate in patient numbers, higher treatment rates, and the strong likelihood of progression of treated patients to insulin therapy, offset by marginally negative pricing.
Longer-term, growth in patient numbers should be in the low-single-digit rates (see Fig. 9), but drug volumes should rise faster due to the current inadequacy of diagnosis and treatment in emerging markets.

This has driven down pricing that was already under pressure, due to a perceived lack of differentiation between leading drugs; market growth has slowed substantially since 2015. In the future, we expect mid-single-digit volume growth to be almost entirely offset by negative pricing, with ex-US markets driving the total growth in the market. Volume growth is particularly strong in China, thanks to a

Fig. 9: Diabetes prevalence by region
2017 and 2045E, millions of people



Source: International Diabetes Federation. IDF Diabetes Atlas, 8th ed. Brussels, Belgium: International Diabetes Federation, 2017. http://www.diabetesatlas.org. Note: reduced estimates of diabetes prevalence compared to the previous edition may reflect changes to data sources rather than a real change in underlying diabetes prevalence.

combination of rising diabetes prevalence, better diagnosis rates, and broader insurance coverage.

As insulin growth has slowed, a new class of injectable insulin treatments known as Glucagon-like peptides (GLP-1) analogues has emerged as a key driver of overall diabetes sales. GLP-1 is a hormone secreted by the gut that helps the body control appetite and insulin levels. For patients still able to produce some insulin, GLP-1 drugs therefore have the important advantage that they promote weight loss, unlike direct insulin injections which tend to lead to weight gain. Patients must still move to insulin treatment eventually; however, since GLP-1 only controls the effect of insulin, it does not produce it, although injections combining GLP-1 with insulin are a promising treatment option.

The GLP-1 market is dominated by the three large insulin manufacturers, although other companies are also present. GLP-1 drugs now account for around 13% of the diabetes market, with sales exceeding USD 6bn in 2017. We expect aggregate GLP-1 sales to grow at mid-double-digit rates for the next five years, given the drug's weight-loss benefits which are driving wider adoption, before slowing to high-single-digit rates thereafter. Combined, insulin and GLP-1 sales should therefore grow in the mid-single-digits for the foreseeable future.

Other related markets include oral antidiabetic drugs, a more fragmented segment, and products for blood glucose monitoring, which is an important part of day-to-day health management for diabetes patients. One research aim for continuous-glucose-monitoring companies is to develop an artificial pancreas, although significant technical challenges must still be overcome that look to prevent it from becoming a commercial reality in the foreseeable future.

Vision-related complications of diabetes

Diabetes leads to a variety of macro and microvascular complications. One microvascular complication of particular note is diabetic macular edema (DME), caused when fluid accumulates in the central part of the eye (the macula) due to damage to retinal blood vessels. This fluid impairs the patient's ability to focus and achieve sharp vision. If untreated, DME can lead to moderate vision loss and potentially blindness. While DME may take a long time to emerge, up to 30% of diabetes patients may ultimately suffer from the condition.

There are several drugs available to treat DME, as well as some surgical options.

Kidney disease and dialysis

Kidney disease is highly correlated to obesity and diabetes. The National Kidney Foundation estimates that diabetes accounts for 44% of new cases of kidney failure. Chronic kidney disease (CKD) describes the progressive loss of kidney function until patients' kidneys can no longer remove toxins from the blood, leading to a rapidly fatal build-up of waste products in the body. This result is known as end-stage renal disease (ESRD) and is typically defined as 10% or less of normal kidney function remaining. ESRD patients require dialysis three times a week to stay alive.

We estimate that the US dialysis-services market alone was worth USD 25bn in 2017. Volume growth dynamics are similar to the insulin market: US patient number growth has been in the 3–4% range most years since 2000, according to the United States Renal Data System (USRDS), while on a global basis patient numbers grow around 6%. We expect these trends to continue. Key opportunities for dialysis companies include volume growth in emerging markets as the ability to pay for this expensive treatment improves, and potentially the opening up of the Japanese market to foreign companies. Including sales of dialysis products (USD 12bn globally) and the smaller international services market, we estimate the total global market opportunity exceeds USD 40bn. Longer-term, we estimate the growth opportunity in the mid-single-digits.

Like the insulin market, the dialysis market is attractive as an investment opportunity due to consistent patient demand, high barriers to entry, and an oligopolistic structure. Dialysis service companies exhibit some earnings cyclicality due to reimbursement dynamics and changes in the mix of commercial pay patients (very profitable) versus Medicare (breakeven), but underlying volume trends are relatively stable.

Fatty liver disease
The two related diseases, non-alcoholic fatty liver disease (NAFLD) and non-alcoholic steatohepatitis (NASH) are caused by an accumulation of fats in the liver. As inflammatory cells try to clear the fatty deposits, cirrhosis or scarring of the liver results, reducing liver function and potentially leading to the need for transplantation. NAFLD also increases cancer risk. It is believed to be linked to obesity and diabetes, but may also arise from other causes. There are currently no approved drugs to treat NAFLD, although a number of companies have candidates in late-stage development. In our view, it is difficult to assess the market opportunity at this stage: a large number of people are thought to have NAFLD, especially in the early, asymptomatic stage of the disease, but most remain undiagnosed. Even once symptoms are identified, a highly invasive diagnostic procedure means treatment is likely to be confined to late-stage disease in practice.

Cardiovascular and other related diseases
Obesity is associated with a wide range of additional comorbidities, but from a medical perspective, cardiovascular disease (including heart failure and stroke) is among the most significant. According to a meta-analysis published in 2009 (source: BMC Public Health), being obese increases the risk of hypertension by 80% for men and 140% for women, the risk of congestive heart failure by 80% and of stroke by about 50% regardless of gender. Other common comorbidities of obesity include high cholesterol levels; respiratory disorders including asthma and obstructive sleep apnea; cancer; psychological and neurological disorders; musculoskeletal disorders including osteoarthritis; and reproductive disorders. With the exception of sleep apnea (shortness of breath during sleep, a USD 5bn annual market), these areas offer few direct investment opportunities, and we see them as suboptimal ways to invest in the obesity theme.

Managing obese patients
The increasing size of obese patients poses a physical as well as monetary challenge to the hospital system. Extra-large patients require special equipment, for example beds and trolleys capable of handling up to 300kg in weight. While we see increased demand for these products, there are currently no companies with a meaningful earnings exposure.

Earnings growth outlook

We expect the underlying trends of urbanization and rising GDP per-capita in emerging markets to continue for decades. Meanwhile, in developed markets, although consumers have an ever-increasing choice of healthy food and fitness options, behavior changes slowly at the societal level, and obesity rates have at best stabilized. We therefore expect the market opportunity for companies targeting the prevention and treatment of obesity to continue to grow above the global GDP growth rate for an extended time.

Link to sustainable investing

Obesity increases the risk of developing diabetes, cardiovascular diseases, and some cancers. The third UN Sustainable Development Goal (SDG) – good health and well-being – calls for reducing mortality rates attributed to cardiovascular disease and for strengthening the capacity for early warning, risk reduction, and management of national and global health risks. Helping prevent obesity and treating obese patients earlier and more effectively contribute to improving their life quality and expectancy, and to preventing adverse psychological consequences such as anxiety and depression. From an economic perspective, treating obesity can be a leading contributor to the expansion of per-capita healthcare spending in emerging markets. Better treatment of obesity will help already-stretched healthcare budgets go further, enabling more patients to be treated and improving access to healthcare, particularly in the developing world.

Obesity and the Sustainable Development Goals (SDGs)

Until recently, global attention has been focused on the issue of hunger, but it is now widely accepted that poor nutrition is the main threat to people's health. While obesity is often seen as a problem of excess, its worst effects are felt by low-income communities in the developing and developed world. Countries in the Middle East and North Africa, Central America, and the island nations in the Pacific and the Caribbean already have an exceptionally high rate of overweight and obese citizens, defined as 44% or higher. Nearly half of countries struggling with obesity also face high rates of malnutrition – a phenomenon known as the "double burden." Indeed, a growing body of research indicates that obesity and hunger are often two sides of the same coin.

Good nutrition is essential to sustaining inter-generational gains in health, social well-being, and economic productivity that underpin the sustainable development agenda. Impact investing can offer solutions to combat obesity, driving capital into the markets with the biggest gaps in awareness, prevention, and treatment, particularly in developing countries. Specifically:

- Obesity is a major risk factor for a number of chronic diseases, including diabetes, cardiovascular disease, and cancer. As obesity rates rise in developing countries, so too will the need for healthcare services. Impact investing can help drive capital to improve access to low-cost healthcare solutions, including infrastructure, generic drugs, or medtech solutions. In addition, impact investors can help channel funds toward R&D spending for any number of obesity-related chronic diseases.
- Lack of food security can have a direct impact on rates of obesity. Due to their long shelf life, processed foods can be transported and stored for longer before spoiling. While low in nutritional value, processed foods offer a higher energy content at a lower cost than non-processed, fresh alternatives. Impact investors can help combat obesity by investing in companies and technologies that improve both the affordability and accessibility of nutritious foods. This may include investments in start-ups offering low-cost alternatives to unhealthy snacks, addressing the issue of "food deserts" in areas with few shops selling fresh food, solutions aiming to increase agriculture yields of nutritionally valuable horticulture crops, or improving access to relevant infrastructure in low-income, rural communities.
- Health education can also help protect individuals in disadvantaged neighborhoods. Impact investors can help raise capital for solutions aiming to improve access to health information in these communities, such as fitness and diet apps or e-learning platforms. Impact investors have also financed affordable gyms and fitness businesses targeted at low-income communities, both in developed and developing countries.

The growing obesity epidemic will have a direct bearing on a number of SDGs, making this an interesting theme for impact investors. Currently, few impact investing solutions focus exclusively on obesity. Impact investors may access this theme indirectly via a growing number of healthcare-related impact funds, through generalist private equity and venture capital funds, or via direct investment opportunities. When investing using non-impact-specific vehicles, impact investors must assess on their own whether individual investments meet impact criteria including intent, measurability, verification, and additionality.

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Conclusion

We expect the underlying trends of urbanization and rising GDP per-capita in emerging markets to continue for decades. In developed markets, we see evidence that obesity rates are stabilizing, but we think they are unlikely to go into reverse any time soon. Therefore, we expect the market opportunities for companies targeting the prevention and treatment of obesity to continue to grow above GDP growth rates for an extended time. This should provide a lasting opportunity for companies exposed to the theme to achieve above-market earnings growth rates and returns on capital, on average. We recommend a diversified exposure to minimize stock-specific risks associated with drug development.

Risks

Human behavior changes little and we see continued demand for the products and services of the healthy-food and healthcare industries. Perhaps the biggest risk to the overall theme would be the development of a medical breakthrough that would turn obesity from a chronic to a curable condition.

Considering the broader investing environment, both the healthcare and the broader food and beverage sectors are sensitive to changes in interest rates, typically underperforming when bond yields rise.

Specific risks include:

- **Healthy-food industry**: Changes in food and drink fashions can impact sales trends either positively or negatively. We view changes in government health policy as likely to favor the healthy-food industry. Companies can also be affected by product recalls, although these are unusual.
- **Sportswear and apparel**: Changes in fashion trends can change the demand for particular brands.
- **Pharmaceutical companies**: Clinical trial failures, product recalls, and litigation are standard risks in the pharma industry. Moreover, new treatments may be developed that make existing products obsolete. This is particularly true of development-stage pharmaceutical and biotech companies. As discussed above, the market for prescription anti-obesity drugs in particular has a history of failing to meet commercial expectations due to patient non-compliance, side-effects, and a lack of insurance reimbursement. For this reason, we prefer the diabetes, dialysis, and certain medtech markets.
- **Medical products**: Government-reimbursed products could face pricing pressure as healthcare budgets are increasingly stretched, including in the emerging world.

Appendix

Terms and Abbreviations

Term / Abbreviation	Description / Definition	Term / Abbreviation	Description / Definition
2011E, 2012E, etc.	2011 estimate, 2012 estimate, etc.	A	actual i.e. 2010A
CAGR	Compound annual growth rate	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		