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# Sweetness and Lite

## How Vulnerable Is Global Sugar Consumption to Food & Beverage Trends?

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### Contents

Sugar's turn under the spotlight	2	So what does it mean for sugar?	4
What's driving the consumer change towards sugar?	2		
A storm of 'lightening'—sugar reduction is now an indispensable part of corporate strategy	3		

## Summary

In this note, we highlight the global shift in attitudes towards sugar and calculate the implications for the sugar industry under a range of scenarios. We make four main observations:

- **Consumers are cutting back on sugar.** The consumer shift away from sugar has become a global trend. This is a big deal for the sugar industry and cannot be dismissed as a passing fad or wished away. For many consumers who follow today's health-and-wellness trends with respect to weight management, calorie reduction has become synonymous with sugar reduction.
- **Companies are committing to sugar (and calorie) reduction.** Leading food & beverage companies, ever eager to cater to their consumers' wishes and changing tastes, have responded by going beyond the traditional industry mantra of 'in moderation, all foods have a place in the diet', and have made public commitments on calorie and sugar reduction through a range of strategies, including reformulation and changing product size. These moves are not necessarily to the detriment of their bottom line.
- **These initiatives could accelerate a longer-term slowdown of sugar consumption.** As in the past, global economic growth is slowly bringing a larger share of the world population towards levels of per-capita income beyond which any further gains in income produce only modest increases in per-capita sugar consumption. Nevertheless, we estimate that, if initiatives by companies and governments were to achieve a significant (5 percent or above) reduction in global food & beverage sector sugar use over a two- to three-year implementation period, it would offset much of the expected global growth in consumption during this period.
- **The outlook for industrial sugar use in emerging markets is key.** Processed foods and beverages account for 63 percent of global sugar consumption, and most of this industrial use—47 percent of total global sugar consumption—is in emerging markets. Thus, any measure that significantly affects industrial sugar use in emerging markets will significantly affect total global consumption.

## Sugar's turn under the spotlight

At its heart, this is a story of steadily rising global obesity rates, finger pointing, and the repercussions of consumers cycling through a love/hate relationship with the three macronutrients—carbohydrates, fat, and protein—and, in the process, demonising certain foods. Currently, protein is on the rise (certainly in North America and Europe), as sugar, sugar-containing products, and other highly refined carbohydrates are increasingly cast as the main villain in the unremitting rise in obesity and metabolic syndrome rates.<sup>1</sup>

Although often repeated, the obesity statistics remain startling. According to the World Health Organization (WHO), in 2014 (the latest available year), about 40 percent of all adults worldwide (around 2bn) were overweight, and 11 percent of men and 15 percent of women were obese, with the prevalence of obesity doubling over the past 25 years. What's equally disturbing is that the WHO estimates that about 42m preschool children were overweight in 2015—overweight children are more likely to become obese adults. Although obesity rates vary greatly by country, no country has experienced a significant decline in the prevalence of obesity. In the US, for example, the Centers for Disease Control and Prevention (CDC) estimate that the obesity rate of American adults rose to 38 percent in 2014, compared to 19 percent in 1997. And it is no longer just a problem of rich countries; about 60 percent of those overweight or obese live in developing countries.

While we do not intend to act as judge and jury on the case against sugar and other calorific sweeteners such as high-fructose corn syrup (HFCS), we believe food & beverage companies have little choice but to respond in some way to the growing consumer concerns over the consumption of added sugar in excess of recommended health guidelines. Faced with declining volumes in many of their core categories—from soft drinks to breakfast cereal—companies simply cannot ignore the rapidly changing tastes of consumers (see the May 2015 Rabobank report [Dude, Where's My Consumer?](#)).

## What's driving the consumer change towards sugar?

Multiple, but interrelated drivers are at play here, but we can boil these down to four main drivers:

1. **We're not getting any thinner.** For the longest time, health practitioners considered fat the main culprit in the rise in obesity. More recently, however, as obesity rates continue to rise, this hypothesis has been challenged by academics who highlight the importance of managing sugar and refined carbohydrate consumption in weight management. These findings have come to the attention of many consumers (via traditional and social media, influential food trendsetters, new diet trends, etc.), resulting in a growing shift from low-fat to low-sugar diets. Some food & beverage categories have been hit harder than others, with global soft drink consumption taking the first and most sustained hit—'don't drink your calories' is a common mantra of many food gurus. But increasingly, even the indulgence categories, like candy and chocolate in markets such as the US, are losing out to healthier and better-for-you snacks, which generally, though not always, have a lower sugar and calorie content.
2. **Changing views on health and wellness.** A related theme is the consumer shift away from highly processed foods (with added sugars and artificial ingredients) towards more 'natural' and less processed 'fresher' foods. Although this has led to an increase in interest in natural sweeteners such as stevia and cane sugar, as food companies turn away from artificial sweeteners, the dominant theme is a reduction in added sugars to help lower the calorie content of packaged food & beverages. Related to this is the growing demand for greater

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<sup>1</sup> The group of conditions including diabetes, high blood pressure, and obesity that compound the risk of getting coronary heart disease.

transparency and clean labels (i.e. fewer ingredients). Consumers are increasingly paying greater attention to what is going into their food, and this puts a spotlight on sugar (and calorie) content.

3. **Government advisories.** Although hard to quantify, consumers are also responding to the more prescriptive health advisories on sugar from international agencies such as the WHO and national agencies. This can be seen in the recent attempts by the FDA to update the nutrition facts label to include added sugars on packaged food sold in the US—though it looks increasingly likely that this will be delayed. The WHO, for example, recommends adults and children reduce their daily intake of free sugars (i.e. added sugars) to less than 10 percent of their total energy intake—but in a clear indication of where it is going with this, the WHO more recently advocated that “a further reduction to below 5 percent, or roughly 25 grams (6 teaspoons) per day, would provide additional health benefits”.<sup>2</sup> This is in line with Public Health England, an executive agency of the UK’s Department of Health, who issued new guidelines in 2015 in light of “new evidence that has emerged over the last 20 years”, recommending a reduction in free sugars, from 10 percent to 5 percent of an adult’s daily energy requirement.
4. **Government legislation.** Adding to the pressure, governments in a number of countries have enacted, or are considering enacting, legislation designed to tax products containing high amounts of sugar and HFCS. To date, it is the soft drink industry that has largely been singled out, because it is the principal source of added sugar in the diet. This constitutes a more direct attempt by governments, states, and even cities to sway the shopping habits of consumers away from sugary drinks by making them more expensive. The list of countries with soda taxes (now or in the near future) is growing and includes Chile, Egypt, Mexico, the Philippines, South Africa, and Thailand, as well as a number of EU countries. In some countries, governments have imposed restrictions on the marketing of high-sugar products, especially those sold to children, or restricted their sales through school vending machines, for example.

## A storm of ‘lightening’—sugar reduction is now an indispensable part of corporate strategy

As the concerns of consumers and governments have gained momentum, food & beverage companies have felt the pressure and need for change, and they are mostly responding with the same three approaches:

- **‘Liten’ up.** Food companies have already embarked on a major overhaul of their existing portfolios, taking out artificial ingredients and, in some cases, genetically modified organisms (GMOs) in order to appeal to consumer demands for better-for-you, natural foods, clean labels, etc. All companies are reformulating their brands’ recipes in the hope of restoring consumer trust and improving the perceived quality of their brands. Sugar and calorie reduction also fits into this reformulation strategy, through the removal of artificial sweeteners and the gradual reduction of sugar content over time to get consumers used to lower sweetener levels, often unannounced. In the near future, sugar will also be reduced through technological advancements, by reformulating sugar itself—like Doux Matok’s ‘enhanced sugar’ or Nestlé’s technology that changes the structure of sugar, allowing less sugar to be used (in certain applications such as chocolate) while maintaining the same level of sweetness. But the functionality that sugar provides to a food product beyond sweetness complicates the reformulation process, especially when the sweetener toolkit is limited by the move away from artificial sweeteners and bulking agents.
- **Portion control.** This strategy is, in part, a means of helping consumers to moderate their consumption, and adjust to lower levels of sugar and calorie consumption. Whether this is really

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<sup>2</sup> <http://www.who.int/mediacentre/news/releases/2015/sugar-guideline/en/>

working depends on how many of the reduced-size units are purchased compared with the original size. This is not necessarily bad news for the bottom line. The soft drink industry provides a great example of how selling less product can still lead to greater sales. Beverage companies have found that by selling more caseloads of soda in smaller 7- to 8-ounce cans and bottles—which cost consumers several multiples more than the larger sizes (such as the gallon) on a per-ounce basis—overall volume of soda may continue to decline, but unit and dollar sales are up. We are drinking less soda, but paying more for the privilege.

- **Portfolio diversification.** At a company level, companies with a ‘high-sugar’ portfolio of products acquiring product lines or brands that are lower in sugar may be seen as reducing the sugar content of a company’s output. Coca-Cola’s recent announcement to become a ‘total beverage company’—eschewing the red can in favour of low and sugar-free beverages in on-trend beverage categories such as energy, sports drinks, premium juices (including coconut water), and particularly bottled water (a major growth engine for beverage companies)—is a prime example of diversification.

The three strategies described above often form part of a broader ongoing commitment by food & beverage companies at the national or international level around the nutritional standards of their products. A few examples will suffice to show the level of commitment shown by corporations:

- Mars has a number of ambitions, including getting 95 percent of its food products to meet the WHO 10-percent guideline on added sugars by 2021.
- Nestlé has already reduced the sugar content of its products by 8 percent, with a commitment to reduce added sugars by another 5 percent by 2020.
- PepsiCo’s new global sustainability agenda (in part shaped by the WHO dietary guidelines discussed earlier) includes a 2025 commitment that at least two-thirds of its beverages will have 100 or fewer calories from added sugars (in a regular 12-ounce can size serving). Currently, about 40 percent of the company’s portfolio meets this requirement.
- The wider beverage industry, including Coca-Cola and Dr Pepper Snapple, have signed up for the Balance Calories Initiative to reduce beverage calories consumed per person nationally by 20 percent by 2025.
- Kellogg’s has cut the sugar content in its children’s cereals by up to 30 percent in the last few years.
- Unilever has adopted its Sustainable Living Plan that covers commitments on calories, salt, saturated fats, and sugar (such as cutting sugar in RTD teas by 25 percent).
- Beyond the food industry, since 2006, the Walt Disney Company has had nutrition guidelines for all its hotels and theme parks that restrict added sugar content to 10 percent for most food items.

## So what does it mean for sugar?

What we want to explore in the rest of this report is the possible impact of these trends on global sugar consumption. However, because many of these initiatives and commitments are couched in terms that make quantifying their impact difficult, and because they may be gradually implemented over an extended period of time, the simple truth is that it is currently very unclear to what extent these developments will shape the future of global sugar consumption. Indeed, the current shape of global sugar consumption is not exactly clear.

### Consumed by doubt

Nobody actually measures sugar consumption. Consumption is what is left after all the other elements of a national or global balance that are easier to measure—like production, exports, imports, and stocks—have been taken into account. Indeed, the term ‘disappearance’,

occasionally used by commodity analysts as an alternative to the term ‘consumption’, may be a more accurate description.

Given that it is very difficult to observe developments in sugar consumption with anything like the speed and detail with which developments in production or trade are routinely monitored, let’s just ask how big an issue these initiatives by companies and governments may be for the world sugar business, by exploring:

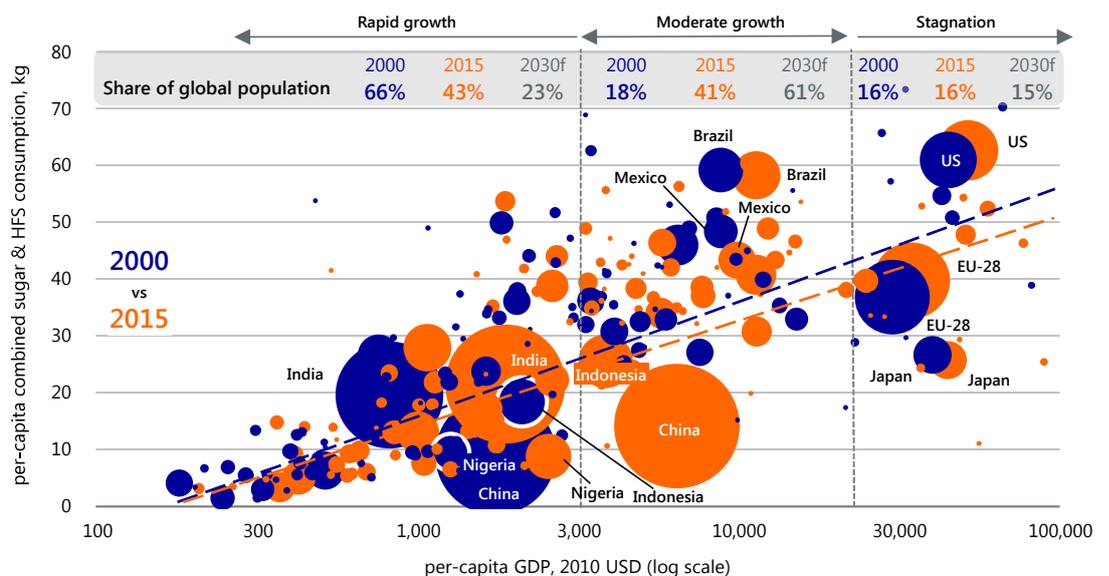
1. the backdrop of longer-term trends in consumption, and
2. the extent to which the global food & beverage industry would have to reduce sugar use as a result of the aforementioned issues in order to produce a shock to the international sugar market.

## What does the past tell us?

Roughly speaking, the rate of growth of per-capita sugar consumption diminishes as per-capita GDP (a proxy for income) increases (see Figure 1). Using the 2015 trend line as a (very) rough guide, a rise in per-capita GDP, from USD 320 to USD 1,000, is associated with an average increase in per-capita sugar consumption at a rate of 12 kilograms per USD 1,000 of income gain. With a rise in per-capita GDP, from USD 1,000 up to USD 3,000, the average rate slows to an additional 4 kilograms per USD 1,000 gain in income. Above annual per-capita GDP of USD 10,000, the additional gains in sugar consumption per extra USD 1,000 are very modest, at around 0.4 kilograms.

Many other factors apart from income play a role in determining sugar consumption, as can be seen in the amount of dispersion around the trend lines in Figure 1. These factors include the availability of alternatives, the local pricing of sugar, and different food habits and preferences across cultures. For example, it could be argued that the slowdown or stagnation of sugar consumption gains at very high levels of per-capita GDP could be due, at least in part, to heightened concern and awareness about diet and weight-gain in such economies.

**Figure 1: Evolution of per-capita sugar and HFS consumption vs. evolution of per-capita GDP, 2000 vs. 2015\***



\* Note: Per-capita GDP is plotted on a logarithmic scale against combined per-capita sugar and high-fructose syrup consumption ('sugar consumption') for a total of 124 countries, with bubble size representing population.

Source: USDA ERS, International Sugar Organization, F.O. Licht, Rabobank 2017

In Figure 1, we highlight the shares of world population accounted for by countries that fall into the three phases of the per-capita GDP/per-capita sugar consumption relationship: rapid growth, moderate growth, and stagnation. It is very clear that, between 2000 and 2015, strong growth in a

number of countries (above all, China and Indonesia) led to a significant shift in terms of population and sugar consumption from the rapid-growth income zone to the moderate-growth income zone. It is also notable that, in both 2000 and 2015, China (unlike India) remains a long way below the trend line in terms of per-capita sugar consumption relative to income levels.

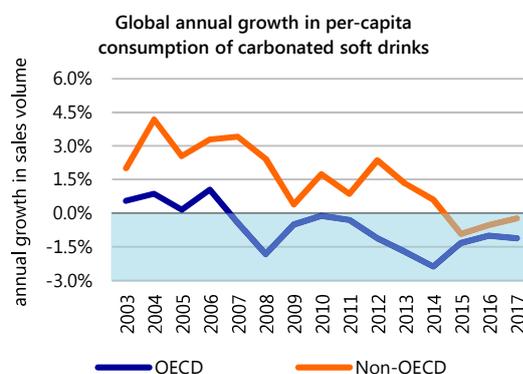
This means that, between 2000 and 2015, the share of the world’s population and the world sugar market that is within the rapid-growth zone has diminished. More than half of the global population—and with it half of global sugar consumption—is now in countries where current income levels would lead us to expect only moderate growth in per-capita consumption, even with robust economic growth.

Between 2015 and 2030, the proportion of the global population in the moderate- to stagnant-growth zones is projected to rise from 57 percent to 76 percent. The countries in the rapid-growth zone as of 2015 are still expected to contribute, by far, the largest share of total global population growth in the coming 15 years. However, India, with its population of over a billion people, is forecast to move into the moderate-growth zone in the first half of the next decade.

These trends on their own, before any consideration of more recent concern about sugar intake, suggest that the rate of growth of global sugar consumption in the coming 15 years is likely to be lower than the growth rate seen in the last 15 years.

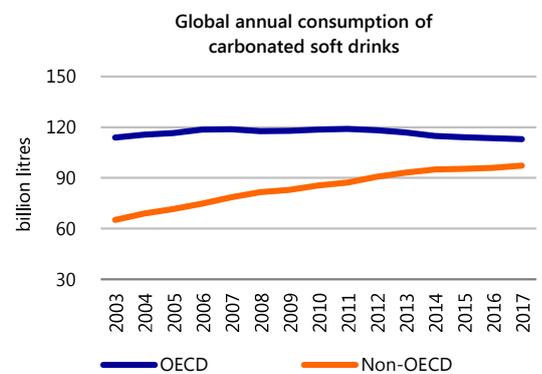
Moving closer to the consumer, growth in per-capita soft drink consumption—a significant source of sugar intake—has been on the decline globally for a long time, and has been negative in OECD countries for a decade (see Figure 2). Whether this trend simply reflects the diminishing rate of growth in consumption as incomes increase, or whether it also incorporates the impact of health concerns is hard to say. The key point is that the trend is strongly downward, and it is worldwide. Even with the boost of population growth in non-OECD countries, total sales growth has slowed to a standstill (see Figure 3).

**Figure 2: Growth in soft drink consumption is in decline, 2003-2017**



Source: Euromonitor 2017

**Figure 3: Soft drink consumption has gone flat, 2003-2017**



Source: Euromonitor 2017

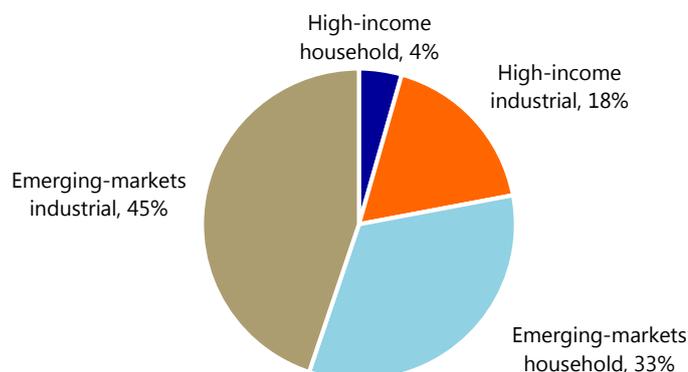
## Crunching the numbers

The long-term outlook seemingly argues for a gradual slowdown in the rate of increase of global sugar consumption. To what extent could this process be accelerated by measures that are currently being implemented or contemplated to curb the high use of added sugars and other caloric sweeteners? And how far would these measures have to go before they produce a significant shock to the global sugar market?

The countries in the stagnant-growth zone of Figure 1 correspond almost perfectly to the group of high-income economies under World Bank classification, which currently account for some 22 percent of total global sugar consumption. In these high-income economies, industrial use accounts for some 80 percent of total sugar consumption. However, in many emerging markets,

the figure is substantially lower, at somewhere between 55 percent and 60 percent. On this basis, we estimate that a total of 63 percent of global consumption is industrial, i.e. it occurs via the consumption of processed foods and beverages (see Figure 4).

**Figure 4: Distribution of global sugar consumption, 2015**



Source: ISO, Rabobank 2016

Let us suppose that, starting from a base case of 180m tonnes raw value of global sugar consumption, companies and governments introduce initiatives to reduce sugar consumption to be implemented over a three-year period. Let's also assume that both household and industrial sugar use in high-income economies is reduced by 5 percent, while in emerging markets, only industrial sugar use drops by the same margin.

What sort of a hit to the current stock of global sugar consumption would this represent? Industrial sugar represents 63 percent of total consumption, so together with household sugar consumption in high-income countries, our scenario suggests a reduction of 5 percent to the 67 percent of global sugar consumption represented by these categories (63 percent from total global industrial consumption plus 4 percent from household consumption in high-income countries) over a three-year period. That corresponds to a total reduction of around 6m tonnes of sugar, or some 2m tonnes per year for three years.

Reductions in consumption of this magnitude would certainly dent global growth in consumption, but would probably not be enough to generate shrinkage of the global market, if we consider that overall growth in global sugar consumption is normally expected to be 1.5 percent to 2.0 percent a year, equivalent to 2.7m to 3.6m tonnes. However, there would certainly be a significant slowdown in consumption growth during the three years in which the hypothetical changes are introduced.

A radical scenario, like a 10 percent reduction in global industrial sugar use phased in over a two-year period, is estimated to produce an actual contraction of global sugar consumption during the implementation period, as the reduction of the current 'stock' of global sugar consumption more than offsets the expansion associated with normal growth.<sup>3</sup> That would certainly count as a shock to the global sugar market.

<sup>3</sup> Average global per-capita sugar consumption is currently around 22kg/year (refined basis). The WHO recommendation (September 2015) for free sugar consumption is 50g/day, equivalent to around 18kg/year, almost 20 percent below the current global average consumption. Thus even what we describe as a 'radical' reduction scenario (radical because there are real challenges for food & beverage players in replacing sugar while maintaining product sweetness, flavour, bulk, texture, etc.) would not bring world average consumption in line with the WHO's recommendation.

## Food for thought

Acknowledging that we have created a very simple thought experiment to consider a very complex issue, what do these scenarios tell us?

- An examination of longer-term consumption trends, coupled with the outlook for global population and income trends, suggests that a gradual decline in the rate of growth of global sugar consumption seems to be a very likely base case, even if the current wave of initiatives to reduce sugar intake were to have relatively little impact on consumption in the shorter term.
- It takes a cut of between 5 percent and 10 percent in global industrial sugar use plus household use in the advanced economies, implemented over a few years, to generate a significant one-off slowdown, or even a modest shrinkage, in global sugar consumption. This is because the impact of such measures on the current stock of sugar consumption can be more than sufficient to offset the growth of markets during the period in which change is being implemented.
- Although a reduction of 5 percent to 10 percent in industrial use of sugar may appear modest, it creates a significant challenge for companies when it comes to maintaining product consistency while replacing not only sugar or fructose syrup's sweetening properties, but also other characteristics, such as taste profile, bulk, and texture. Hence, we currently view the 10 percent scenario as truly radical. It is worth remembering that the length of any phase-in period for such measures also has a significant impact on the severity of any shock to demand.
- We believe that the scenarios simulated would be sufficient, even in the case of the 5 percent reduction, to represent a significant temporary shock to the world sugar market, which is accustomed to global sugar consumption growing at 1.5 percent to 2.0 percent a year, roughly the equivalent of an additional 3.0m tonnes of consumption annually.
- A key takeaway of these assumptions is the importance of industrial sugar consumption, especially in emerging markets, which is estimated to account for 47 percent of total global sugar consumption. Any measure that significantly affects industrial sugar use in emerging markets will significantly affect total global consumption.
- Even if there were to be widespread introduction of measures to curb high use of added sugar in food & beverage products around the world, which could involve a significant shock to the market on a temporary basis, it appears unlikely that global sugar consumption would enter a long-term downward trend. The long-term outlook still suggests a growing market, albeit slower-growing than in the past, but growing nevertheless.
- We reiterate that it is often very hard to perceive trends in sugar consumption, because they are not directly observed. Parallel developments also have the potential to muddy the waters, at least in the short term. Two recent examples of this are the impact of India's demonetisation measures on consumption at the end of 2016, and the extreme competitiveness of HFCS vs. sugar in China in 2017, as a result of high domestic sugar prices and low corn prices. It will therefore be neither quick nor easy to evaluate the extent to which the measures discussed in this paper may have already begun to filter through to the world sugar market... and how much (or little) change is yet to come.

# Imprint

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