



# The rising cost of a healthy diet

*Changing relative prices of foods in high-income and emerging economies*

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Executive summary  
May 2015

## Motivations and questions

In 2014 our previous study ‘Future Diets’ (Keats and Wiggins, 2014) described how across the world an increasing share of the population is overweight and obese, with the rate of increase particularly pronounced in developing countries. No nation, however, has stemmed the rising rates of people who are overweight and obese. Effective policies to combat obesity have yet to be proved, if only because no country has yet tested a sufficiently comprehensive set of policies. The causes of excess weight are multiple, including rising incomes, urbanisation and more sedentary occupations, the influence of media and advertising, and changing relative prices of different foods. This last element is the focus of this report.

The report starts from two working hypotheses:

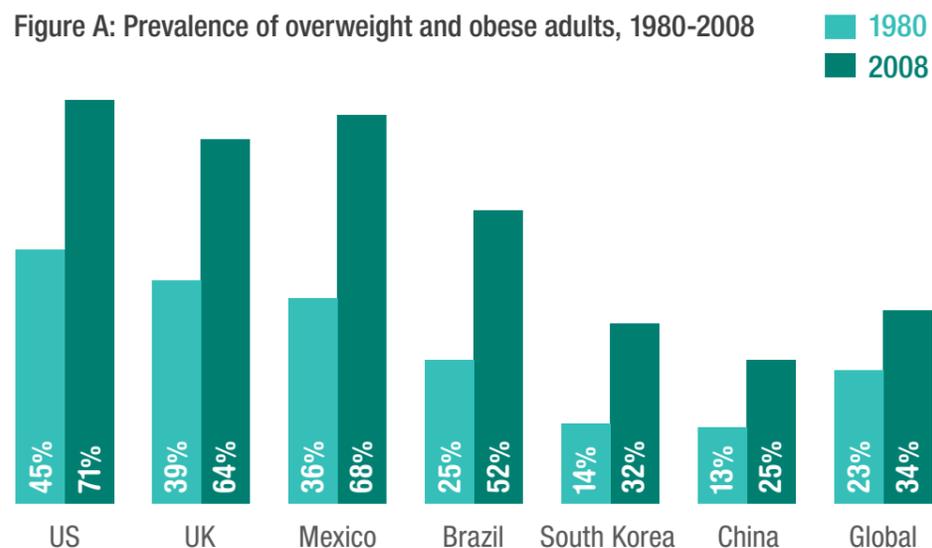
- When the relative prices of foods change, people will consume more of foods that have become relatively less expensive, and less of those that have become relatively more expensive. People on low incomes are expected to be more sensitive to prices than those on higher incomes; and,
- When consumption of foods with high calorie content per unit weight (energy-dense foods) increases at the expense of food that is less dense in energy, we may expect to see a significant increase in the prevalence of overweight and obese people.

If these hypotheses are correct, they would suggest that using taxes and subsidies to influence diets is likely to be effective.

To the best of our knowledge, there is no existing study that compares the changing costs of foods from separate food groups across a sample of developing and emerging economies. The report focuses on four countries: three upper-middle-income countries (UMICs) – Brazil, China and Mexico; and one high-income country (HIC), the Republic of Korea, which was still a developing country in 1990. They have been chosen since they represent emerging economies that are growing faster than most industrialised countries, and where since 1990 significant changes may be expected in both diets and the relative prices of foods. Analysis of prices in the United Kingdom (UK) has been added to

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Sources and full report available at [odi.org/rising-cost-healthy-diet](http://odi.org/rising-cost-healthy-diet)



## Key Messages

- In high-income countries over the last 30 years it seems that the cost of healthy items in the diet has risen more than that of less healthy options, thereby encouraging diets that lead to excess weight.
- The same may apply in emerging economies, such as Brazil, China, Korea and Mexico, where prices of fruit and vegetables have been rising more than most other foods, including energy-dense processed foods.
- A strong case emerges for using taxes and subsidies to offset these changes to encourage more consumption of healthy foods and less of unhealthy items.

provide some comparison. The literature from the United States (USA) has been reviewed given the large number of studies that report on the price of food, the effect on food consumption and in some cases the consequences for body weight.

While changes in prices of some foods such as bananas, beverages, cereals, dairy produce, edible oils and sugar on international and national markets are regularly reported, less is known about the evolution of national retail prices of food in the form presented to consumers. Hence the central questions posed in this report:

- What changes have been seen in the retail cost of food in the four countries since 1990? Are there systematic differences in the evolution of prices for different foods, and hence changes in relative prices?
- In particular, has processed food become cheaper relative to unprocessed staples, fruit and vegetables, meat and dairy produce? This may be expected since much of the retail cost of processed food arises in manufacturing and logistics, where technical advances have reduced unit costs, perhaps by more than advances in farming have reduced the cost of agricultural produce.

It was possible to examine only a sample of the many foods on offer in retail outlets, the aim being to have at least one example from the food groups in the table opposite.

## What is already known? Insights from the literature

Published studies for the UK and the USA frequently report the following, even if contrary findings and qualifications can be found in many other studies:

- Most studies find that healthier foods cost more than less healthy ones. Moreover this effect has increased over the last 30–40 years, as energy-dense, processed foods have become cheaper relative to less energy-dense fruit and vegetables.
- Consequently healthy diets tend to cost more than less healthy diets. This is not inevitably so: choosing cheaper healthy items and substituting them for costlier less-healthy ones might both improve diet and save money. But for most consumers, this would require both the ability to see the distinctions, and the discipline to follow a particular diet.
- Although it seems that some energy-dense processed foods have become notably cheaper compared to fruit and vegetables, the nature of the latter have changed – with higher-value prepared items common in food outlets, and also available all year round. Taking such added value into account the change in relative prices may be less than is at first apparent.

|                               |   |
|-------------------------------|---|
| <b>Staples</b>                | Cereals, root crops, legumes                          |
| <b>Fruit and vegetables</b>   | Fruit and vegetables                                  |
| <b>Meat, fish, and dairy</b>  | Minimally processed animal products and milk products |
| <b>Oils, fats, and sugar</b>  | Vegetable oils and fats, animal fats, sugar           |
| <b>Highly processed foods</b> | Foods usually produced by industrial processes        |

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- Consumption of most foods responds to price changes, although for many foods the response is relatively inelastic – but far from perfectly so. Those on low incomes are most likely to respond to changing prices.
- Studies of the impacts of food taxes that often seem to trigger tiny changes in consumption obscure these findings, but this is because most studies observe or model the effects of very low taxes, 5% or less being typical.
- Cross-price effects matter in assessing the nutritional effects of price changes. Taxes on fat or salt content may affect consumption of other, complementary foods leading to less consumption of beneficial nutrients. Using tax revenues to subsidise such complementary foods would counter this effect.
- Studies of the impacts of changes in prices on body weight produce a surprisingly strong consensus that higher prices of unhealthy options reduce body mass index (BMI), as do cheaper healthier options. ‘Surprising’ since body weight is the outcome of many factors, yet prices changes can be seen to make a difference. The strongest effects are seen among those on low incomes who are most sensitive to the cost of food.

There are fewer studies on the four emerging economies, but they indicate the following:

- Some studies link changes in diets, above all those involving more consumption of processed foods, to processed food and cooking oil becoming cheaper than other foods.
- In Latin America, the rising consumption of ultraprocessed foods and sugar-sweetened beverages (SSBs) is notable. Some see this as the consequence of heavy marketing by the large corporations that manufacture much of this food and drink.
- The possibility of using taxes to reduce consumption of processed food and SSBs is actively being studied, with most authors seeing the potential to significantly reduce consumption. Mexico has already introduced taxes on both SSBs and energy-dense food. These, which came into effect in January 2014, will be the focus of intense scrutiny to see what effects they have.



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### Data and methods

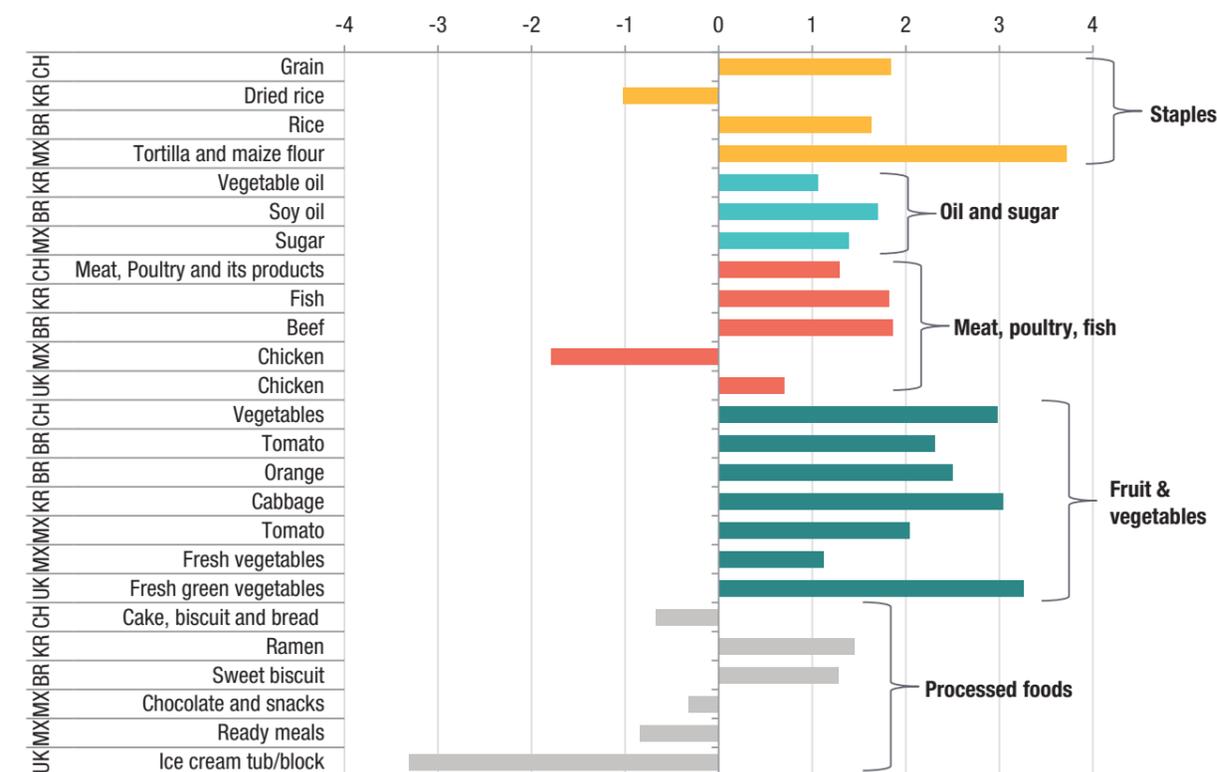
Key data for this report are series for food prices from 1990 to recent years in the four countries plus the UK. Retail prices were sought for representative foods – those frequently consumed – from the food groups listed previously.

In most cases, directly observed retail prices were used. For Mexico, however, a food price index was used and calibrated to price levels from observed prices in Mexico City. In the UK, household surveys reported both spending and quantity for 330 foods. Hence it was possible to create unit prices paid by dividing expenditure by the quantity.

Price series have been deflated by either the consumer price index (CPI) or the Gross Domestic Product (GDP) deflator to remove the effect of inflation and allow comparison over time. Once prices were deflated, indices of these deflated prices were constructed to see how much prices of different foods in each country had changed since the same base year.

More formal testing of price changes was carried out by regressing time on deflated and logged prices from 1990 to a recent year, in most cases 2012. This allowed a test of whether a significant (log-linear) trend can be inferred, and if so, what the average annual price change has been.

Figure B: Estimated average annual price changes from 1990



## Results

The key findings from the analysis come from estimated annual price changes (see Figure B).

Two things are readily apparent. One is that prices of fruit and vegetables have risen substantially since 1990, mainly by between 2%–3% a year on average – or by 55–91% between 1990 and 2012. The other is that four of the six processed products for which estimates are significant show price falls since 1990. Most of the other foods have seen their prices rise by 1–2% a year, with the exception of the price falls for rice in Korea and chicken in Mexico.

## Discussion

If the detected trends are real they prompt questions about the reasons for them. If, for example, technical progress in farming were uniform, so that unit costs of production were falling for all agricultural output, and if advances in the logistics of food wholesaling and retailing were similarly uniform, then we might expect the costs of most foods to move roughly in line with one another. But that is not the case.

So why have fruit and vegetables become more costly compared to other items? It is not as though there have not been technical advances in horticulture: on the contrary some of the most sophisticated seeds, soil nutrition, water control, and prevention of pests and diseases are seen

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precisely in the gardens and glasshouses in which so many fruit and vegetables are grown. While there is a world of difference between Dutch heated glasshouses and the tiny plots of green beans of central Kenya, in both cases, compared to other agriculture in their neighbourhoods, these systems are both more intensive and use more sophisticated technology than most other local farm enterprises. Moreover, advances in transport mean that fruit and vegetables are traded more than in the past, so that retail managers should be able to source from lowcost suppliers no matter where they may be.

Hypotheses can be imagined: horticulture may well have a stepped supply function, so that while small quantities of fruit and vegetables can be supplied at low unit cost, once a particular volume is reached, costs rapidly escalate to a significantly higher level. It may also be that the changes in quality noted explain the increased relative prices. Or, it may not be a matter of cost but of increased demand from those consumers who appreciate the health benefits of fruit and vegetables. These hypotheses merit a separate study.

Why does not the same apply to some processed foods? One possibility is that much processed food does not rely on costly farm ingredients, but rather is manufactured from relatively cheap ingredients, the added value being largely in factory processes of combining the ingredients and enhancing their flavour. Advances in manufacturing and flavouring probably help reduce unit costs in factory. That said, processed foods are not uniform in quality and pricing, since for any sub-category, there are usually products that are branded, sold on their special characteristics, usually with a price premium – as applies, for example, to SSBs, which compete with cheaper, unbranded options. This may explain why not all the processed foods considered show declining constant prices. Again, additional studies might shed light on this.

Evidence presented in the literature review suggests that prices do affect consumption, especially for people on low incomes. Hence it is no surprise to see much study of the potential of taxes on less healthy options to reduce their consumption, perhaps even with subsidies on more healthy options to raise theirs. Most such studies indicate that imposing taxes would reduce consumption. But two qualifications apply.

One is that there may be cross-price effects, whereby when taxes raise the cost of a particular food, not only does its consumption fall, but so too does that of complements (foods which are typically consumed together, such as bread and butter). When those

complements contain valued nutrients it is thus possible for taxes to reduce the quality of diet. In theory this problem can readily be tackled by placing a subsidy on the valued complement to offset the cross-price effect. In practice, learning which foods really are complements, to what extent, and then determining an optimal level of subsidy, could lead to a thicket of regulations that have to be adjusted in the light of emerging evidence, creating high administrative costs and giving the impression that such fiscal measures are just too difficult to contemplate. The question is how strong cross-price effects are and whether they may be remedied by other measures to encourage healthier diets.

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The other is the apparently seductive argument that small taxes would create only small effects: that considerable change in consumption would require high taxes that would look disproportionate and unfair – say, more than the rate of value-added tax (VAT) of 20% in the UK. But a logical flaw applies. The policy question is not so much, ‘how large a tax would be necessary to bring down consumption of less healthy food X to recommended or insignificant levels’, but ‘how much benefit would be derived from imposing a politically acceptable tax on less healthy food X?’ The answer to the former may be a number so high as to be dismissed from the debate; but the answer to the latter may be as striking as that provided by Nnoaham et al. (2009) for the UK: that taxes and subsidies of less than 20% could save no fewer than 6,400 premature deaths a year from coronary heart disease (CHD) and cancers. The argument about ‘small taxes, small gains’ is tantamount to arguments that condemn doing good because perfection is unattainable.

In terms of what might be taxed and subsidised, this report suggests that energy-dense foods might be taxed, while fruit and vegetables, whose prices often rise compared to other foods, might be subsidised.

Much comes down to the political appetite to contemplate taxing foods. Events in Mexico suggest that some emerging economies may steal a march on HICs in this respect. The evidence presented in this report suggests that the Mexican taxes should achieve considerable good, thereby providing valuable lessons for other developing and emerging economies.

Read the full report at [odi.org/rising-cost-healthy-diet](http://odi.org/rising-cost-healthy-diet)

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In newly-rich countries, healthy food is getting more expensive – but junk food is getting cheaper.

**CHINA**

+50%

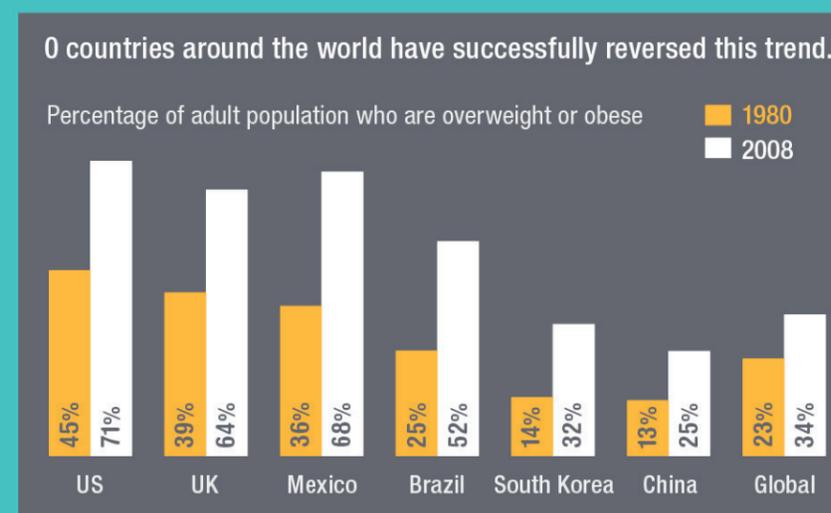
In real terms, green vegetables have doubled in price over the last 20 years.

People are getting heavier.

**BRAZIL**

The number of overweight and obese people has almost tripled since 1980.

1980 33 million    2013 90 million



But Mexico introduced a junk food tax last year – and we recommend that other emerging economy governments consider following its example.

Find out more at [odi.org](http://odi.org) #richerdiets

Sources available at [odi.org/rising-cost-healthy-diet](http://odi.org/rising-cost-healthy-diet)

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