



# The great resource price shock

By Julian Morgan



## Summary

“As the UK is becoming more dependent on imported commodities, rising resource prices will have increasingly adverse impacts on the UK economy”

Over the past decade, world prices of key resources have risen sharply and have been highly volatile. Between 2003 and 2013, world fuel prices rose fourfold, metal prices trebled and food prices roughly doubled. This sharp rise, affecting most commodity groups, is in marked contrast with much of the 1980s and 90s, when real commodity prices generally declined. In this policy insight we call this recent phenomenon the ‘great resource price shock’ and explore its impacts on inflation and living standards in the UK. We also discuss the factors likely to influence its future evolution and the policy responses available to mitigate it.

Since 2003, rising food and energy bills have pushed up the overall inflation rate by around 0.5 percentage points per annum and have made the task of controlling inflation more difficult for the Bank of England. These higher bills have also made a significant contribution to declining real living standards in the UK with poorer households particularly affected. We have calculated that, if food and fuel prices had just kept pace with other consumer prices since 2003, the average household could have saved over £1,000 on its food and household energy bills in 2012. Given that the UK is becoming more dependent on imported commodities, rising resource prices will have increasingly adverse impacts on the UK economy.

Whether the great resource price shock continues will depend on how a number of opposing factors play out. The exploitation of new sources of supply and technological advances may put downward pressure on prices, but increasing marginal costs of production and an expected acceleration in world growth are likely to work in the other direction. If the latter factors predominate, and the great resource price shock continues, by 2020 household food and energy bills could have risen by another £1,675 a year over and above general inflation.

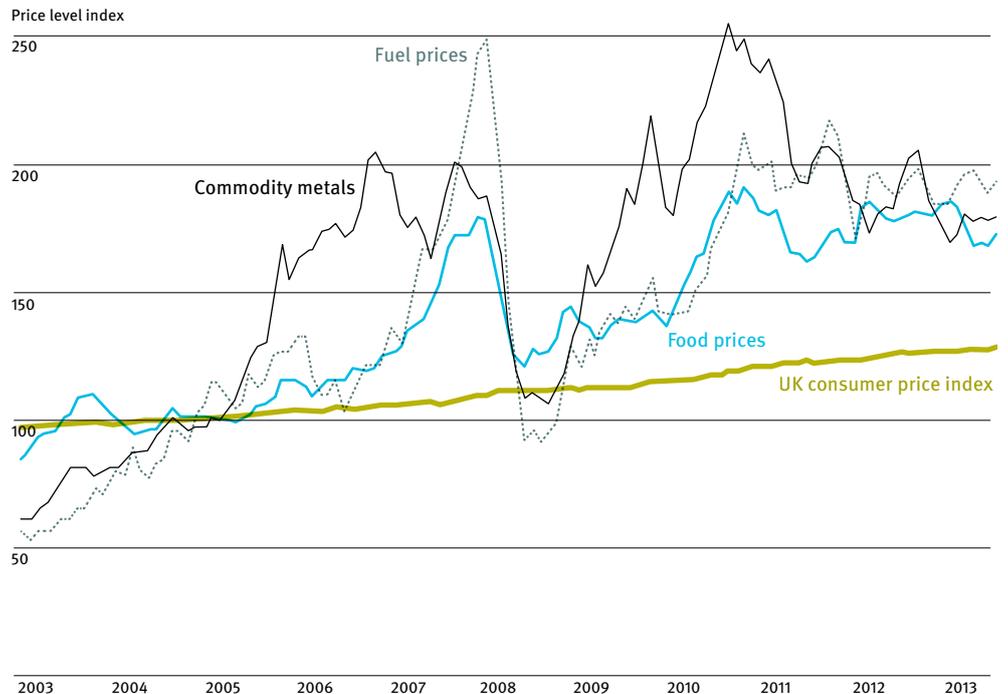
Irrespective of future price trends, there are good reasons to expect ongoing high volatility. This is due to a combination of potential supply disruptions emanating from geopolitical uncertainties in commodity producing regions, increasing environmental impacts associated with producing commodities and the risk of weather impacts affecting harvests, which may be increased due to climate change. Such volatility can in itself have adverse impacts on the UK economy, even without an upward trend in prices.

The only reliable way to protect the UK economy against resource price shocks in future is to improve the efficiency of our resource use and reuse, reducing dependency on foreign imports. By reducing the need for resources, this approach could also offset some of the damaging effects of past price increases. And, if more countries followed this approach, increases in global demand would be reduced, helping to keep a lid on world resource prices.

## Trends in world resource prices

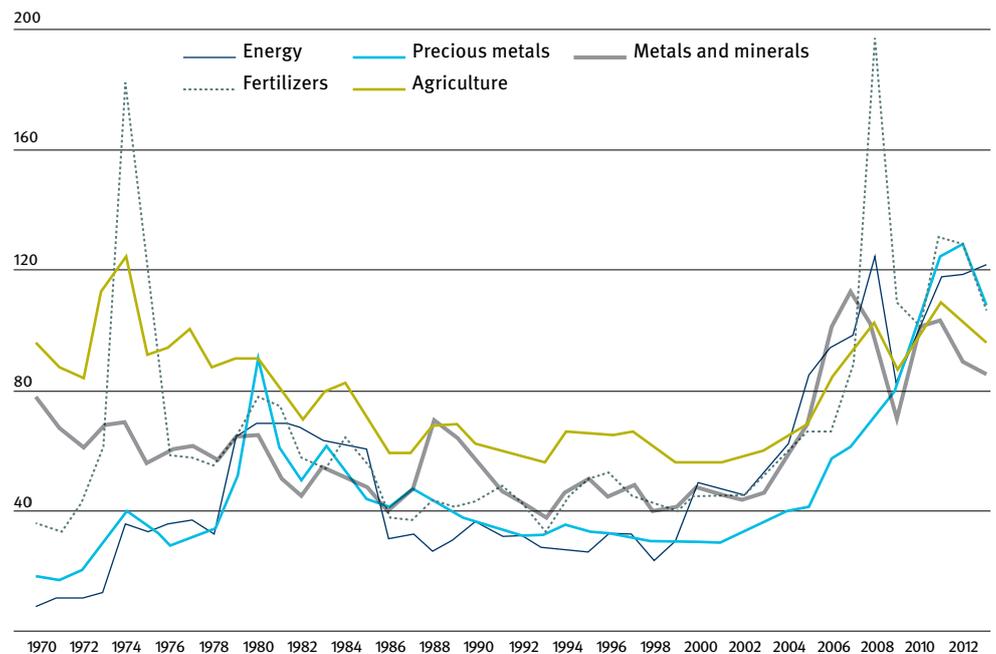
There has been a broadly based rise in commodity prices over the past ten years as shown in the graph below which reports IMF commodity price indices against the backdrop of the UK Consumer Price Index (CPI). Commodity prices rose strongly in the mid noughties, particularly in the run up to the financial crisis. They then fell back during the crisis but recovered again to rise above previous peaks, in the case of food and metals, and close to previous peaks for fuel. As the graph shows, world resources prices have risen much more quickly than UK consumer prices over this period. As a consequence, resource prices have risen relative to the cost of other goods and services typically purchased by UK consumers.<sup>1</sup>

### Nominal commodity price indices and the UK Consumer Price Index<sup>2</sup>



To put these increases in commodity prices in context, it is worth noting that the dominant trend for much of the post war period had been one of declining real commodity prices. Focusing on the period since 1970, the chart overleaf shows the trends in real energy, agricultural and other commodity prices using World Bank data.

### Real commodity price indices<sup>3</sup>



This chart can be split into three periods:

#### The 1970s: the great inflation

The real prices of energy, fertilisers and precious metals rose strongly on the back of geopolitical uncertainty, particularly in the Middle East for energy and also due to Cold War tensions around the Soviet invasion of Afghanistan, pushing up precious metal prices. In contrast, other commodity prices showed little change. This period coincides with what some economists also term the ‘great inflation’ a period of high and rising inflation in many developed economies.

#### Early 1980s - early 2000s: the great moderation

The real prices of all commodities drifted down and also showed comparatively low volatility. This coincided with a period of stability in the economies of many developed countries which managed to successfully reduce inflation to low and stable levels after the 1970s. This period has been labelled by some economists as the ‘great moderation’ to emphasise the difference from the earlier inflationary episode.

#### Early 2000s – the present: the great resource price shock

It now seems that a third period has emerged since the early 2000s, one of rising and more volatile commodity prices. In contrast to the 1970s, all the main commodity groupings have shown real price rises, in what is sometimes called a commodities ‘super cycle’ and the co-movement of the indices has increased remarkably (the average cross correlation co-efficient rose from 0.26 in the 1970s to 0.83 since 2000). Interestingly, also in contrast to the 1970s, this has not led to a generalised surge in inflation, most likely reflecting the greater credibility of monetary policy conducted by independent central banks. Hence, there has been a relative price shift leading to significantly higher commodity prices. In this policy insight we will refer to this as the ‘great resource price shock’, to emphasise that there has been a generalised rise in commodity prices without leading to another great inflation.

The turn around in world commodity prices has broadly coincided with an acceleration in global economic growth which, from 1980-2002, had averaged 3.2 per cent per annum. Between 2004-07 annual average growth accelerated to 4.8 per cent, before weakening considerably during the financial crisis. Nevertheless, even including the recession, world growth still averaged 3.8 per cent during the great resource price shock from 2003-13 and was, therefore, still noticeably stronger than in the period 1980-2002.<sup>4</sup>

## UK inflation and the impact of resource prices

Although overall UK inflation has remained relatively benign, at least in comparison with the 1970s, the great resource price shock will certainly have left its mark on UK prices. Below we outline the main routes by which commodity price increases pass through to domestic consumer prices.

### How commodity price rises are passed through to UK consumer prices

**Rise in world commodity prices**  
(usually expressed in dollars)



**Rise in sterling cost of imported commodities to the UK**  
(impact depends on the exchange rate)



#### First round effects

**Direct** - on commodities consumed in a relatively raw form, such as energy and unprocessed food. These tend to pass through fairly quickly.

**Indirect** - via the commodities used in processed/manufactured products eg processed food, metals used in cars, cotton in clothes, energy in production processes. There may also be indirect feedbacks in the cost of imported processed and manufactured products.



#### Second round effects

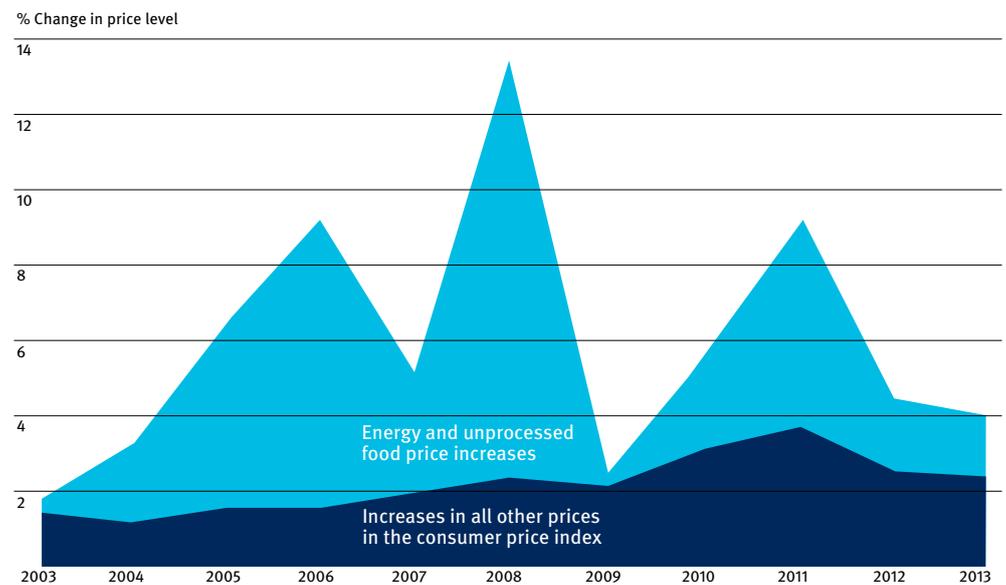
**Impacts from the real economy** such as downward pressures on prices due to lower real activity.

**Further upward pressures on prices** if workers and firms try to restore the loss in real wages or profit margins caused by first round effects, or if they come to expect that higher inflation will persist. Central banks may tighten monetary policy if they see signs of this happening, as there is a danger of initiating a wage-price spiral, as experienced in the 1970s.

The direct effects of price increases for commodities consumed in a comparatively raw form are generally the easiest to observe as the CPI can be split into sub-indices for energy and unprocessed food. The following graph shows the inflation rate for the sub-index 'energy and unprocessed food' in comparison with the inflation rate for all other CPI items, excluding energy and unprocessed food. The impact of the great resource price shock is immediately apparent as, in every year from 2003-13, energy and unprocessed food prices have risen faster and, in some years, much faster than other prices. Annual inflation in energy and unprocessed food averaged 5.8 per cent, compared with inflation in other prices of 2.1 per cent over this period. As the overall average inflation rate was 2.6 per cent, the direct effect of the rising fuel and energy costs was to raise the average annual inflation by around

0.5 percentage points over the period 2003-13, leaving the CPI in 2013 over five per cent higher than it would have been if energy and unprocessed food prices had increased in line with other prices.

### UK consumer price sub-indices<sup>5</sup>



Although rises in energy and unprocessed food prices cannot only be ascribed to rising world prices, as factors such as changes in taxation and domestic costs of production and profit margins can play a role, it is likely that world prices have been the dominant factor over this period. It is worth noting that this applies also to household fuel where it has been suggested that the government's climate change policies have led to higher bills. In fact, according to DECC's calculations, the rise in household energy bills between 2010 and 2012 was at least 60 per cent due to wholesale energy costs, 25 per cent to network costs, supplier operating costs and margins, and only 15 per cent due to the costs of energy and climate change policies.<sup>6</sup>

Our analysis of energy and unprocessed food prices misses a large number of impacts from commodity price rises as they only relate to the first round direct effects of energy and food price rises and ignore the indirect effects and other commodities. Quantifying the indirect effects of the great resource price shock is more difficult, requiring more complex economic analysis than the simple accounting exercise of decomposing the CPI.<sup>7</sup> According to analysis by the OECD, the combined impact of energy, food and other commodities, such as agricultural products, metals and minerals, was to add around 0.6 percentage points to annual UK inflation from 2001-08.<sup>8</sup> This was larger than the direct contribution of unprocessed food and energy prices to overall CPI which was under 0.4 percentage points per annum over this period.

The Bank of England has the job of controlling UK inflation so it worth reviewing what factors it has cited to explain periods of high inflation the UK. Under the current monetary policy framework, the Bank's governor has to write a letter to the chancellor of the exchequer to explain episodes of high or low inflation, defined as deviations of more than one percentage point from the Bank's target of two per cent. In these letters, the governor typically cites the main factors driving high inflation, the outlook and the measures that it is taking to restore inflation to the target. To date, 14 such letters have been written as shown in the table opposite.

On all the occasions when a letter has been written for CPI inflation above three per cent, CPI excluding unprocessed food and energy has been growing more slowly. The gap between the two inflation measures has ranged between 0.2-2.0 percentage points, averaging about 0.8 percentage points. So it may not be surprising that, when the governor has given his explanations for high inflation, he has always cited resource prices as an important factor. Energy prices have always been mentioned, whilst food was also cited as important in the first five letters and, in February 2011, 'other commodities' were also mentioned.

The effect of a weaker pound pushing up the sterling price of imported commodities and other import prices has also been mentioned frequently. As regards domestic sources of inflation, the main culprit has been rising VAT (when the temporary cut in VAT to 15 per cent was restored to 17.5 per cent and then raised to 20 per cent). Only on one occasion has an overheating domestic economy been implicated in overshooting inflation. This was in the first letter, in April 2007, when there was reference to 'capacity pressures' shortly before the onset of the financial crisis.

#### Summary of key statistics behind the Bank of England governor's letters to the chancellor

Letter date	Base rate	CPI inflation	CPI excluding unprocessed food and energy inflation	Main reasons cited for high inflation		
				Resources	Exchange rate and import prices	Domestic factors
April 2007	5.25%	3.1%	2.2%	Energy, food		Capacity pressures
June 2008	5%	3.3%	2.1%	Energy, food		
September 2008	5%	4.8%	2.8%	Energy, food		
December 2008	2%	3.1%	1.7%	Energy, food	Depreciation of sterling	
March 2009	0.5%	3.1%	2.3%	Energy, food	Depreciation of sterling	
February 2010	0.5%	3.4%	3.2%	Energy	Depreciation of sterling	VAT
May 2010	0.5%	3.7%	3.2%	Energy	Depreciation of sterling	VAT
August 2010	0.5%	3.1%	2.8%	Energy	Depreciation of sterling	VAT
November 2010	0.5%	3.1%	2.9%	Energy	Depreciation of sterling	VAT
February 2011	0.5%	4.0%	3.5%	Energy, other commodities	Depreciation of sterling	VAT
May 2011	0.5%	4.5%	4.1%	Energy	Import prices	VAT
August 2011	0.5%	4.5%	3.8%	Energy	Import prices	VAT
November 2011	0.5%	5.0%	3.8%	Energy	Import prices	VAT
February 2012	0.5%	3.6%	2.9%	Energy	Import prices	VAT

The text of the letters also reveals the importance of resource price shocks in explaining UK inflation over this period. As the selected quotes from the letters below show, there was a remarkably consistent pattern of concern regarding the impact of commodity price increases. There was an equally consistent and, as it turns out, optimistic expectation that these resource price shocks would not continue.

### Quotes from the Bank of England governor's letters related to resource prices

**April 2007:** "Let me turn to the reasons for the rise in CPI inflation to 3.1%...part of that rise reflects an unexpectedly sharp increase in domestic energy prices...Part reflects a rise in food prices caused by a weather induced global reduction in supply."

**June 2008** "Inflation has risen sharply this year, from 2.1% in December to 3.3% in May. That rise can be accounted for by large and, until recently, unanticipated increases in the prices of food, fuel, gas and electricity...We are seeing a change in commodity, energy and import prices, relative to the prices of other goods and services."

**September 2008** "...there have been sharp, largely unanticipated increases in the price of food and energy reflecting developments in the global balance of demand and supply for these commodities."

**December 2008** "There were sharp increases in the global prices of food and energy through the first half of 2008."

**February 2009** "...most of the rise in inflation in 2008 was associated with developments in commodity prices, particularly those of food and energy. The effects on UK retail prices of increases in these world prices were magnified by the sharp depreciation in the sterling exchange rate."

**February 2010** "...over the past year, oil prices have risen by around 70%. That is pushing up petrol-price inflation significantly, which, in turn is raising overall CPI inflation."

**May 2010** ".....the impact of higher oil prices, which on average in April were nearly 80% higher than at the beginning of 2009, pushing up petrol price inflation..."

**November 2010** "...commodity and other world export prices have increased recently, adding to companies' costs and so to inflationary pressures in the near term..."

**February 2011** "Inflation is likely to continue to pick up to somewhere between 4% and 5% over the next few months, appreciably higher than when I last wrote to you. That primarily reflects further pass through from recent increases in world commodity and energy prices."

**May 2011** "Continuing volatility in energy and commodity prices makes it difficult to be sure when inflation will return to target."

**August 2011** "...it is likely that inflation will rise to around 5% in the coming months, boosted by increases in utility prices...."

**November 2011** "...the current high level of inflation reflects the increase in the standard rate of VAT earlier this year, and previous steep increases in import and energy prices, including recent domestic utility price rises. In the absence of those temporary factors, it is likely that inflation would have been below the 2% target...."

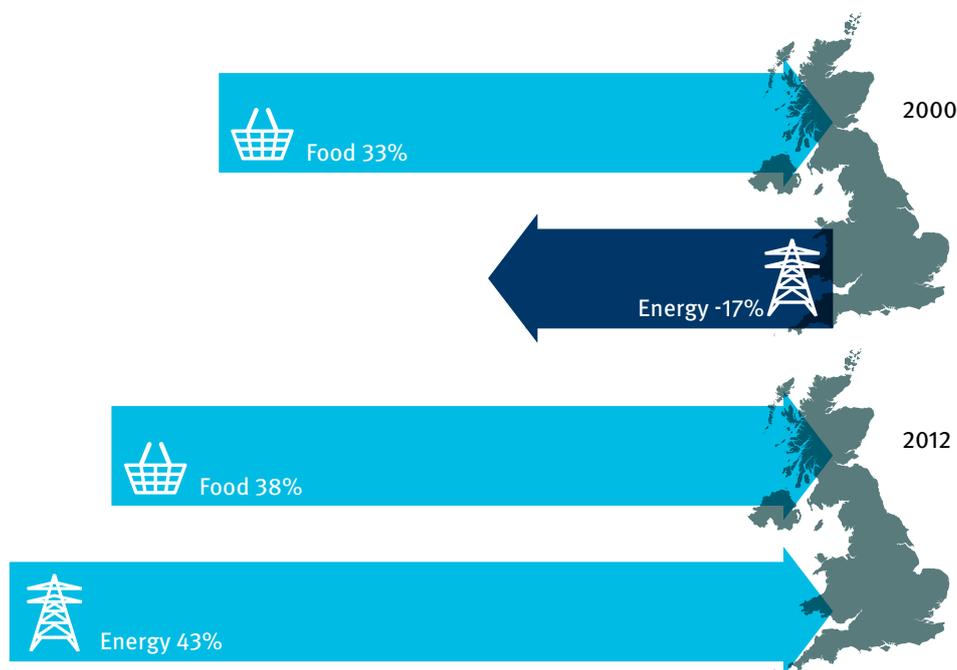
**February 2012** "...inflation was pushed up... by increases in VAT, import prices and energy prices that were largely unexpected."

## Resource prices and the UK economy

In broader economic terms the impact of resource price shocks depends crucially on the extent to which a country is an exporter or an importer of resources. The most clear cut example is for oil exporting countries, whose balance of payments clearly benefit from higher oil prices. Overall, such a country should also see a rise in GDP, although not all sectors of the economy will necessarily benefit as there is likely to be an appreciation in the exchange rate which can crowd out other tradable sectors, such as manufacturing. By contrast, oil importing countries are likely to experience deterioration in the balance of payments and a fall in GDP. However, there may be additional inward investment if the oil revenues from the exporting countries are ‘recycled’ in the form of overseas investments.

In the case of the UK, we have been increasing our dependence on imported foreign commodities. As shown below, between 2000 and 2012 the UK’s net import dependency for food rose from 33 per cent to 38 per cent. Even more strikingly, over this period the UK went from being a net exporter to a substantial net importer of energy as the North Sea oil and gas fields went into decline. Hence, as well as raising inflation, higher commodity prices will have had an increasingly adverse impact on the UK’s GDP.

UK net import dependency in 2000 and 2012<sup>9</sup>



Reflecting these trends, the UK now runs a substantial trade deficit on basic resources. In 2012, the combined trade deficit on food, drink and tobacco, raw materials and mineral fuels and lubricants amounted to £43 billion, or 2.8 per cent of GDP.

“If the effects of rising fuel and food prices were removed real earnings could have been around five per cent higher in 2013”

## What has been the impact of the great resource price shock?

Given that rising resource prices have had such a pronounced effect on UK inflation, it is worthwhile considering what might have happened if the great resource price shock had not occurred and UK energy and unprocessed food prices had risen in line with other consumer prices.

Such a calculation can only tell part of the story. It is likely to underestimate the full effect of resource prices as it only takes account of the direct effects of energy and food commodities and ignores the impact of other commodities or the indirect effects on processed and manufactured goods. In addition, it cannot represent a true counterfactual as, in the absence of a global resource price shock, many aspects of the global economy would be different.<sup>10</sup> However, it seems reasonable to abstract from considering the global interactions and treat the UK economy as too small to affect world commodity markets to any significant extent and one which, therefore, has to adjust to what happens to world resource prices.

We first consider how the great resource price shock may have affected the Bank of England over this period. As we have already shown, 14 letters were sent to explain breaches of over one percentage point from the Bank's two per cent CPI target. If the threshold triggering letters had been expressed in terms of 'CPI, excluding energy and unprocessed food', only seven letters would have been needed.<sup>11</sup> But, this only takes account of the direct effects of fuel and unprocessed food prices. If indirect effects of the prices of processed food and commodities, such as the metals, minerals and plastics used in consumer goods, were removed, it is likely even fewer letters would have been sent. Indeed, as some of the seven letters would have been for small breaches of the threshold, then additionally excluding the indirect effects of commodity price rises could have meant that a further three letters would not have been sent, so only four letters, rather than 14, may have been needed.

Leaving aside the letter writing, it is interesting to consider how the monetary policy of the Bank of England may have been affected by the resource price shock. It is now central bank orthodoxy for policy makers to 'look through' the first round effects of commodity price shocks and not raise interest rates unless second round effects occur, in the form of attempts to recoup the purchasing power lost from the first round effects or if people start to expect higher inflation to persist.<sup>12</sup> What this means is that central bankers are unlikely to tighten policy when higher commodity prices feed through directly into energy or unprocessed food prices, or even if they push up the cost of processed and manufactured goods indirectly.

The logic behind this approach is that monetary policy makers in the UK cannot hope to influence global commodity prices and they should, instead, ensure that the domestic UK component of inflation is stable.<sup>13</sup> Nevertheless, whilst this view is generally accepted within the central banking community, it is not necessarily well appreciated by the general public, who only see the high inflation and may perceive these arguments as excuses. This can create a communication challenge for the Bank of England if it is to persuade the public that it is delivering on its mandate to control inflation.<sup>14</sup>

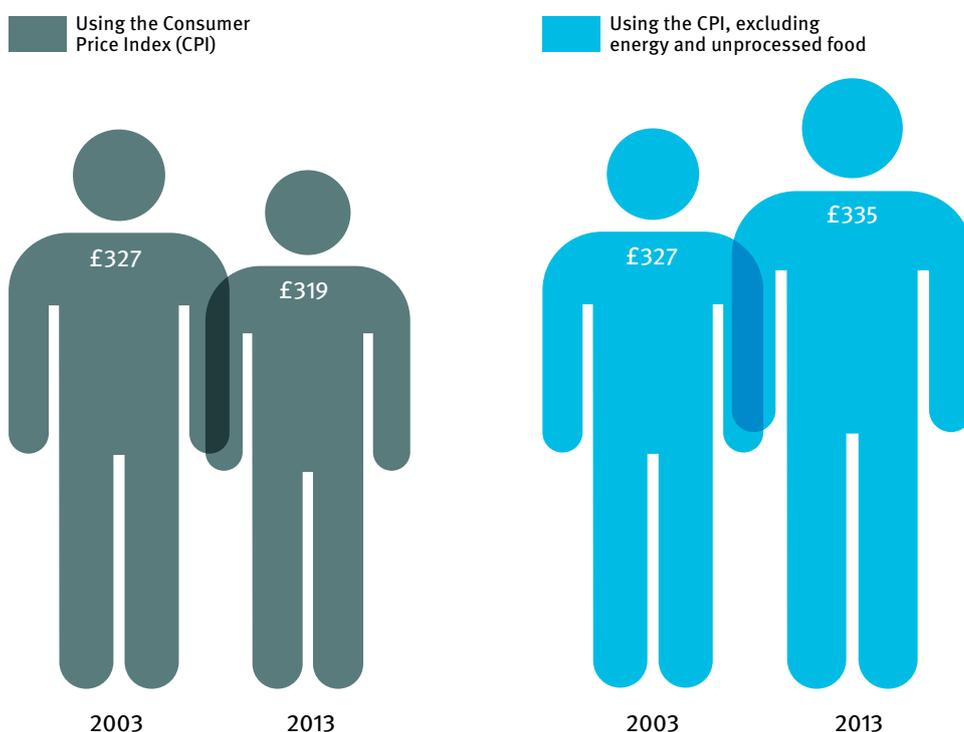
### Impact on purchasing power

While central bankers are unlikely to react to the first round effects of commodity price increases, they will be looking closely for any second round effects. So they will wait to see if workers try to push up wages or if firms try to recoup any lost profit margins, or if expectations of higher inflation become entrenched, and only then consider tightening policy.

What is striking from this past decade is the extent to which these forms of second round effects did not seem to occur. For most people, wages did not keep up with prices,

leading to real loss of purchasing power. As shown below, real median earnings fell from £327 to £319 between 2003 and 2013 (expressed in 2003 prices). If the effects of rising fuel and food prices were removed, by calculating real earnings using the CPI excluding energy and unprocessed food, real median earnings could have increased to £335 per week in 2013. In other words, real earnings could have been around five per cent higher in 2013.

**Real median weekly earnings in 2003 prices<sup>15</sup>**



**Impact on bills**

What has been the effect of food and energy price rises on the average household’s food and domestic energy bill? According to the ONS Family spending survey, the average household spent £2,954 on food and £1,206 on domestic fuel in 2012. We have calculated what this would have cost if food and fuel prices had not increased as fast as they did but, instead, had risen in line with the CPI excluding unprocessed food and energy. Assuming that spending patterns remain the same, these bills would have been £2,532 for food and £619 for fuel. This implies a combined household saving of over £1,000 a year.

As a caveat, it should be noted that households have actually cut back their real spending on food and domestic fuel over this period, most likely partly in response to the higher prices. Average real spending on food was eight per cent lower in 2012 than in 2003 while real spending on domestic fuel was over 18 per cent lower. The latter is likely to have been helped by the greater take up of domestic energy efficiency measures. Hence, it is possible that, if prices of food and fuel had been lower, then households may have actually taken the opportunity to spend more on these items.

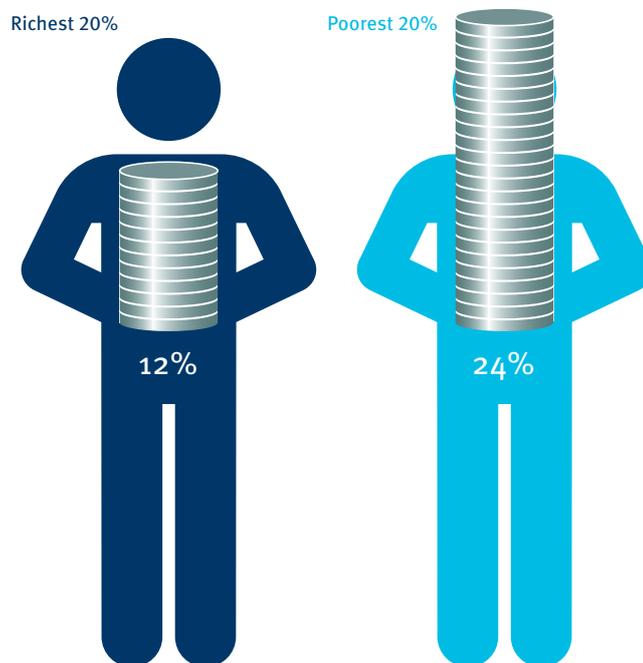
What food and energy could have cost without the great resource price shock<sup>16</sup>



Impact on the poorest

Looking at the median wage earner or the average household ignores the fact that it is the poorest members of society who are typically the hardest hit by resource price shocks. This is because they tend to devote a much higher proportion of their spending to essentials such as food and energy as the graphic below shows.

Proportion of household spending on food and fuel<sup>17</sup>

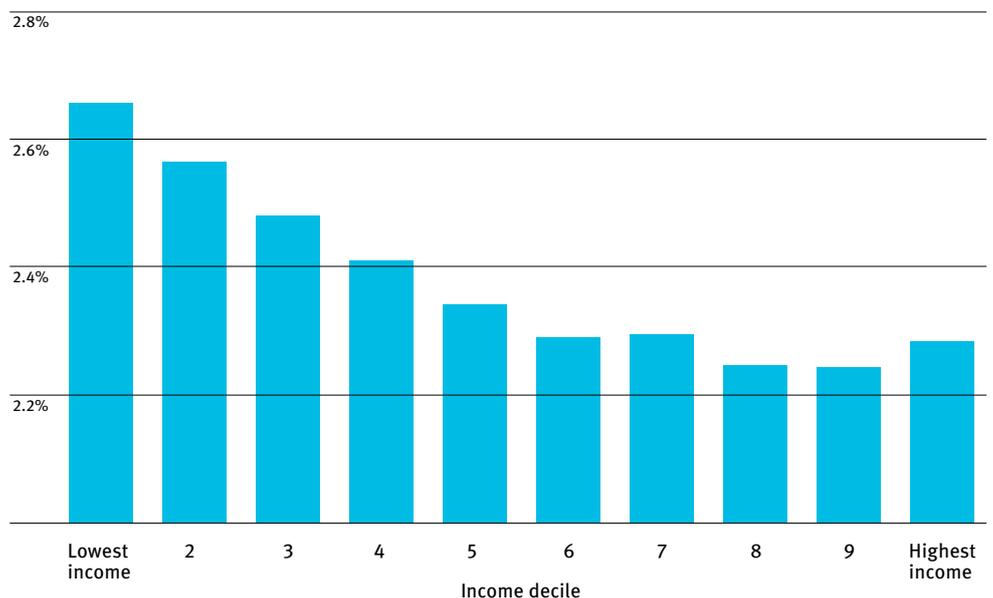


As work from the Institute of Fiscal Studies has shown, because those on lower incomes devote a higher proportion of their spending to these essentials, they have actually faced a higher rate of inflation than the better off.<sup>18</sup> The standard rate of inflation, calculated using the CPI, reflects a basket of the goods and services typically bought by UK consumers. Because everyone buys different amounts of goods and services, we all experience different rates of inflation. If we look at the typical spending patterns of people at different income levels, we can calculate specific average inflation rates for these groups. These will not just reflect energy and food spending, but also other prices which have risen more quickly, such as water bills.

Taking these factors into account, the illustration below shows how the average inflation rate has varied from 2.2-2.3 per cent for those on higher incomes (sixth to tenth deciles of the income distribution) compared with 2.6-2.7 per cent for those on the lowest incomes (first and second deciles). In other words, over the past decade, those on the lowest incomes experienced inflation which was, on average, around 0.4 percentage points higher than some of the more affluent members of society.<sup>19</sup>

**Estimated average inflation rate, 2003-13, by income decile<sup>20</sup>**

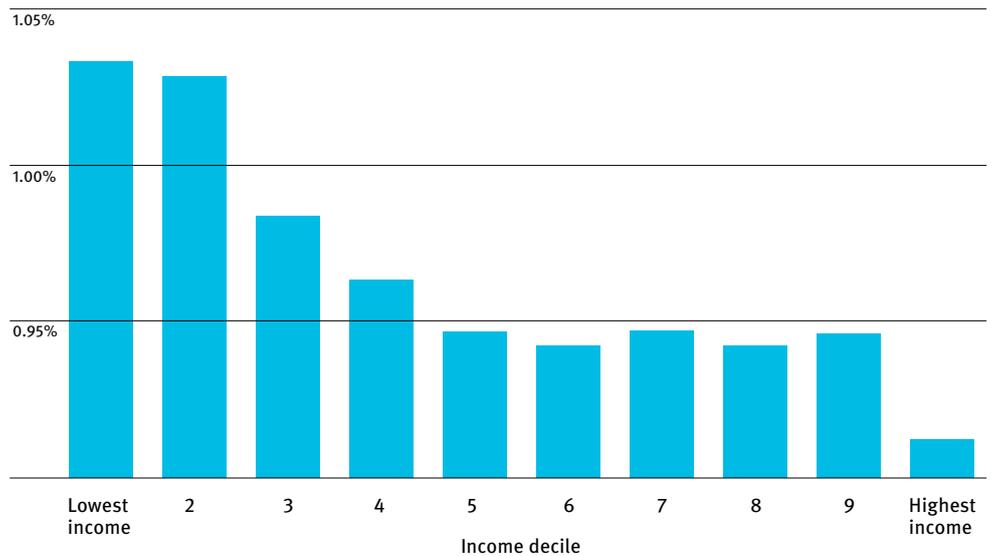
Average annual inflation rate (%) 2003-13



However, this calculation does not tell the whole story. As resource prices were volatile as well as rising over this period it is interesting to see whether the volatility of the inflation rate faced by these differing groups also varies. The following graph shows that for those on low incomes it is noticeably higher than it is for the better off. This matters as the poorest have the least spare cash and limited access to finance to cover unexpected rises in food and energy bills.

### Standard deviation in the inflation rate, 2003-13, by income decile<sup>21</sup>

Standard deviation  
(% annual inflation  
rate 2003-13)



## Will the great resource price shock continue?

Before considering this question, let's conduct the thought experiment of what might happen if CPI inflation continued to be pushed up by around 0.5 percentage points per annum, due to faster growth in domestic fuel and food prices. If such a trend were to continue to 2020, overall prices would be around four per cent higher than if food and fuel costs were to rise in line with other prices. Domestic fuel and food bills would rise by £1,160 and £515 respectively, over and above general inflation, assuming that there was no further reduction in real energy and food consumption.

Naturally, such calculations are only an illustration of one possible outcome. Some would challenge whether this is likely and suggest that the commodity super cycle has already come to an end, while others see scope for it to continue.<sup>22</sup> Although the outlook to 2016 is generally seen as fairly benign for many commodities,<sup>23</sup> a number of international organisations have made longer term projections for resource prices and these generally show continuing rises, albeit far more modest than those experienced in the past decade. For instance, the International Energy Agency (IEA) expects the nominal oil price to reach \$215 a barrel in 2035 (\$128 a barrel in 2012 prices).<sup>24</sup> The Organisation for Economic Co-operation and Development (OECD) and United Nations Food and Agricultural Organisation (FAO) have prepared an agricultural outlook to 2022.<sup>25</sup> This indicates that they expect prices to remain high and to show modest further increases to 2022.

“Forecasting commodity prices is exceptionally difficult and is typically one of the biggest sources of error in macroeconomic projections”

These projections reveal an expectation that resource prices will continue to be high, with some further increase but not a continuation of the dramatic upward trend seen over the past decade. However, such outlooks should be treated with some caution as the record of forecasters and economic commentators, particularly over longer time horizons, has not been impressive.<sup>26</sup> Indeed, forecasting commodity prices is exceptionally difficult and is typically one of the biggest sources of error in macroeconomic projections. Work by the European Central Bank found that the root mean squared errors in assumptions regarding the oil price was 15 per cent in the current year and 30 per cent for the year ahead. As a 20 per cent change in the oil price can affect inflation by around 0.4-0.8 percentage points (depending on the initial level of the oil price), so uncertainty about the oil price is a major contributor to volatility in inflation projections.<sup>27</sup> An even more striking example of our inability to predict commodity markets can be seen in an article from the *The Economist* in 1999. It discussed a recent fall in the oil price to \$10 a barrel and included a typically well argued case for why oil prices might fall further to \$5 a barrel. Instead, oil prices rose to nearly \$150 a barrel just nine years later.<sup>28</sup>

Although we cannot say with any confidence what will happen to commodity prices in the future, it is possible to identify factors that may be expected to push them in different directions. The trend movements we will see in commodity prices are most likely to depend on the relative strengths of the following three factors, which may vary over time and will most likely lead to price volatility:

### Increase in global supply

This is the main factor that may lower prices. It would be a classic response to rising commodity prices, in that high prices, particularly when sustained for any period of time, would be expected to incentivise the discovery and exploitation of new resources. This is most obvious for energy, with the boom in unconventional oil and gas in the US and the search for new supplies in more challenging environments such as the Arctic. In agriculture, to a limited extent, more land may be brought into cultivation and there may be technological advances which increase agricultural yields.

### High supply costs

Although new supplies of resources are likely to become available, discovery and extraction are expected to become increasingly costly. As the 2013 report from the Circular Economy Task Force says: “The IEA projects that water demand just to produce energy will rise by 85 per cent by 2035. Research from JP Morgan shows that horizontal fracking uses 4.2 times more steel per well than conventional production and that offshore wells are now more than twice as deep as they were in the late 1990s, further increasing demand for steel. Partly as a result, the marginal price for new oil production has risen by 14 per cent a year since 2001, reflecting the increasing interdependency between resources”<sup>29</sup> Similar pressures apply in agriculture, where there is more limited scope for expanding agricultural land and the costs of production are rising.<sup>30</sup>

### Increase in global demand

In addition to increasing marginal costs, it is widely expected that global demand will accelerate in the coming years. The IMF expects global GDP growth to average four per cent a year from 2014-18, driven by strong growth in emerging economies. This is faster than the average growth rate seen during the great resource price shock of 2003-13, when world growth averaged 3.8 per cent, and well above the 3.2 per cent average growth from 1980-2002.<sup>31</sup> Reflecting the expectation that renewed growth will be driven by emerging economies, these countries are expected to account for more than 90 per cent of net energy demand growth to 2035.<sup>32</sup> Also, increasing affluence in many emerging economies is increasing food demand; diets are shifting to increased consumption of meat which is more

resource intensive. For instance, growth in food consumption is predicted to outstrip supply in China, according to the OECD-FAO study.

There are other possible sources of disruption to supply, which have the potential to induce further volatility in commodity prices and security of supply. These include:

### Geopolitics

Geopolitical uncertainties continue to have the potential to disrupt supplies. Oil prices have long been vulnerable to geopolitical tensions, particularly those affecting the Middle East and North Africa.

### Environmental impacts

Environmental factors may disrupt supplies in a number of ways. The increasing dependency on other resources, such as water, as inputs to agriculture or fossil fuel extraction, can leave supplies vulnerable to their continuing availability. Some resource extraction activities may be the subject of increasing local environmental concerns which may limit their development, particularly in the event of environmental disasters, such as major oil spills. Global environmental concerns relating to climate change may mean that it becomes politically unacceptable to use high carbon fossil fuels. Finally, agricultural commodities may be disrupted by changing weather patterns, potentially exacerbated by climate change. Indeed, as the OECD-FAO outlook warns: “As long as food stocks in major producing and consuming countries remain low, the risk of price volatility is amplified. A widespread drought such as the one experienced in 2012, on top of low food stocks, could raise world prices by 15-40 per cent.”<sup>33</sup>

### Market speculation

It is often suggested that speculation in derivatives markets may be increasingly contributing to volatility in commodity markets. Interestingly, the oil derivatives market first developed as a way of managing risk due to volatilities in the oil market. However, paralleling the general growth of finance, the oil derivatives market is now at least 14 times the size of the actual oil market. Despite this, there remains considerable debate on the extent to which speculation could be a significant factor behind volatility.<sup>34</sup>

Taken together, although there is considerable uncertainty about future trends in commodity prices, there is a widespread belief that volatility is here to stay. As a recent, acclaimed report from Chatham House argues “Whether or not resources are actually running out, the outlook is one of supply disruptions, volatile prices, accelerated environmental degradation and rising political tensions over resource access.”<sup>35</sup>

Even without continuation of the upward trend in resource prices, increased volatility would carry significant economic consequences. It is likely to have adverse impacts on GDP growth.<sup>36</sup> Consumers and investors with any degree of risk aversion are more likely to delay major purchases or investments during a period of elevated volatility and uncertainty. Volatility in resource prices can also lead to volatility in relative prices which can damage the efficiency with which the price signal allocates resources. As we have shown, this is likely to make the job of monetary policy makers more difficult and lead to volatility in living standards, particularly for the poorest members of society. Finally, volatility may not just affect prices but may also reduce the security of supply for inputs, potentially causing costly production shut downs for UK producers.

“Volatility may not just affect prices but may also reduce the security of supply”

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## How the UK can protect itself against future resource price shocks

We conclude by briefly outlining the main policy responses available to the UK to mitigate the effects of damaging resource price shocks.

There are three main possibilities:

### Rely on the supply response

Adopting this strategy would mean trusting the supply response to bring prices under control. Broadly speaking, this requires the following assumptions to hold:

- increasing marginal costs of production are addressed through technological innovation, eg improved extraction techniques, crop yields etc;
- global geopolitics remains favourable to open free trade in commodities;
- growth in the world economy does not experience any significant new acceleration;
- environmental impacts of resource extraction and climate change do not disrupt supplies.

While some may argue that all of these things could happen, policy makers may not wish to rely on this.

### Resource nationalism

This is where countries seek to ensure their own supplies of vital resources by restricting exports and securing foreign sources by purchasing land and extraction rights, or by signing long term supply deals with foreign countries.<sup>37</sup> There are a number of problems with this approach:

- it is hardly compatible with free trade for national governments to secure resources for exclusive domestic use;
- political instability may limit access to the resources and the experience of the former imperial powers suggests that assets may be vulnerable to nationalisation, eg as happened with the Suez crisis;
- moreover, when resources are in short supply there may be no guarantee of resource security. For example, in times of food shortage, it is likely that governments will prioritise feeding their own populations rather than allowing exports to foreign countries. This was precisely the response of the Argentinian government to food price spikes in 2006: in response to domestic concern about the rapidly rising price of beef, Argentina raised export tariffs and then imposed a 180 day ban on exports in a bid to “increase domestic supplies and stabilise meat costs for consumers.”<sup>38</sup>

“Resource stewardship measures would reduce the UK’s dependence on imported resources and reduce its economic vulnerability to price shocks”

## Resource stewardship

The final approach is to improve the efficiency with which we use existing resources and encourage other countries to do the same.

- For energy, this means increasing energy efficiency and developing domestic sources of energy, particularly renewables which are less exposed to imported fuel price risks.
- For food, there is significant scope to reduce waste, as between one third and one half is wasted globally;<sup>39</sup> and possibly shift to less resource intensive diets, eg consuming less meat; unavoidable food waste can also be converted to energy via anaerobic digestion. In addition, insofar as the UK is structurally dependent on food imports, it will indirectly benefit from increasing food supply by helping to close the yield gap between agricultural productivity in western countries and the developing world.<sup>40</sup>
- Other commodities, such as metals and plastics can be recycled or, better still, remanufactured and reused; UK analysis suggests remanufacturing saves at least 70 per cent of materials compared to new goods.<sup>41</sup>

The box below gives examples of where there is scope for resource savings in the UK, particularly with respect to other countries. Resource stewardship measures would reduce the UK’s dependence on imported resources and reduce its economic vulnerability to price shocks. By reducing the need for resources it could also offset some of the damaging effects of past price increases. If other countries also adopted these approaches then the aggregate reduction in global demand could put significant downward pressure on world resource prices, so imports that were still needed could be secured at a lower cost.

## The scope for resource stewardship in the UK

### Energy efficiency:

- The UK can save 40 per cent of its 2030 electricity demand cost effectively, according to analysis by McKinsey. Achieving this means expanding ecodesign regulation of lighting and appliances for domestic and commercial use; and better heating, ventilation and air conditioning, lighting controls, and pump and motor efficiency in commercial use and industry.<sup>42</sup>
- According to Energy Bill Revolution, UK homes lose three times more heat than Swedish homes due to poor insulation. Despite having colder winters and more expensive energy prices, Sweden has fewer people in fuel poverty.<sup>43</sup> A programme of energy efficiency could insulate 600,000 homes a year, dropping average annual bills by £310.<sup>44</sup>

### Food waste and agricultural productivity:

- In 2012 the UK had a trade deficit of £19 billion in food. This exactly matches estimates of the value of UK food wasted each year, of which around £12.5 billion is thought to be avoidable.<sup>45</sup>
- Despite being edible, up to 40 per cent of some crops are rejected on cosmetic grounds. Changes in contracts, grading standards and consumer preferences could make these available for use.<sup>46</sup>

### Recycling and remanufacturing:

- Japan’s recycling rate is around 75 per cent for appliances covered by regulations. By contrast, 38.4 per cent of used electrical equipment is thought to have been recycled in the UK.<sup>47</sup>
- Germany, Belgium, and Switzerland recover over 90 per cent of aluminium cans compared to the UK’s 55 per cent.<sup>48</sup>
- A concerted infrastructure strategy for remanufacturing, which saves at least 70 per cent of input resources compared to new goods, could have the scope to bring the UK’s remanufacturing rate up from one per cent towards 50 per cent, which is consistent with existing industry best practice.<sup>49</sup>

## Endnotes

- <sup>1</sup> The IMF indices are dollar based indices while the UK CPI is sterling based. Correcting for the exchange rate movements would actually lead to a slightly stronger upward trend in commodity prices in sterling terms as sterling was slightly weaker against the dollar in 2013 than it had been in 2003 (1.64 in 2003 versus 1.56 in 2013)
- <sup>2</sup> IMF, *Commodity Price Indices*; ONS, *Consumer Price Index (CPI)*. All prices expressed as indices where 2005=100
- <sup>3</sup> World Bank, *Commodity Price Indices - annual indices, 2010=100, 1960 to present, real 2005 US dollars*
- <sup>4</sup> IMF, October 2013, *World economic outlook database*
- <sup>5</sup> ONS, CPI data showing year-on-year change for: energy & unprocessed food (DKD7) and CPI, excluding energy and unprocessed food (DKC7)
- <sup>6</sup> Such policies were thought to have actually lowered bills overall due to increased energy efficiency. Source: Department of Energy and Climate Change (DECC), *March 2013 Estimated impacts of energy and climate change policies on energy prices and bills*, pp 8-10
- <sup>7</sup> A very detailed analysis of the pass through of energy prices, conducted by staff at the European Central Bank for euro area countries, found that indirect effects of energy price shocks can be large: about 60 per cent of the size of the direct effect, and the combined indirect/second round effects can exceed the direct effects of the shock. See ECB, August 2010, *Monthly Bulletin*, table 3, p 91
- <sup>8</sup> OECD *Economic outlook 2008*, table 4.1, p 250. The OECD use a slightly different terminology and describes these as direct effects' which is equivalent to the 'first round effects described here.
- <sup>9</sup> Energy (net import dependency ratio): DECC, 2012, *Energy trends*; and DECC, 2012, *UK energy in brief*; Food (approximation of net import dependency ratio, using inverse of food production to supply ratio): Defra, *Food statistics pocket handbook 2013*
- <sup>10</sup> This would depend crucially on the reason why the shock did not happen in the first place. If, for instance, the supply of commodities had responded to increasing demand, without leading to rising prices, then it is likely that world output would have been higher leading to increased demand for UK exports and, therefore, stronger UK growth. If, alternatively, global demand for commodities had been weaker, perhaps due to a slower emergence of the BRIC nations, then global growth would have been lower, leading to lower UK exports and slower UK growth. The thought experiment here can be seen as best representing a situation where the global resource price shock did not happen, due to a combination of both stronger global supply and weaker global demand, leaving resource prices and global activity broadly unchanged.
- <sup>11</sup> The table on the Bank of England letters actually sent, shows that only six of them occurred at times when CPI excluding unprocessed food and energy inflation was over three per cent. However, this is not the whole story, as the maximum frequency of letters is one every three months. Hence, to work out when letters would be needed, it is necessary to implement a rule that a letter is only sent if inflation is more than one percentage point above the target and no letter was sent in the preceding two months. Using this rule on the monthly CPI excluding unprocessed food and energy inflation series results in seven letters being needed. These relate to inflation overshoots in January, April and November 2010 and February, May, August and November 2011. As the CPI data are released the following month, the letters would then all have been sent one month later.
- <sup>12</sup> The governor of the Bank of England was explicit about this approach in a number of letters. For instance, in June 2008 when he stated that: "It is crucial that prices other than those of commodities, energy and imports do not start to rise at a faster rate. That would happen if those making decisions about prices and pay began to

expect higher inflation in the future and acted on that. It could also happen if employees respond to the loss of real spending power that results from higher commodity prices by bidding for more substantial pay increases”

<sup>13</sup> If all monetary authorities take this view, then it may be the case that monetary policy is too loose at the global level. If there were only one world central bank, it would probably adopt a different approach and treat trend rises in commodity prices as a sign of excessive global demand in relation to the available supply.

<sup>14</sup> It is sometimes suggested that measures of underlying inflation, such as CPI excluding food and energy, are only for central bank officials who don't drive or eat. An illustration of the communication challenge can be seen in the *Wall Street Journal* article 'Bernanke recasts his language on inflation', 15 March 2011

<sup>15</sup> ONS, *Annual survey of hours and earnings*, 'Median gross weekly earnings, all employees', table 4; data spliced in 2004, 2006 and 2011 to account for breaks and provide a consistent series; divided by CPI and CPI, excluding energy and unprocessed food (both rebased to 2003=100)

<sup>16</sup> Alternative spending on food and fuel calculated by rebasing 2012 spending to 2003 fuel and food prices using the electricity, gas and other fuels (D7CH) and food & non-alcoholic beverages (D7BU) sub-indices of the CPI and rebasing to 2012 in line with increases in the CPI, excluding energy and unprocessed food.

<sup>17</sup> ONS, *Family spending survey*. Share of weekly spending on electricity, gas and other fuels (not-transport) and food & non-alcoholic drinks, divided by total weekly spending. The poorest are the lowest income quintile (combining the lowest two deciles), whilst the richest are the highest income quintile (combining the top two deciles).

<sup>18</sup> See: P Levell and Z Oldfield, 'The spending patterns and inflation experience of low income households over the past decade', in *IFS Commentary C119*, 2011, Institute for Fiscal Studies

<sup>19</sup> Our calculations are slightly different from

those of the IFS. We cover a different period (2003-13) and take an average household spending pattern using non-equalised data. We used non-equalised data, as annual household survey data are available back to 2003 and it allows a more detailed decomposition by expenditure category. Nevertheless, despite the differences in data and period covered, the IFS also reports a higher inflation rate for the lower incomes deciles and a spread of around 0.3-0.4 percentage points in inflation rates.

<sup>20</sup> This uses ONS *Family spending survey* data combined with corresponding sub-indices from the CPI. Weights for the consumption baskets of each decile reflects the average spending patterns of each decile over the period 2001-12. It uses non-equalised data.

<sup>21</sup> Sources and calculations as before, but this reports standard deviation in decile specific annual inflation rates

<sup>22</sup> See: McKinsey Global Institute as reported by Reuters, 25 September 2013, 'Too soon to say commodity super cycle over: McKinsey'

<sup>23</sup> See, for instance, the discussion in the Bank of England's *Inflation report*, November 2013

<sup>24</sup> IEA, *World energy outlook 2013*

<sup>25</sup> OECD-FAO, *Agricultural outlook 2013-20*

<sup>26</sup> When making forecasts at horizons beyond one to two years ahead, one is unlikely to do systematically better than taking some historical norm, such as the past average growth rate. To illustrate this, see the Bank of England's projections for GDP from November 2013. The two year ahead projection for the annual rate of growth is for 2.37 per cent (in the year to 2015, q4) but the probability of it being in the range two to three per cent is only 26 per cent and the probability that very large errors are made, ie growth either below one per cent or above four per cent, is 33 per cent.

<sup>27</sup> European Central Bank *Monthly Bulletin*, May 2013 'An assessment of Eurosystem staff macroeconomic projections', pp 71-83

<sup>28</sup> *The Economist*, 4 May 1999, 'The next shock?'

<sup>29</sup> D Benton and J Hazell, 2013, *Resource*

resilient UK: a report from the Circular Economy Task Force, (p 9) Green Alliance. This report contains references to the work mentioned in the quotation.

<sup>30</sup> OECD-FAO Agricultural outlook 2013-20

<sup>31</sup> IMF, October 2013, *World economic outlook database*

<sup>32</sup> IEA, *World energy outlook 2013*

<sup>33</sup> OECD-FAO, press release, *Agricultural outlook 2013-20*

<sup>34</sup> See the discussion on this issue in: Z Ebrahim and O R Inderwildi and D A King, January 2014, 'Macroeconomic impacts of oil price volatility: mitigation and resilience', in *Frontiers of Energy. Leaving aside possible impacts on volatility, it is likely that there will be a continuing need for financial mechanisms for risk management of commodity resource costs. With appropriate regulation, and given our traditionally strong financial sector, this may represent an economic opportunity for the UK.*

<sup>35</sup> B Lee, F Preston, J Kooroshy, R Bailey and G Lahn, 2012, *Resources futures*, (Executive Summary, p1), Chatham House

<sup>36</sup> For a useful review of these issues see: Z Ebrahim, O R Inderwildi & D A King, January 2014, 'Macroeconomic impacts of oil price volatility: mitigation and resilience', in *Frontiers of Energy*

<sup>37</sup> For a discussion on this, see B Lee, F Preston, J Kooroshy, R Bailey and G Lahn, 2012, *Resources futures*, Chatham House

<sup>38</sup> Bloomberg, 29 March 2006, 'Argentine beef prices fall; export ban boosts supply'

<sup>39</sup> Institution of Mechanical Engineers, January 2013, *Global food, waste not, want not*

<sup>40</sup> World resource Institute, December 2013, *Creating a sustainable food future: interim findings*

<sup>41</sup> Next manufacturing revolution report, July 2013

<sup>42</sup> McKinsey, November 2012, *Capturing the full electricity efficiency potential of the UK*

<sup>43</sup> Energy Bill Revolution and Association for the Conservation of Energy, November 2013, *Comparing the UK and Sweden*

<sup>44</sup> P Washan 2012, *Energy Bill Revolution campaign report*

<sup>45</sup> Source: Defra, *Food statistics pocket handbook 2013*; and WRAP, November 2013, *Estimates of food and packaging waste in the UK grocery retail and hospitality supply chain*

<sup>46</sup> Global Food Security Programme, 2013, *Food waste within global food systems*

<sup>47</sup> H Furukawa, 15 March 2012, 'Status of Japanese e-waste recycling'; and WRAP, overview document, *WEEE recovery in the UK: the current situation and the road ahead*

<sup>48</sup> [http://www.alueurope.eu/wp-content/uploads/2011/07/846\\_ANNEX\\_Press-Release-Alu-bevcans-recycling-2009final26July2011.pdf](http://www.alueurope.eu/wp-content/uploads/2011/07/846_ANNEX_Press-Release-Alu-bevcans-recycling-2009final26July2011.pdf)

<sup>49</sup> Next Manufacturing Revolution report, July 2013

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