

Global commodities: a long term vision for stable, secure and sustainable global markets

June 2008



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FOREWORD BY THE RT HON ALISTAIR DARLING MP, CHANCELLOR OF THE EXCHEQUER

Commodities are an essential part of people's every day life, whoever they are and wherever they are from. They are the food we eat. They help us heat our homes. They are a critical part of the economy. Their affordability therefore matters. At the extreme, their availability is a matter of life and death.

The recent rises in the commodity prices and their volatility has therefore had an impact across the world, affecting almost all people and presenting a challenge to the international community.

The implications of continuing instability and uncertainty are wide ranging and far reaching: economic, social, political and environmental. Ensuring stable, secure and sustainable global commodity markets is therefore an urgent international priority. It requires action in the short, medium and long term; and it requires action at the national, regional and international level.

This paper sets out Britain's vision for the required international action to enable efficient and effective global commodity markets, and sets the framework for guiding the international community's response: maintaining economic stability, promoting openness, encouraging cooperation, supporting innovation and investment, ensuring fairness and mitigating and adapting to climate change.

These principles and the policies alongside them can form the basis of a coherent international response to what is one of the greatest challenges for ensuring rising prosperity, fairness and opportunity for all.



THE RT HON ALISTAIR DARLING MP, CHANCELLOR OF THE EXCHEQUER

EXECUTIVE SUMMARY

Over the past six months significant increases in global oil and food prices have led higher fuel and supermarket bills, driving inflation around the world. Pictures of food and fuel price demonstrations have served as a reminder of how important these essential items are for supporting and spreading prosperity and stability.

This document sets out a comprehensive analysis of the trends and drivers behind commodity markets looking at food, oil and other commodities and outlines the UK's long-term vision for the required coordinated international response to ensure stable, secure and sustainable global markets that are key ensuring fairness and prosperity for all.

For most of the past 50 years commodity prices have fallen in real terms, as demand and supply have risen in tandem; although this trend has been punctuated by a number of significant supply side shocks. In recent years, most prices have risen sharply. There are a number of reasons for this, both on the demand and supply side. Commodity prices are notoriously hard to forecast, even over relatively short periods, especially oil. However, on balance the expert views and market expectations reviewed here suggest that prices are likely to remain higher than their historical averages, if lower than today's levels, with continuing and perhaps more frequent shocks, driven by continuing strong demand and a continuing slow supply response. This demands a strong response at a national and international level to protect the poor and continue sustainable economic growth.

Continued population growth and rising incomes are driving demand. The world's population is predicted to rise from 6.7 billion in 2007 to 9.1 billion by 2050. Economic growth is being driven by the rise of large, fast-growing emerging economies, particularly in Asia. Improving resource efficiency will be critical in determining how this growth impacts on demand for commodities.

Supply will face continued pressure to keep up. The World Bank predicts that world grain production will have to rise by 50 per cent to meet demand by 2030. On oil, the International Energy Agency predicts that the world could be demanding an extra 30.5 million barrels of oil per day by 2030, over a third more than current levels. As the impacts of climate change increase, volatility and supply shocks will continue in the coming years and decades, most likely with increased frequency.

As basic necessities for life, commodities have a direct effect on people's welfare, in the developed and developing world alike. With some 850 million people facing hunger each day, and commodities such a significant share of personal consumption and economic activity, energy and food security are fundamental concerns for all governments, domestically and internationally. Globally, increased hunger and malnutrition, as well as the risk of fiscal pressures leading to reduced spending on health and education, threaten the achievement of the Millennium Development Goals.

Against this background, the overarching aim of the international community's policy response should be to ensure stable, secure and sustainable global commodity markets, by improving resource and in particular energy efficiency, and by stimulating supply through technological change and creating a business and regulatory environment that encourages investment in sustainable supply.

To do this will require action in the short-term to address immediate drivers of current price increases and ameliorate their impact, and in the medium and long-term to address underlying causes of inefficiency in the commodity markets, including action against protectionism. Action by the international community should be at national, regional and international level and based on the following six principles:

- **Economic stability** – anchoring inflation expectations and delivering sustainable economic growth through sound macroeconomic policies and well-targeted assistance from the International Financial Institutions.
- **Openness** – allowing markets to function effectively, removing tariff barriers and export subsidies and restrictions, promoting structural reform and allowing all countries to trade.
- **Cooperation** – reform to the shape and role of the international commodity, trade and financial institutions, greater transparency and a radically different level of dialogue between producers and consumers.
- **Innovation and investment** – stimulating supply side growth through greater expenditure on research and technology.
- **Fairness** – working nationally and through international institutions to ensure that the poor and those hardest hit by higher and more volatile commodity prices receive affordable access to the basic commodities they require.
- **Climate change** - recognising that no approach to commodities will succeed that does not consider the impact on climate change, including the need for an international agreement to limit greenhouse gas emissions, and the need to ensure that growth and development are climate resilient.

The world has adjusted to increased commodity prices in the past. The current trends can be changed, and economic growth continued, provided there is a concerted effort by all countries to enhance efficiency, invest in new technology and maintain open and fair markets.

The paper therefore argues that the required response from the international community is clear. It is not to turn inwards and adopt distorting measures. Rather, achieving the goals of food and energy security requires the international community to work together to harness the power and the innovation of the global system, underpinned by a renewed commitment to openness and fairness, to deliver more stable, secure and sustainable commodity markets.



INTRODUCTION

1.1 This paper sets out a comprehensive analysis of the trends and drivers in commodity markets that have led to the recent increases in commodity prices. It looks at food, oil, gas and other commodities, and outlines the United Kingdom's long-term vision for ensuring efficient and effective global commodity markets that are such a critical foundation of economic growth and prosperity for all.

1.2 Chapter 2 begins by examining the crucial role that commodities play in the modern global economy, and underlines how price movements have direct economic, public policy, environmental and security implications – including in different parts of the world and different parts of the economy – in varying ways.

1.3 It then continues by analysing past, recent and predicted future trends in commodity prices, recalling the general downward trends in prices in real terms over the past 50 years and identifying both long-term and short-term drivers of the current price rises. The chapter sets out a number of areas where structural changes in the global economy affect commodity prices as a whole, for example, through increasing demand in the emerging market economies, as well as identifying individual issues that have impacted on food or oil prices.

1.4 Having analysed the causes behind the recent price increases, and differentiated between long-term structural issues and short-term supply and demand shocks, the paper moves on to discuss the possible future trends in commodity prices.

1.5 Against this background, Chapter 3 examines the social, economic, political and environmental impacts and risks of high and potentially more volatile commodity prices.

1.6 Finally, Chapter 4 builds on the analysis by setting out a framework for an internationally coordinated policy response to avoid the most harmful impacts and mitigate these risks, which is based on:

- enabling stable, secure and sustainable global commodity markets;
- ensuring global markets work as efficiently and effectively as possible and ensuring arrangements are in place for managing shocks; and
- taking action against a framework of six key principles on international, regional and national levels, in the short, medium and long-term.

2

TRENDS IN COMMODITY MARKETS

2.1 This chapter examines the crucial role that commodities and commodity markets play in everyday life, and takes a backward and forward look at how the global market has developed over time. It looks at four specific issues:

- what are commodities and why they are important;
- historic trends in commodity markets;
- an analysis of recent price increases; and
- a review of potential future market behaviour..

2.2 The analysis in this section provides the background to consider the impacts of commodity market developments on the international community covered in Chapter 3, and the policy framework discussed in Chapter 4.

WHAT COMMODITIES ARE AND WHY THEY ARE IMPORTANT

Sustaining human life

2.3 Due to the importance of food in sustaining human life, food security – ensuring the physical availability and affordability of food and supply resilience – is critical. In simple terms, food is our most basic source of energy. Energy security is similarly critical for heating people’s homes, and an important input for the economy as a whole.

Vital for the economy

2.4 It is virtually impossible to think of a good or service consumed that does not require energy as an input somewhere along the production chain. In manufacturing, metals and petroleum products are used extensively. In agriculture, chemical products such as fertilisers are crucial inputs. Even in the service sector, the energy used to heat and light offices or retail premises represents an important cost. While food does not typically make up a significant proportion of businesses’ input costs, it is a key use of what is often their largest cost, the wages and salaries of employees.

An important asset class

2.5 Some commodities, notably precious metals, are also held as an investment asset. This is particularly true of gold, which is often regarded as the safest of assets in times of uncertainty and as a hedge against inflation. Income from commodities is playing an increasing role in global investment flows, especially in the context of Sovereign Wealth Funds (SWFs), which are government-established investment vehicles, funded in many cases by oil and commodity revenues.

2.6 Commodities, as natural resources, also have an important environmental impact in terms of how they are extracted, produced, used and consumed.

Features of commodity markets

2.7 A commodity is a physical substance, such as food or oil, that is interchangeable with another substance of the same type, in other words they are homogenous goods. Commodities are traded on over-the-counter and on exchanges, which bring buyers and sellers together without the underlying commodity being physically present. In recent years, the global trading of commodities, and particularly the trading of derivative products related to commodities, has expanded rapidly.

2.8 As with nearly all goods and services, the price of commodities is determined by the balance of supply and demand in the marketplace. There are, however, a number of

features of commodity markets, particularly the oil and food markets where recent developments have had such an impact on people's lives, that distinguish them from the markets for many other goods and services. These features are important underlying factors explaining the trends in prices discussed in this chapter.

Demand does not change much with price

2.9 Within the consumption basket of households there are certain items that are essential to our daily lives. In every country of the world these essential items include food and, in some form, energy. Households will typically be unable to vary greatly the volume of food and energy they consume in response to the price of such items: in other words, in the short term demand is inelastic to changes in prices. In the longer run, as historical precedents demonstrate, demand does change with price as new more energy-efficient technologies become available. The resource efficiency of demand has also an important impact on the rate of climate change.

Neither does supply in the short term

2.10 In the short term, it is also difficult for suppliers of commodities to increase output in reaction to the profit opportunities offered by higher prices. In the case of food, higher prices this year might prompt farmers to increase grain production, but the supply will not be available until at least the following harvest. In the case of oil, once any spare capacity has been exhausted, the time lag between higher prices and additional supply can be even longer. In the short term, therefore, supply is also relatively inelastic to changes in price.

So shocks can have a big impact on price

2.11 The combination of inelastic short-term demand and inelastic short-term supply in many commodity markets means that, in the short term, unanticipated changes in demand or supply will tend to generate price volatility. The geographical concentration of production of individual commodities, and the importance of such factors as the weather, means that many markets are prone to periods of supply disruption. Some commodities, especially oil, are also concentrated in areas of high geo-political tension that adds to the risk of disruption. Such temporary disruptions serve to exacerbate price volatility.

Box 2.1: What are 'non-energy' and 'non-food' commodities?

Among commodities most attention tends to be paid to energy prices, because of the importance of energy as a consumption and production good, and more recently to food prices. However, other commodities also play an important role in the world economy. 'Non-energy and non-food' commodities can broadly be split into three groups:

- 'base metals' – industrial metals including copper, aluminium, iron ore, lead, tin and zinc;
- 'precious metals' – including gold, silver, and platinum; and
- 'agricultural raw materials' – which are non-food agricultural goods, often used as a production input, including timber, rubber, cotton, wool and animal hides.

Non-energy and non-food commodities are important for many of the same reasons as commodities as a whole. Like food prices, the prices of agricultural raw materials may be particularly important to the farming sector, while like energy, base metals are an important input to many industrial production processes, and their prices can have direct consequences for the profit margins in some industrial companies.

In addition to the general considerations, base metals may be of particular interest because of their close relationship with economic industrial activity. Because of their role as an input in industrial production, base metals are highly sensitive to changes of economic activity, and often provide a leading indicator of future activity. Precious metals, as well as being consumption goods for use in jewellery, are also purchased as investment goods, particularly those metals that are seen as providing a good store of value.

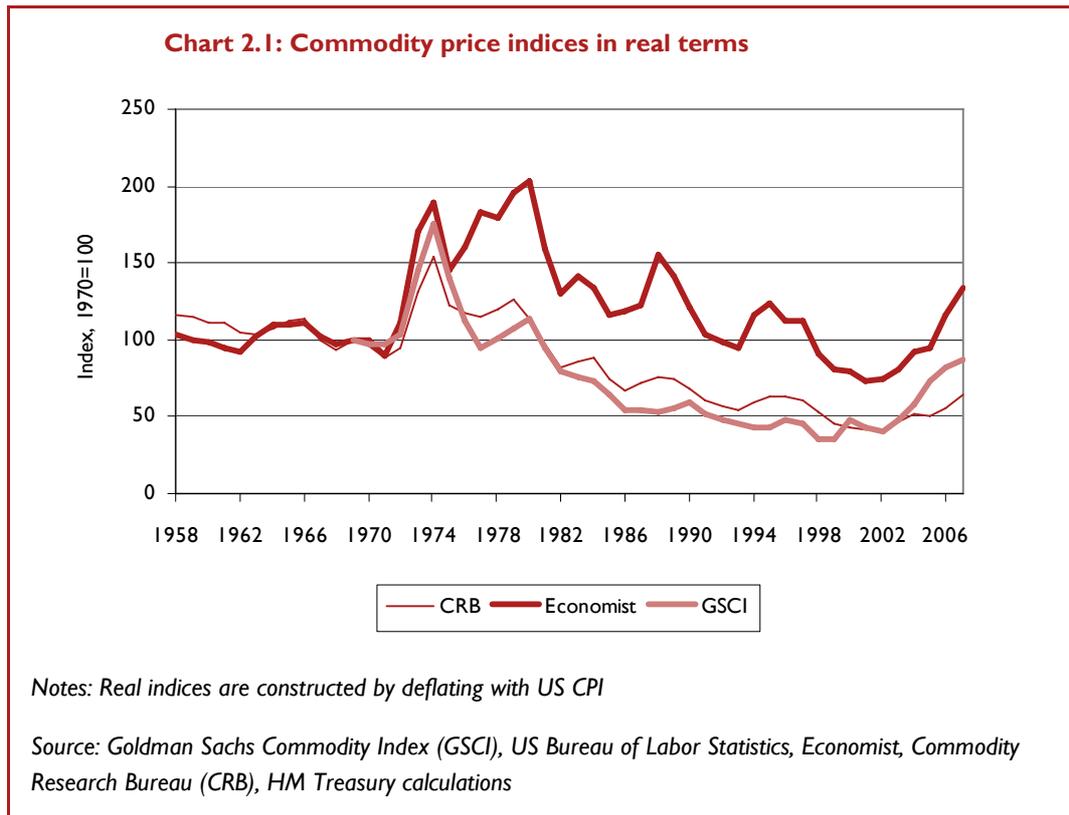
The price of gold in particular is influenced by developments in investment markets because it is often seen as providing a safe haven for investors in times of crisis and high uncertainty (since other financial assets, such as equities, tend to perform poorly during turbulent economic times, and because there is no counterparty risk to holding gold). Related to this, gold can provide a hedge against inflation, since while the value of other financial assets is eroded by inflation, it should maintain its value because of its scarcity as a precious metal. Given its historical role as a means of exchange, gold is also often treated as a currency in its own right, and thereby provides a hedge against uncertain currency movements, particularly for the US dollar.

HISTORIC TRENDS IN COMMODITY MARKETS

General factors

2.12 Commodity prices have fallen in real terms over the past 50 years. Chart 2.1 demonstrates this, setting out various measures of average commodity prices using different indices, deflated using US consumer price inflation.

2.13 Four separate periods can be distinguished in the data, providing historical precedents for the current price disturbances the world is seeing today. First, in the period up to 1972, prices decreased in real terms. Second, during the following ten years, a period that included a number of severe supply disruptions, commodity prices temporarily doubled. Third, the following two decades from 1982 to 2002 saw commodity prices continue to fall in real terms partly because of improving energy efficiency and growing supply. Finally, since 2002, commodity prices have experienced sustained increases, rising by up to 100 per cent.



Demand increasing

2.14 A number of supply and demand factors underpin these developments. Strong income growth, underpinned by population growth, has been the main demand side factor. Global real GDP growth averaged around 3 ½ per cent between the early 1960s and 2002. This represents a total increase of 350 per cent over the period. During this time, the world's population doubled from three to six billion people. The impact on commodity demand was moderated by large improvements in the efficiency of their use: the energy intensity of GDP, for example, fell by about a quarter between 1980 and 2005.¹

With supply responses

2.15 That real prices have not, on average, increased over the past 50 years is a reflection of supply being able to keep up with demand and as set out above energy intensity has dropped significantly despite economic growth, largely due to the responses of the advanced economies to the oil shocks of the 1970s. The biggest supply-side factors have been improvements in technology, market structure and competition, which have driven up productivity in the commodities sector.

But with periodic supply-shocks

2.16 These factors, on balance, have meant that price spikes have only been sporadic, but when they have occurred, they have been significant. During the 1970s, a number of sudden supply-side shocks sent commodity prices considerably higher. This included the oil price shocks of 1973 and 1979, as well as occasional short-lived weather-related disruptions to the production of food. The price changes announced by Organization of Petroleum Exporting Countries (OPEC) in 1973, which helped to precipitate the oil shock, is an example of how cartel behaviour has had an influence on commodity markets; this is discussed more widely in Box 2.2. The use of some metals as stores of value and inflation hedges (see Box 2.1) also led to spikes in their prices during the 1970s.

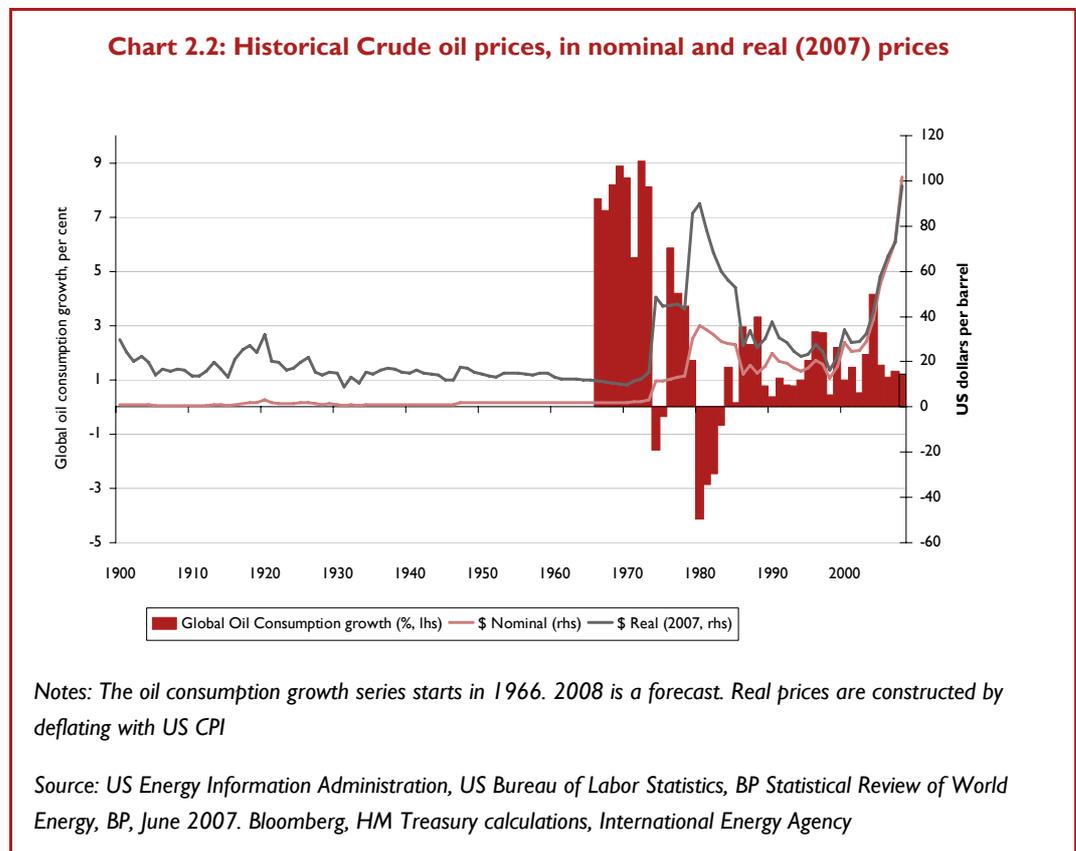
¹ Source: World Development Indicators, World Bank

2.17 The following sections discuss these historic trends in more detail for oil, food and other commodities.

Oil

A history of supply shocks

2.18 After falling for most of the twentieth century real oil prices spiked in the 1970s as a result of geopolitical tensions in the Middle East. In October 1973 the Arab oil embargo, following the Yom Kippur War, and OPEC price changes caused prices to rise by over 200 per cent in the space of a month. This took place at a time when the world financial system was already under pressure from the breakdown of the Bretton Woods system of fixed exchange rates, and the uncertainty that resulted. This set large parts of the developed world on a series of recessions and high inflation that persisted until the early 1980s. The effect was compounded by the impact of the 1979 Iranian Revolution and the 1980 Iran-Iraq war, which caused Iranian oil production to drop by two thirds over the space of two years and a doubling of oil prices. These price trends are set out in Chart 2.2.



Box 2.2: Cartels in commodity markets

Cartels exist to restrict competition in order to raise prices and boost profits. To be effective, cartels need to be able to limit production below what would be produced in a competitive market, and ensure all members are complying with their quota. Monitoring and enforcing compliance within a cartel is easier and more effective when there are only a small number of producers in the market, and the market is sufficiently transparent for the production choices of each producer to be observed. If these conditions are not met, it is likely that each player will “free ride” by exceeding their individual quota, but hoping that others will observe theirs, thus keeping prices high. If each member of the cartel behaves in this way it will quickly break down and all market power will be lost.

Some primary commodities lend themselves to being the subject of cartels, because the production or extraction of the commodity is possible in only a few countries or regions, naturally restricting the number of players in the market. This prevents competitors from outside the cartel entering the market.

The Organisation of Petroleum Exporting Countries (OPEC), formed in 1960, is the best-known commodity cartel. Oil is particularly suited to being the subject of a cartel as it is only extractable in significant quantities at an economic cost by a relatively small number of countries.

The 13 members of OPEC control around 42 per cent of global oil production, and around 78 per cent of proven reserves. Although in previous decades OPEC has been very important in influencing oil prices, for example, the oil embargo of 1973 when its members accounted for 53 per cent of global production, this market power is now much reduced. OPEC now has limited spare capacity, with only Saudi Arabia retaining a significant margin of spare capacity and most of that is unsuited to the current composition of the refinery sector. Historically, OPEC members have also proved unwilling to keep production within agreed quotas, further reducing the organisation’s influence over prices.

However, OPEC members, and some other large oil producers such as Mexico, have a greater impact on world prices through their market structure. Most of these countries retain large, state-owned national oil companies (NOCs) that own the rights to extract oil in their country. International oil companies (IOCs) have limited or no access. This is likely to restrict production levels.

In contrast, the gas market is not well suited to cartel behaviour. Although gas reserves are also geographically concentrated, pipeline gas is generally traded on the basis of long-term, bilateral contracts, and thus achieving the coordination and transparency a cartel requires is difficult. Besides, such contracts already typically involve prices some way above marginal costs. The Liquefied Natural Gas market is more similar to the oil market in structure, and therefore as this market develops and matures the possibility of a gas cartel may emerge in the long run.

International cartels of agricultural commodity producers also have a weak track record. For example, the Association of Coffee Producing Countries attempted to control coffee prices for eight years, but disbanded in 2001 after failing to have a significant impact on global prices. Despite its members accounting for over 70 per cent of the world’s coffee supply, their failure to respect agreed production quotas meant that the association had little market power. In May 2008 the Thai government suggested a rice cartel with its south-east Asian neighbours, but the proposal received little support. Rice importing countries criticised the distortion in food markets a cartel would create, whilst the difficulties in allocating and coordinating production quotas among millions of rice farmers were raised to illustrate its unfeasibility.

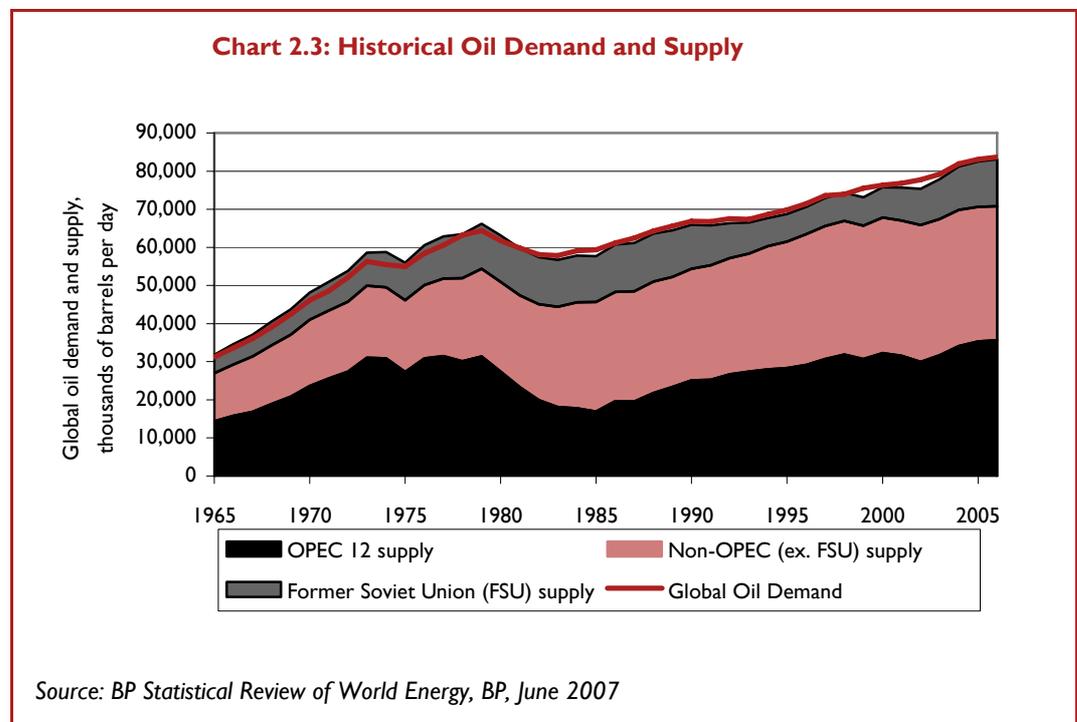
2.19 Prices declined in nominal and real terms throughout much of 1980s until the Iraqi invasion of Kuwait in 1990, which caused prices to spike again. After the Gulf War and the liberation of Kuwait in early 1991, prices returned to their declining trend. In 1998, increased OPEC production coincided with stagnant growth in Asian oil demand, due to the Asian financial crisis, sending oil prices below US\$10 again. However, strong world oil demand, OPEC production cutbacks, and other factors, including weather and low inventory levels subsequently caused oil prices to triple between January 1999 and September 2000. This increase was interrupted briefly by the global recession in 2001. However, robust demand growth from outside the advanced economies prevented prices from falling significantly, and this phenomenon has set the backdrop for recent price increases.

Long-term trend is increased demand and supply

2.20 Overall, these shocks notwithstanding, the long-run trend of the past 50 years has been one of rising demand and supply in a growing world economy. Since 1965, oil consumption has risen by over 150 per cent, with growth since the mid-1980s increasingly coming from the Asia Pacific region.² Chart 2.3 demonstrates the overall growth in the demand and supply.

2.21 Alongside this, non-OPEC producers increased supply by 10 million barrels per day during the period of 1980 to 1986. This reduced OPEC's market share from its peak of above 50 per cent in 1973 to below 30 per cent in 1985.

2.22 The balance within non-OPEC producers has also shifted over time. In the 1980s production in the developed economies increased significantly, for example, from the North Sea and Alaska. As production in these regions has declined, today's new sources of non-OPEC production are more focused on the non-advanced world, for example, Mexico and African countries such as Angola.

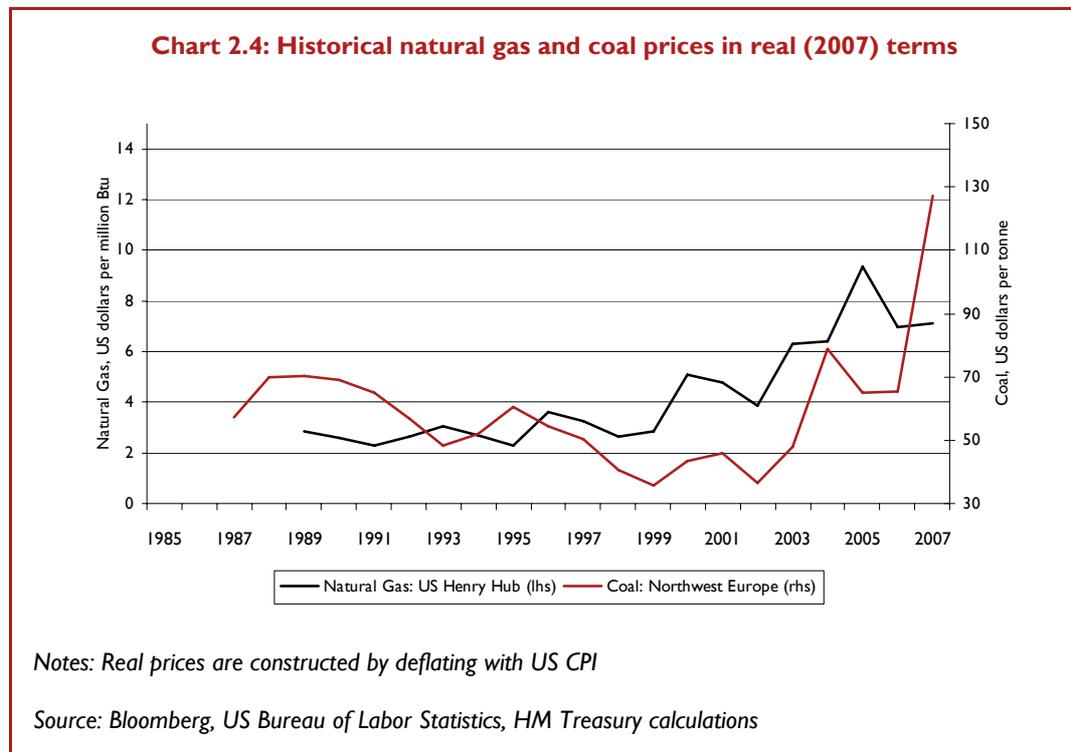


² BP Statistical Review of World Energy, BP, June 2007

2.23 Previous price increases stimulated the introduction of price controls and subsidies: for example, the US introduced price controls on domestically produced oil in an attempt to lessen the impact of the 1973-74 price increase; and the release of strategic inventories. Both supply disruptions in the 1970s, and subsequent price rises in the 1990s and 2000s, were preceded by periods of robust demand growth.

2.24 Previous significant price increases have also driven demand reduction and oil substitution strategies: between 1980 and 1986 the G7's oil consumption declined by around 7 per cent; the oil intensity of the G7 economies fell by over 38 per cent between 1980-1986; oil declined from 53 to 49 per cent of the G7's overall energy consumption between 1980-1986;³ and consumers have sought alternative energy sources: for example, Brazil's development of a bioenergy sector.

Other Energy



Natural Gas 2.25 The price of natural gas declined steadily through much of the 1980s and 1990s, but has since picked up significantly as illustrated in Chart 2.4. As a natural co-product of oil and coal extraction, natural gas has been used since the 1800s, primarily as a source of light. Historically, transportation has limited the use of natural gas. Since the introduction of technology for its transportation, the use of gas as a source of energy has increased significantly, with consumption increasing by over 300 per cent since 1965, dwarfing the 150 per cent growth in oil consumption.⁴ Up until the 1990s, the former Soviet Union and Europe accounted for much of this growth.

2.26 Traditionally, gas was not traded in the global market like oil, but supplied under long-term contracts linked to the price of oil; this relationship is discussed in Box 2.3. Gas markets are essentially regional, fed either by piped gas or more recently by

³ BP Statistical Review of World Energy, BP, June 2007; World Development Indicators, World Bank; and HM Treasury calculations

⁴ BP Statistical Review of World Energy, BP, June 2007

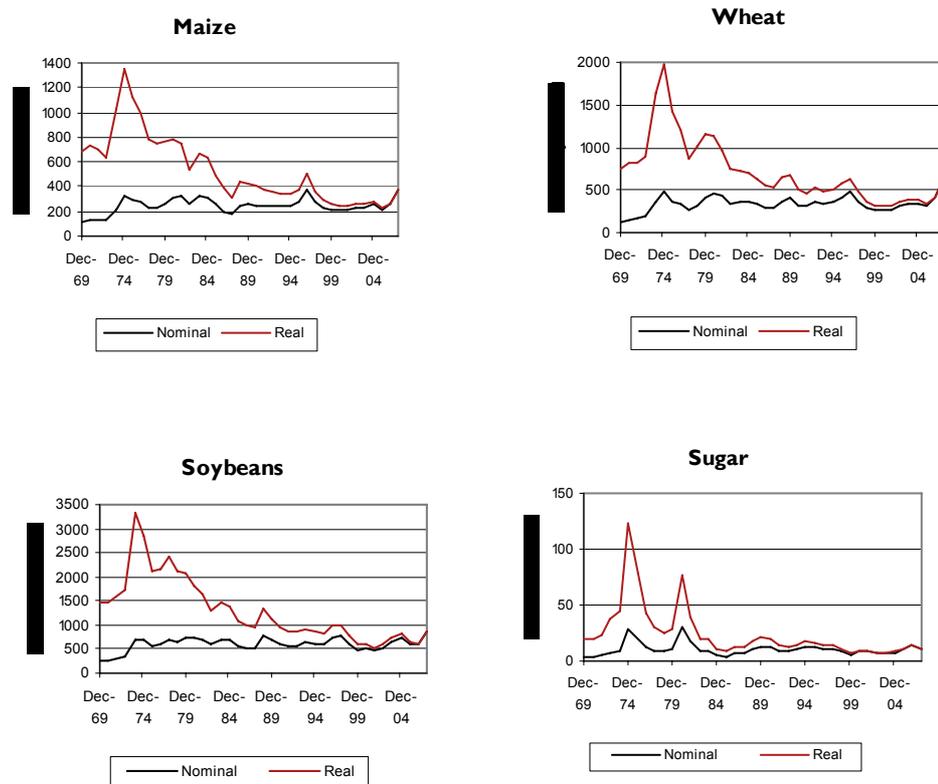
dedicated Liquefied Natural Gas (LNG) supplies (with the LNG supply route functioning as a “virtual pipe-line”).

Coal 2.27 The nominal price of coal remained relatively stable throughout the 1980s and 1990s, meaning that real prices fell over this period, despite rising demand with a significant impact on global carbon emissions. This is illustrated by Chart 2.4.

Food

2.28 Prices of most agricultural commodities have also been on a downward trend in real terms over the last three decades.

Chart 2.5: Monthly agricultural commodity prices in nominal and real (2007) terms



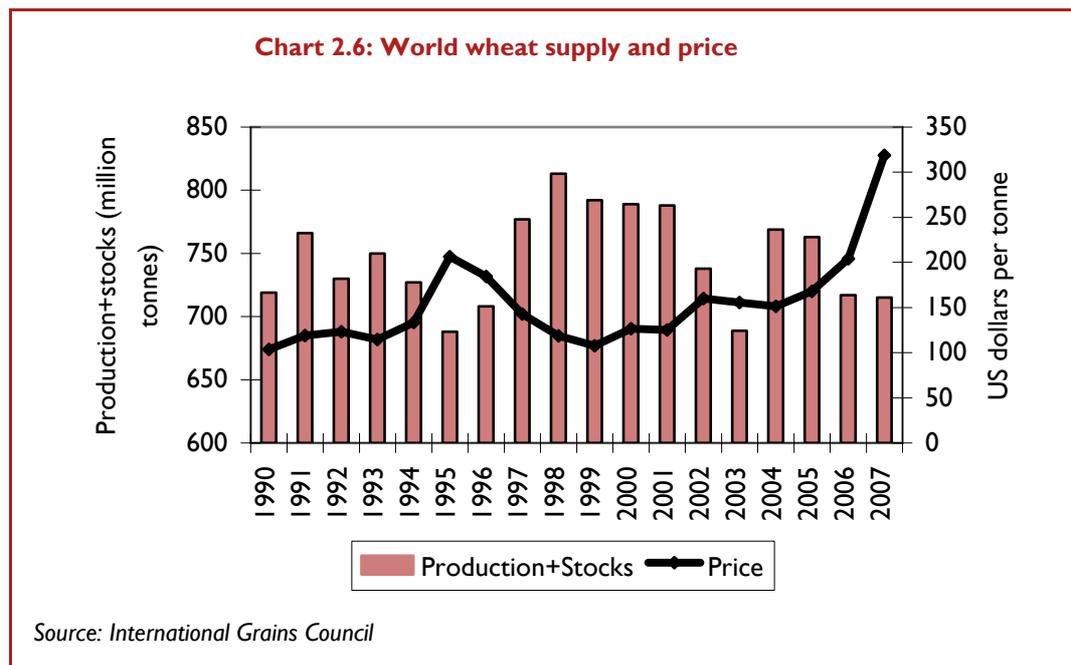
Source: Chicago Board of Trade and IntercontinentalExchange, US Bureau of Labor Statistics, HM Treasury calculations

2.29 Chart 2.5 shows average world prices for wheat, maize, sugar and soybeans from 1969 to April 2008, in real and nominal terms. The long-run downward price movements reflect that supply has kept up with increasing demand. This is primarily as a result of technology-driven improvements in productivity and yields, such as during the ‘green revolution’ in the 1960s, which was based on improved varieties of wheat, rice and maize suited to smallholders in developing countries. For example, it is estimated that the production of wheat, rice and maize has roughly doubled between 1971 and today. Most increased agricultural production has come from increased yields, rather than greater land use.

Supply shocks in the 70s and 90s 2.30 In 1972-73, coinciding with the oil crisis, global agricultural production was affected by bad weather leading to poor harvests. The former Soviet Union – one of the worst affected areas – bought huge quantities of grain on the world markets, reducing

world grain inventories to their lowest level for two decades. These factors caused wheat prices to treble between mid-1972 and mid-1973. Various national policies to encourage production coupled with improved weather brought prices down over the next three years.

2.31 In 1995, again as a result of a bad harvest, there was a production shortfall of 5 per cent compared to the previous year. Coupled with a significant increase in demand, this led to a reduction in global inventories of nearly 15 per cent compared to 1993 levels and wheat prices rose by over 50 per cent, as chart 2.6 demonstrates. In 1996-97, global production and inventories recovered as more cereals were planted in response to the higher prices. Within two years, global prices had returned to pre-1995 levels.



Other commodities

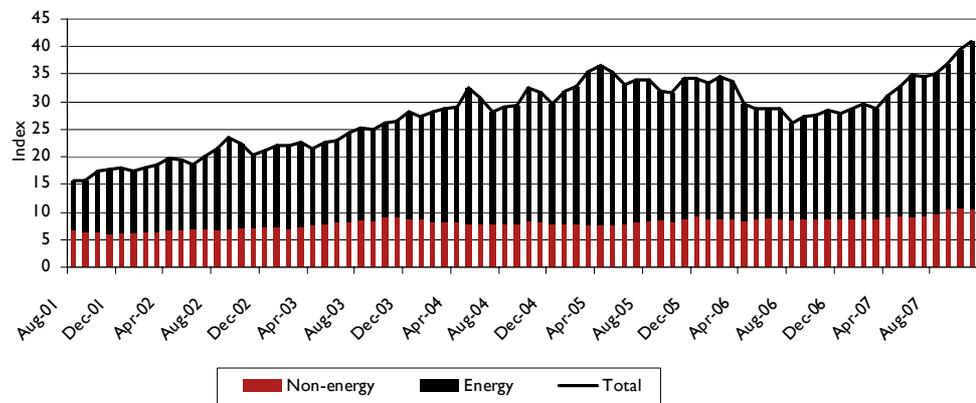
2.32 In real terms, the prices of many industrial materials, and particularly industrial metals, also fell for much of the last century, reflecting technological gains and increasingly effective means of extraction. A number of peaks and troughs have been observed around this declining trend as demand for these industrial inputs has varied with the business cycle. Individual metals prices have also spiked at different points, similarly to food and oil, reflecting market-specific factors: gold, for example, saw a considerable price spike during the 1970s oil shock, as investors sought a hedge against inflationary pressures.

ANALYSIS OF THE RECENT PRICE INCREASE

General factors

2.33 In contrast to the long-term downward trend in the late twentieth century, since 2002 average real commodity prices have increased markedly. Chart 2.7 shows recent movements in real prices, decomposed into the contributions from energy and non-energy commodities. An increase can be seen in both indices, most noticeably in the case of energy commodities since 2002 and in the case of non-energy commodities since 2006.

Chart 2.7: GSCI commodity price indices, in real terms by energy and non energy contributions



Source: Goldman Sachs Commodity Index, US Bureau of Labor Statistics, HM Treasury calculations

Demand factors 2.34 A number of general factors have contributed to the sharp increase in commodity prices. On the demand side, these include:

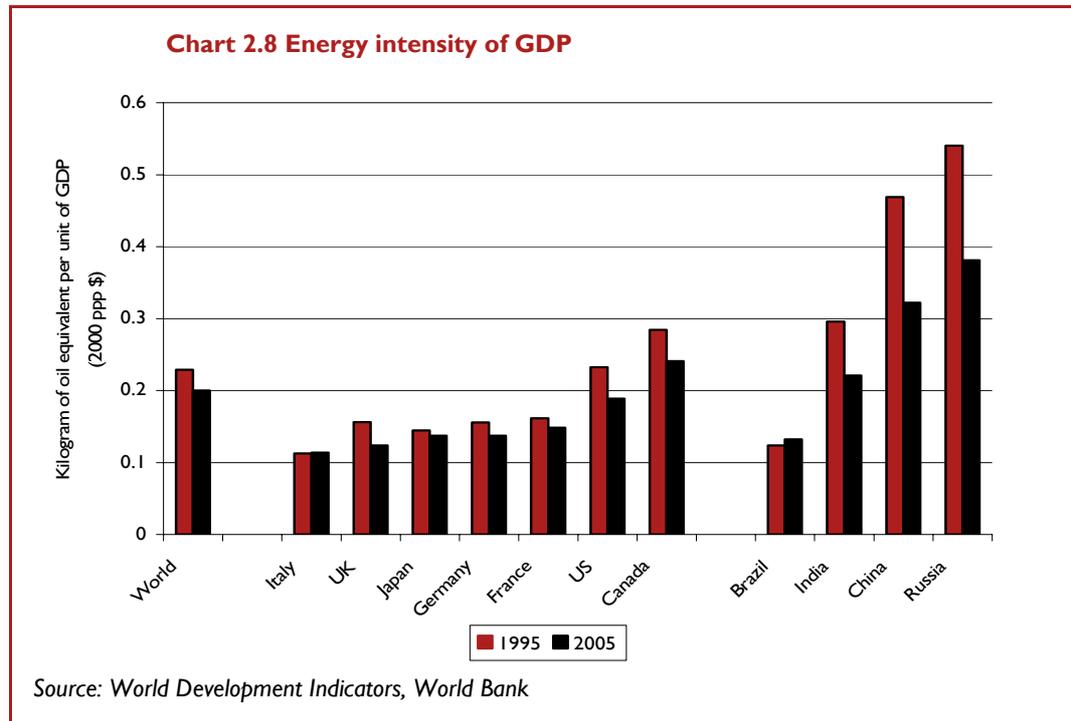
- steadily rising population;
- strong economic growth;
- slower improvements in efficiency of resource use, in particular in terms of energy intensity; and
- in the past year, decreasing interest rates and depreciation of US dollar.

2.35 The period since 2002 has been one of strong global growth. Between 2003 and 2007, the International Monetary Fund (IMF) estimate that world GDP grew by a total of 21 per cent in real terms. This represents an average annual growth rate of 4.5 per cent, compared with an average of around 3 per cent since 1980.

2.36 In April 2003, the IMF's forecast for world GDP growth over the following three years was below 4 per cent a year. Similarly, the consensus view was that the advanced economies would lead the recovery following the 2001 recession, with the IMF forecasting annual Chinese GDP growth to be just 7 ½ per cent in 2003-04. Instead, Chinese growth has been over 10 ½ per cent since 2003, contributing to strong emerging market activity, which has outstripped growth in the advanced economies by even more than expected earlier this decade.

Resource efficiency 2.37 The composition of world activity matters because energy intensity remains higher in the emerging economies than in advanced economies, as illustrated by Chart 2.8. For example, China consumes twice as many barrels of oil to deliver a dollar's worth of GDP, compared to the G7 economies. This means that as global growth will be driven by the emerging economies over coming years, that growth will be less resource efficient than equivalent growth in advanced economies. This is partly the result of these countries' stage of development reflected by Chinese investment in African natural resources, but it does put more upward pressure on prices, partially offsetting the global energy efficiency gains of recent years. Although over time energy efficiency

of emerging economies should continue to increase and converge towards advanced economies.



Supply factors 2.38 On the supply side, there are a number of reasons why producers have not been able to increase supply sufficiently to meet rising demand at previously prevailing prices:

- there have been restrictions on the immediate availability of supply. A number of conflict and weather related events have had an effect on some countries' productive capacity. Political interference, and the effect of government policy, has also been a factor in limiting supply of some commodities;
- producers have been slow to respond, in terms of investment in productive capacity, for a variety of reasons, including uncertainty about future demand, time lags and resource nationalism;
- the increased cost of a number of inputs into the production process of commodities, such as freight, energy and labour, have reduced the return on investment in new production. The impact of oil prices on other commodity prices is discussed in Box 2.3; and
- the depreciation of the US dollar and other financial market activity have also had an impact on commodity markets. The next section of this chapter will expand on some of these factors.

Box 2.3: Impact of high oil prices on other commodity pricesGeneral impact on commodities

The price of most commodities is heavily linked to the oil price. Oil is often a component of the production function of most primary commodities. Some commodities have to go through an energy-intensive primary processing stage (e.g. metals such as aluminium). Other commodities can be used to produce substitutes for crude oil (e.g. maize and sugar for ethanol production or rapeseed and other oils for biodiesel production). In other cases, the main input may be a close substitute for crude oil, such as natural gas, which is used when making nitrogen fertilizer.

Other energy commodities

Gas and coal constitute key substitutes for oil products (fuel oil and gas oil) in the industrial, heating and power generation sectors. The higher oil product prices, the greater the incentive to switch to alternatives, and hence the greater the demand and price for alternatives. This substitution dominates the relationship between oil, gas and coal in the US.

In Europe, the impact of oil prices on natural gas prices is mainly through the contractual terms between suppliers and consumers of gas. The impact is smoothed and lagged, with analysis showing a close linkage between a three month rolling average of oil prices, lagged six months, and the quoted price of gas at different entry points in Europe^a.

Fossil fuel prices can also have a strong impact on electricity prices, as the wholesale price of electricity is typically determined by the short-run marginal costs of marginal power plants, which will differ in each country: for example in the UK this is typically gas-fired.

Impact on food production

The exposure of agricultural products to changes in the oil price has been a key factor in the increase of food prices. Higher oil – and metal – prices have put upward pressure on food prices by increasing production costs, through high fuel, fertiliser, transport, packaging and processing costs. In the UK between 15 and 20 per cent of farm production costs are accounted for by fuel, fertilisers and pesticides.^b Research from the World Bank estimates that a 10 per cent rise in crude oil prices translates into a 1.6 per cent increase in agricultural commodity prices^c. More recent findings from the IMF suggest that higher oil prices may explain as much as one-third of the increase in US corn prices and around one tenth of US soybean prices since January 2006. Higher oil prices also have the effect of stimulating the demand for alternative energy, feeding back once more into pressure for increased biofuels, with the potential impacts discussed in the food section of this chapter.

Impact on transport

As oil prices have increased, transport costs have increased, putting further pressure on commodity prices. The impact is particularly felt through shipping costs, which account for 96 per cent of world trade transport and 70 per cent of all the freight carried globally. Because fuel costs account for between a quarter and a third of variable costs for vessels, the recent rise in oil prices is likely to feed through to other commodities. Increased transport costs are a reflection of excess demand over supply: shipping is also supply inelastic in the short term, for example it takes around two years to build a new ship, and many ports are facing capacity pressures.

^a Department for Business, Enterprise and Regulatory Reform

^b Department for Environment, Food and Rural Affairs

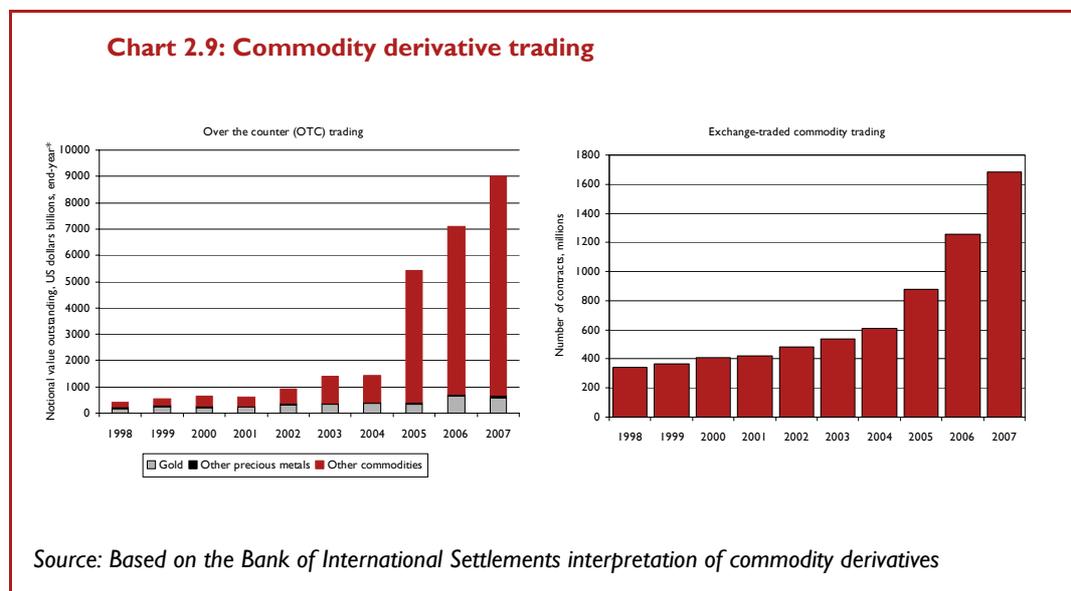
^c *Oil Spills on other Commodities*, J. Baffes, World Bank Policy Research Working Paper 4333, August 2007

The role of financial flows in commodity markets

2.39 Well-functioning financial markets are critical for well-functioning commodity markets.⁵ However, some commentators have argued that investment activity, shifting out of equities and mortgage-related products and into commodities, is causing commodity prices to inflate above their fundamental levels creating a ‘bubble’.

Investors are moving into commodity markets

2.40 Investors typically aim to hold a diversified portfolio of assets to reduce risks. A longer-term trend has been that institutional investors such as pension funds and insurance companies have been looking to diversify by investing more money into commodities. Since 2000, the level of investment in commodities has risen significantly so that commodity related assets are now regarded as an investment asset class in their own right. Chart 2.9 shows how the market has grown: the number of commodity contracts trading on exchanges has grown four-fold to reach around 1.7 billion, and over-the-counter derivatives have grown exponentially so that the notional value of outstanding contracts was US\$9 trillion in 2007.



2.41 The established ongoing shift into commodity assets has been accelerating since August 2007, most notably for oil, gold, copper and the main agricultural commodities.⁶ Data show that the move by investors away from US assets, particularly equities and asset-backed securities, coincided with a rise in the price of some, but significantly not all, commodities. There are a number of reasons for this.

2.42 Commodities have traditionally been a comparatively attractive investment during periods of economic uncertainty. Studies show that commodity-related assets have been negatively correlated with the price movements of other assets, and with the economic cycle.⁷ The current trend may have been strengthened by the combination of slowing growth and financial turmoil in advanced economies and continued commodity-intensive growth in emerging economies.

⁵ For elaboration, see: *UK discussion paper on the European Commission's review of the financial regulatory framework for commodity and exotic derivatives*, HM Treasury and Financial Services Authority, December 2007

⁶ Bloomberg, Reuters and HM Treasury calculations

⁷ See for example: *Growth in commodity investment: risks and challenges for commodity market participants*, Financial Services Authority, March 2007

2.43 Inflation uncertainty further increases the attractiveness of commodities. An inflationary environment prompts investors to move toward real assets, such as commodities and real estate, to hedge against an erosion of the value of money.

2.44 Commodity prices have also traditionally been closely affected by the value of the US dollar, with knock-on impacts for their attractiveness to investors. The IMF calculates that, in the long run, a 1 per cent depreciation of the US dollar is associated with increases for dollar-denominated gold and oil prices of more than 1 per cent. A similar if less pronounced pattern is seen for other commodities.⁸ Recent trends conform to this long-term pattern.

2.45 Dollar depreciation can make commodities cheaper in non-dollar regions, thereby stimulating their demand and depressing supply. If the depreciation is associated with lower interest rates in the US, then this will further depress commodity supply by lowering the opportunity cost of delaying extraction.

2.46 In addition, dollar depreciation can increase the overall relative attractiveness of commodities as an asset class. This is because returns on US financial assets will fall when repatriated in foreign currencies. Also, if the depreciation is associated with lower interest rates then US Treasury bills and bonds become less attractive alternatives.

Increased investment activity does not necessarily increase prices

2.47 These factors – portfolio diversification, inflationary uncertainty and US dollar depreciation – help explain the growth in investment activity in commodity derivative markets, but they do not explain why commodity prices have risen so rapidly over the same period, or whether increased investor activity has played a role. Box 2.3 reviews the available evidence of the impact of investor activity in itself, and in particular the role of so-called speculators. It finds that investment activity in the financial markets is not driving prices, although in following them it could in the short term be having a small and transitory impact. It notes however, that it is difficult to find conclusive evidence and that there are limitations in the data.

2.48 It is more likely that wider uncertainty about fundamentals in the commodities market and tight supply conditions are driving price levels and volatility in the market. In the case of oil, continued pressure on existing capacity has forced producers along a steeply upward-sloping short-run marginal cost curve, as the cost of extraction and other investment has increased sharply.⁹ Buffers against supply shocks are low because sustained demand growth and production problems have reduced spare capacity and put pressure on inventories. This will lead to a greater pass through of shocks to prices and so enhancing price volatility. A similar pattern is observed for other commodities; for example, the global food market is traditionally comparatively thin.

2.49 Market uncertainty about future supply conditions may also lead to producers demanding a higher risk premium to increase supply in the market. This will, in turn, feed through to higher prices. This points to fundamentals in the commodity market impacting on investor behaviour in determining prices rather than investor activity itself. In turn, this implies the correct policy response should focus on tackling these fundamental demand and supply conditions. These fundamentals are discussed in more detail in the rest of this chapter.

⁸ *World Economic Outlook: Housing and the Business Cycle*, International Monetary Fund, April 2008

⁹ *The Revenge of the Old Political Economy*, Goldman Sachs, March 2008

Box 2.4: Investment activity and commodity prices

A well-functioning financial derivatives (e.g. future and options) market supports a well-functioning commodities market. Speculation, hedging and arbitrage, are all important elements of this. Commodity consumers typically want to offset the future risk of rising prices; producers the future risk of falling prices. Investment activity helps offset these positions, allowing producers and consumers to manage risks. Investors engaging in speculation activity also have a strong financial incentive to bring all available information to the market, and thereby facilitate the price discovery function of the market.

Investors engaging in commodity derivatives need not, in principle, have any effect on the underlying physical demand and supply for commodities, and therefore its spot price.^a This is because these investors do not need to take actual delivery of crude oil or grain; in fact, most investors settle their contract before delivery, either by selling the contract to a genuine consumer or settling with cash.

However, the relationship is more complicated than this. Futures markets can signal expectations about the future direction of prices and can influence a producer's decision whether to hold on to inventories. This can, in turn, feed through to the spot price. It is therefore necessary to test the available evidence to understand better the relationship between investment activity and prices:

- the data show no consistent relationship between rising investment activity and prices across commodities. For example, the price of nickel has fallen by half recently, but at the same time investment activity in the metal has increased; while the scale of net buyers in oil is similar to last July when prices were half of what they are today. So there appears to be no clear correlation between investment activity and prices.
- a comparison of the prices of metals which are exchange-traded and non-exchange traded (and so cannot be easily influenced by investment activity), shows little difference in price performance, suggesting that other non-financial or structural factors are driving prices in metals.

- econometric analysis finds that, in most cases, high and rising prices attract investors into the market, not the other way around. When it is found to run in the opposite direction, it is weakly significant and short term.^b
- although investor interest has increased substantially, market participants tend to emphasise the longer term nature of the increase in flows reflecting their desire to diversify their portfolios, and argue that recent months are little different in that regard.

In addition, were financial market activity itself driving higher commodity prices, it might be expected that inventories would be increasing as prices would be above that required to clear the spot market. However, current data shows that inventories, which for food commodities have been low for some time, have continued to fall or remain stable. This reflects fundamentals in the market discussed in more detail later in this chapter.

In considering the impact of market activity, no accurate data exists to distinguish between different types of market actions. The only available data to examine the role of speculation in commodity markets is the US Commodity and Futures Trading Commission (CFTC) data on 'non-commercials'. This represents only a subset of all likely financial activity. There remains a need for sufficient information on financial flows into commodity derivatives to ensure an accurate understanding of market developments.

Nevertheless, taken together the available evidence suggests that derivative investors are not driving price increases and, although there is insufficient evidence to conclusively rule out any impact, it is likely to be only small and transitory relative to fundamental trends in demand and supply for the physical commodities.

^a In fact, fewer than 2 per cent of futures contracts result in physical delivery. Source: *Commodities Trading 2008*, International Financial Services London, June 2008

^b See, for example: Box 5.1 of Chapter 5 in *World Economic Outlook: Financial Systems and Economic Cycles*, International Monetary Fund, September 2006

Oil

Rising prices 2.50 The past six years have seen a significant increase in oil prices. From a low of US\$18 per barrel after the September 2001 terrorist attacks, oil has ended each year higher than it started and has risen to more than US\$130 per barrel in recent weeks. This unprecedented rise has reflected a broad range of factors, discussed below.

Chart 2.10: Nominal price of Brent Crude



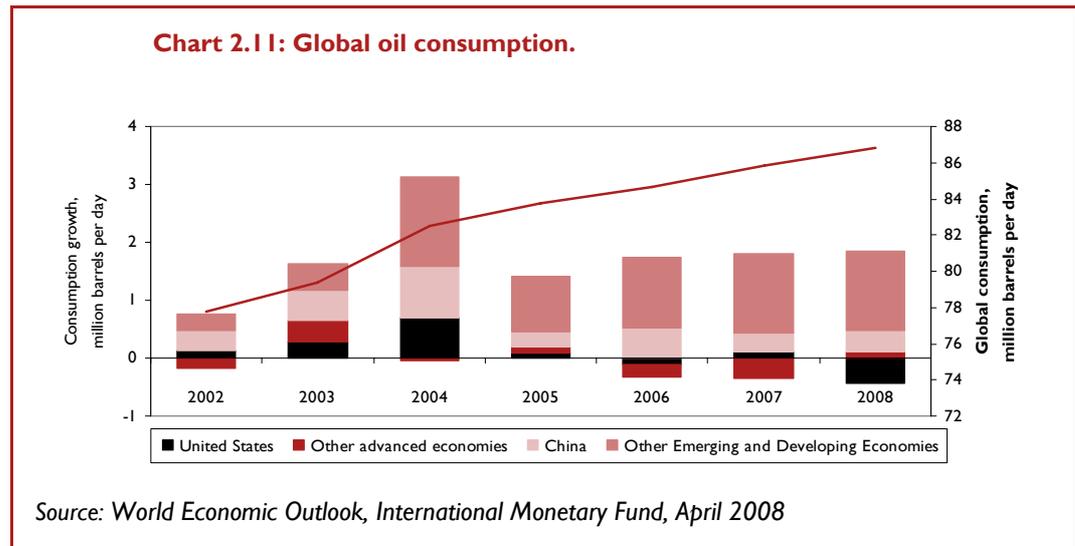
Sources: IntercontinentalExchange

**Robust
emerging
market
demand**

2.51 Global oil demand has been on an upward trend since the mid-1980s, and has increased by 10 per cent since 2002. Unlike episodes in previous decades where demand growth in the advanced economies has driven changes in world oil demand, the emerging markets particularly China, India and the Middle East have propelled recent demand growth, as illustrated by chart 2.11.

2.52 As explained in the previous section, this shift in the balance of demand is important because, the responsiveness of demand to income varies inversely with the level of income, and as such is higher in emerging markets than advanced economies. The International Energy Agency (IEA) estimates that a sustained 10 per cent increase in incomes would increase oil demand by over 70 per cent in developing Asia, compared to around 20 per cent in North America.¹⁰ While demand from the OECD countries did increase in the early phase of the price boom, 2002-2004, it has subsequently contracted in response to higher prices, illustrating the greater responsiveness of demand to price within OECD countries. This is in contrast to countries where consumers have been shielded from the full pass-through of price changes.

¹⁰ *World Energy Outlook*, International Energy Agency, November 2006



Supported by subsidies

2.53 Policy measures, such as price controls and subsidies, aimed at addressing socio-economic objectives including poverty and equitable access to basic economic necessities have also played a role in the recent period of strong demand growth. The available estimates indicate that almost a quarter of the world's petrol is sold at less than the market price as a result of fuel subsidies.¹¹ Such subsidies inhibit the automatic stabilisation that should occur through changes in consumption as a result of price movements, while resulting in a deterioration of government fiscal positions. Using 2005 data, the International Energy Agency has previously estimated that global energy consumption subsidies are likely to be of magnitude of \$250 billion per year.¹²

Supply is responding

2.54 In response to rising demand and prices, oil production has increased by 11 per cent since 2002. OPEC, which provides approximately 40 per cent of the world's oil supply, has been responsible for much of this growth, providing the market with 25 per cent more oil in 2007 than in 2002. In contrast, supply from non-OPEC countries has only increased by 3.5 per cent over the same period.¹³

2.55 The increase in supply has not, however, been enough to prevent the overall balance of demand to productive capacity tightening in recent years. Reasons for this include the long lags involved in increasing oil production and short-term supply disruptions, both natural and artificial.

Short-term supply disruptions

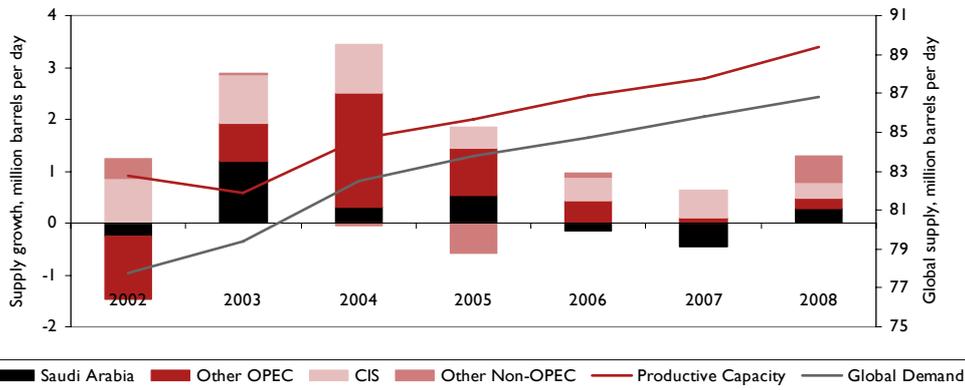
2.56 As set out earlier in this chapter, there is nothing new in short-term supply shocks affecting oil prices. These have had an important impact on recent price rises, including weather-related disruptions, and geopolitical tensions, in particular in the Middle East and Africa. Security risks particularly affect oil supply because production is concentrated in regions affected by instability and, over the longer term, whether because of economic sanctions or security threats, this constrains the flow of investment.

¹¹ *Enjoy the Energy Subsidies While You Can*, Morgan Stanley, May 2008

¹² *World Energy Outlook*, International Energy Agency, November 2006

¹³ *Oil Market Report*, International Energy Agency, various editions

Chart 2.12: Global oil productive capacity and supply



Source: *World Economic Outlook, International Monetary Fund April 2008*. 2008 figure: *Oil Market Report, International Energy Agency, May 2008*

2.57 In addition to weather and geopolitical related disruptions, supply to the market is partly determined by OPEC and other producers' behaviour. Accounting for over 40 per cent of contemporary global production, the setting of production quotas by OPEC influences the overall demand-supply balance at any one time and the building of inventories. Although there is little consensus on the exact influence OPEC has had since the 1980s, it is clear that this influence varies over time and has decreased in recent years as:

- the futures market's role in price discovery has grown - OPEC's influence on prices is now dependent on the expectations of participants in the futures market. Specifically, the effectiveness of an OPEC signal will depend on the whether the market believes that OPEC is able to undertake the necessary output adjustment; and
- spare capacity has decreased - when most OPEC members are producing at or close to their maximum capacity, OPEC has little influence on oil prices. This can be compounded by market scepticism about OPEC's spare capacity and its ability to raise production. In the absence of significant spare capacity (i.e. above 3 per cent of global supply), prices are increasingly set by marginal demand.¹⁴

Investment costs are rising

2.58 There are a number of investment related reasons why productive capacity has not kept pace with the rise in demand. Key among these is the time lag it takes to bring new supply to market, up to ten years in most instances, and rising production costs due to shortages in skilled labour and specialist equipment. The cost of developing a new oil field is estimated to have doubled in the last four years.¹⁵ As a result the real value of investment into oil production has been eroded, reducing the number of barrels produced per dollar of investment.

¹⁴ *OPEC pricing power: the need for a new perspective*, B. Fattouh, Oxford Institute for Energy Studies, Working Paper 31, March 2007

¹⁵ *Upstream Capital Cost Index*, Cambridge Energy Research Associates

2.59 There are also a number of pressure points within the system. In particular, there is an increasingly significant mismatch in the quality of global crude oil supply, which is becoming increasingly heavier, and existing refinery capacity, which is mostly designed to handle lighter crudes. This influences the price dynamics in both crude oil and oil product prices, and is incentivising increased investment in the refinery sector, contributing to the rising demand for materials and labour.

2.60 However, many of the factors that have constrained investment in recent years reflect long-term imperfections in the market. These can be characterised in terms of disincentives to investment and barriers to investment.

Disincentives to invest

2.61 The ongoing negotiations regarding global climate change policy has contributed to uncertainty over future oil demand, which acts as a disincentive for further investment in oil supply. The lack of credible demand projections and robust and timely data on key oil market data such as demand, supply, inventories, investment and reserves exacerbates this uncertainty.

2.62 At the same time uncertainty about security, political and regulatory stability in producer countries can also affect incentives for oil companies to invest significant sums in upstream exploration and development. Recent experiences in Venezuela, Russia and legal uncertainty within Iraq underline the significance of stable and predictable regulatory frameworks in oil markets.

Barriers to investment

2.63 Leading from this there are a number of factors that are acting as further barriers to investment. The share of reserves that are now under the control of National Oil Companies (NOCs) has been increasing since the 1970s and is expected to continue to do so. This has significantly limited the ability of International Oil Companies (IOCs) to develop new reserves, constraining the flow of both capital and technology into oil production. In some cases, NOCs face constraints on both the level and complexity of production they can undertake, including competing wider domestic socio-economic priorities, reducing productive efficiency of the supply chain. A desire to save oil for consumption for future generations may also motivate slower investment in some countries, though this assumes that oil will act as a store of value over time, which may not be the case with the development of alternative energy sources.

2.64 More generally, wider regulatory barriers such as obtaining planning permission and licenses can also impact investment by preventing it, slowing it down, or increasing its cost.

2.65 The range of factors limiting access to low cost reserves has increasingly led IOCs to focus on development of marginal fields, characterised by increasing geological complexity, and non-conventional sources of oil, both involving increased technological challenges.

2.66 With continuing demand pressure, there are a number of consequences on the oil market resulting from the continuing slow supply and investment response, in particular reducing spare capacity and, increasing pressure on inventories. Both spare capacity and inventories provide important buffers to deal with supply shocks or swift increases in global oil demand, mitigating the risk of a physical supply disruption to consumers and price volatility. Inventories can also provide a timely indicator of the fundamental balance between demand and supply.

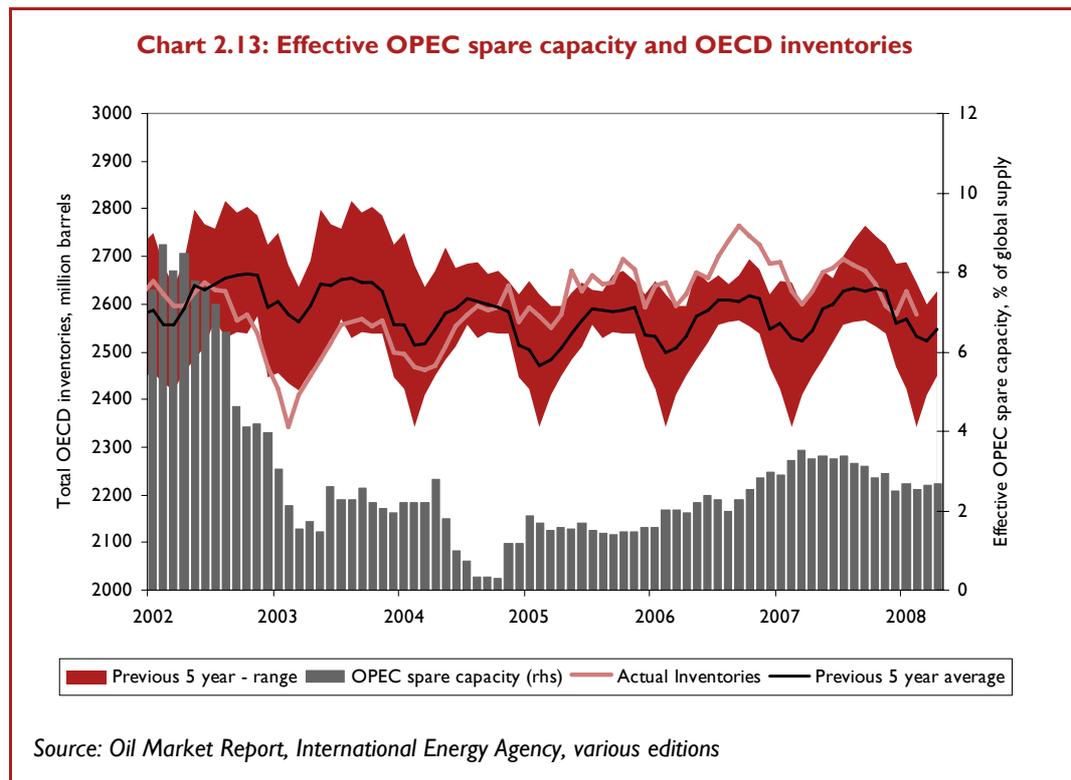
2.67 It is important to recognise that maintaining spare capacity carries a high opportunity cost, and would be unlikely to exist to any significant degree in a fully

liberalised market as it is inconsistent with efficient capital allocation and the principle of maximising shareholder value.

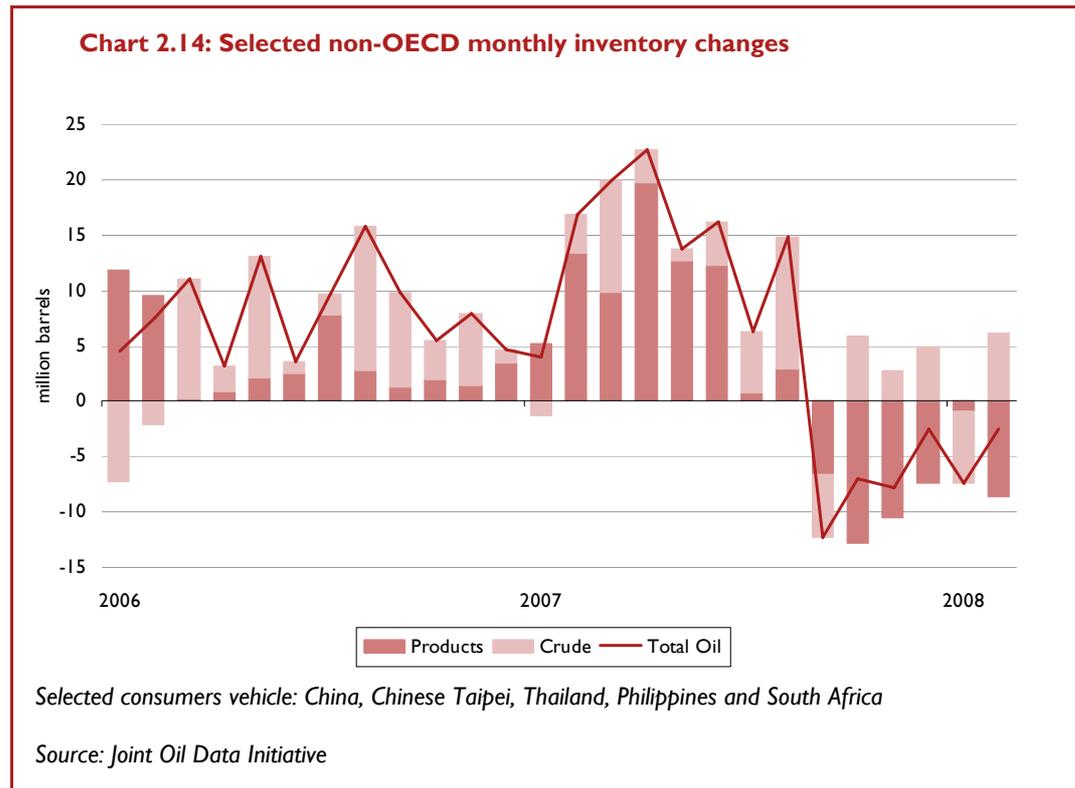
2.68 Maintaining inventories also comes at a cost, though consumers will want to maintain some inventories as a buffer against supply disruptions in order to ensure continuity of production runs. At the international level, the IEA coordinates its members' response systems, which include the holding of inventories, to mitigate physical supply shortfalls; but not price increases.

Reducing spare capacity

2.69 Oil producing countries have had to draw heavily on previously spare capacity to meet demand. The effect of this has been a significant reduction in the level of spare capacity held by OPEC members, as illustrated by chart 2.13.



2.70 As spare capacity falls, the importance of inventories as a market buffer can be expected to increase further. However, as illustrated by Chart 2.17, the overall level of OECD inventories has remained broadly constant over the last five years, while demand has increased. However, the OECD only accounts for around half of total consumption, having fallen over time as demand from non-OECD countries has increased. The most recent data for several major non-OECD consumers, shows clear signs of draw downs of inventories in these countries, in aggregate, in the second half of 2007 and, tentatively, in early 2008 as well. Despite their participation in the Joint Oil Data Initiative (JODI), the lack of timely and robust data from the major consuming countries makes it difficult to accurately assess the inventory picture.



2.71 With spare capacity significantly below historical averages, the overall size of oil market buffers has decreased in recent years. As discussed earlier in the chapter in the context of financial markets, as a result the market is more sensitive to short-term uncertainty and supply disruptions, which implies an increasing risk premium within the oil price and the potential for greater volatility. This is likely to be reinforced by market concern about the factors limiting the level of future investment.

Other energy

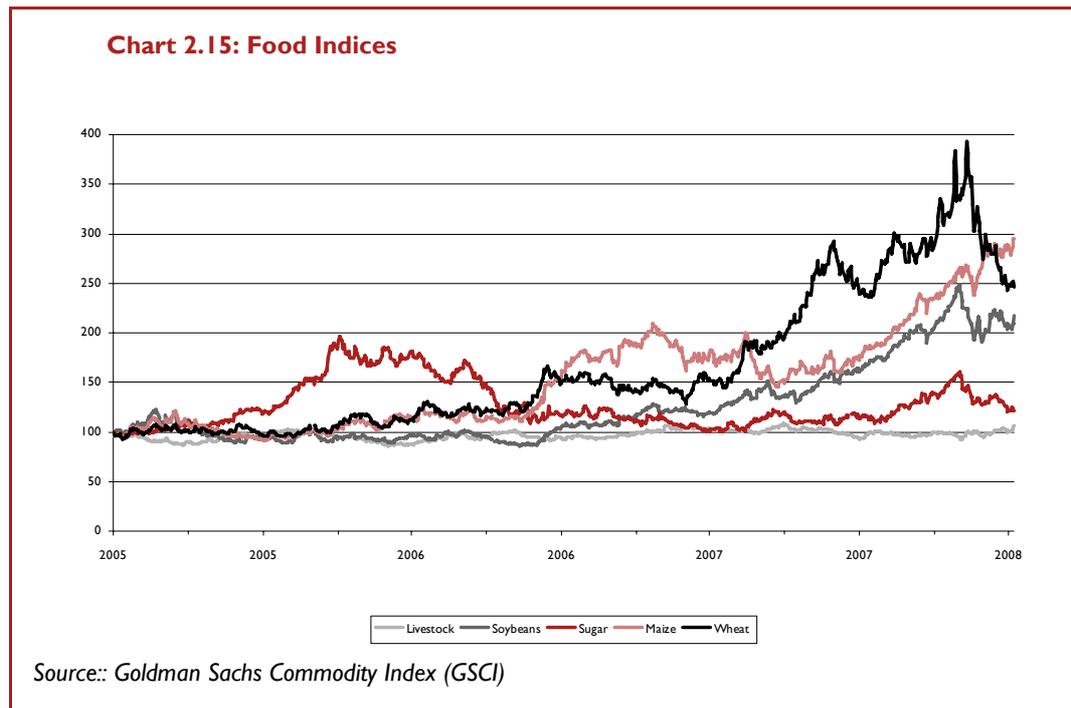
Natural Gas 2.72 Since 2002, UK natural gas prices have nearly trebled. Natural gas prices in Europe and the US are also more than two to three times higher than their levels in 2002. There have also been several price spikes during this period. For example US prices also ‘spiked’ in 2005 and 2006 due to Hurricanes Rita and Katrina damaging natural gas production, pipeline and processing facilities in the Gulf of Mexico area. The resulting shortages in supplies, coupled with higher winter demand, resulted in historically high natural gas prices in the US. In addition over the same period, natural gas prices also reached their highest levels historically in the UK. This was primarily because of tight supply conditions specific to the UK leading to a spike in UK prices.

2.73 However, most, if not all, of the recent increases in natural gas prices in the UK as well as globally are attributable to increases in oil prices (with a small impact from seasonality). This relationship is discussed in Box 2.3.

2.74 From 2001-02 onwards there has been strong growth in the international LNG trade, which has grown from a very small base at roughly double the rate of international trade in piped natural gas. This increase in global trade of natural gas has led to prices being more responsive to supply and demand fundamentals. However, it is unlikely that the link between oil and natural gas has been altered significantly due to the recent increase in LNG trade, as pipeline trade still dominates gas markets. This may change over time, as LNG’s share of the world market grows.

Food

2.75 After 30 years in which global food prices have fallen in real terms, there has been a strong increase in food prices since 2006. This has been particularly pronounced in the markets for maize, rice, soybeans and wheat, where nominal prices increased between 95 per cent and 152 per cent respectively in the period from March 2006 to March 2008, as Chart 2.15 illustrates. However, despite these sharp increases, prices experienced over recent months are still far below the levels experienced in the 1970s in real terms.



2.76 Historically price increases have been uneven across different foods, as producers substitute out of low priced foods into high priced ones in the next planting season, thus pushing some prices downwards and others upwards. One of the features of the current situation is that prices of all key staples have been high simultaneously.

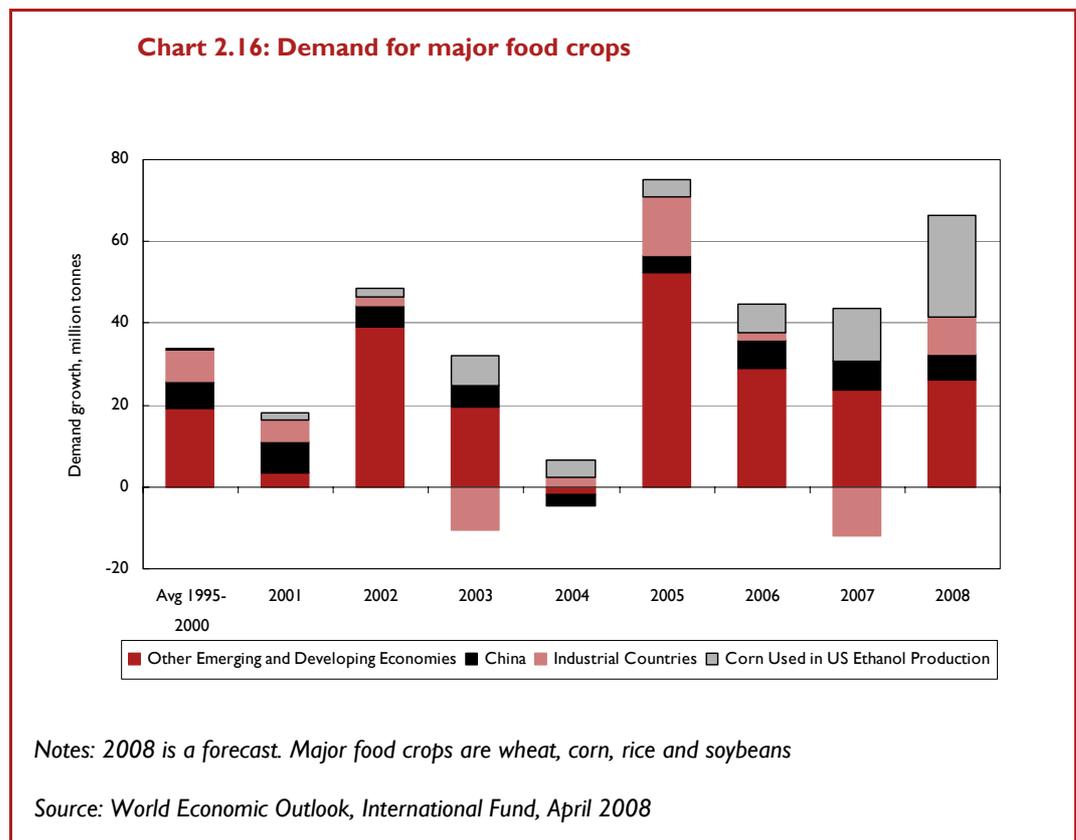
2.77 Determining the driving forces and underlying factors behind these price increases is difficult and complex, with a mix of interrelated demand and supply factors having played a role.

Demand side pressures

2.78 Beyond the structural effect of population growth, a recent driver of demand has been the effect of rising per capita incomes, particularly in China and India, which tend to shift consumer preferences towards more protein products such as meat, dairy and vegetable oils. Per capita meat consumption in China is now 50kg of meat per year, compared with just 20kg in 1985¹⁶. These products can push up aggregate agricultural demand because of the resource intensity of turning grain into meat.

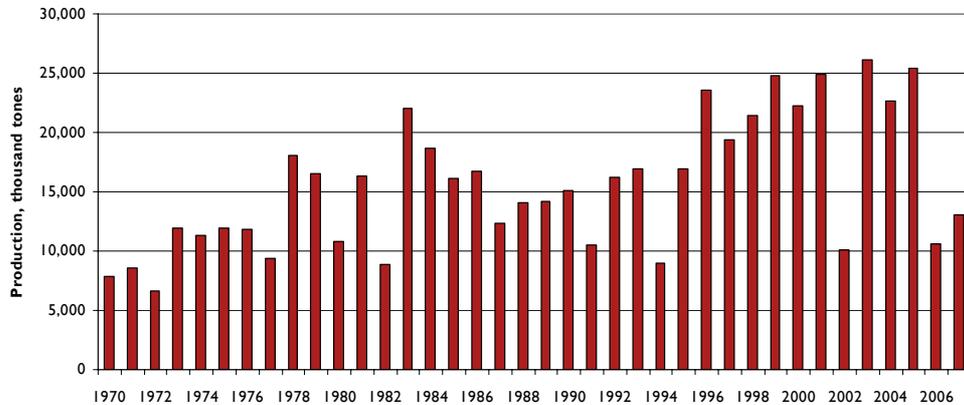
¹⁶ Tackling the challenge of rising food prices: Directions for EU action, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the regions, May 2008

Biofuels 2.79 Growing demand for biofuels which has shifted land from crops devoted to food to those for fuel. Emerging evidence suggests that, while biofuels cannot explain the recent surge in food prices, they seem to have been an important contributing factor. For example, research from the IMF estimates that maize-based ethanol accounted for three quarters of the increase in demand for maize and could explain one quarter of the increase in demand for the four major cereal crops between January 2006 to March 2008. In the US, around 30 per cent of the corn harvest next year is expected to be turned into biofuels, a rapid expansion on past years, as Chart 2.16 demonstrates.



Temporary supply-side factors 2.80 As with previous price shocks, a significant determinant in the recent food price rises has been the impact of bad weather creating supply shortfalls in a number of important producing and exporting countries. With poor harvests in 2006, global production fell by 6 per cent compared with the previous year. This was exacerbated by the fact that levels of international inventories were already below their long-term average and resulted in a nominal price increase of around 20 per cent. In 2007, with inventories further depleted and demand increasing, further bad weather hit food exporting countries and regions, such as Australia, the US and Canada, restricting supply further, and leading to further sharp price increases across a range of agricultural commodities. For example, Chart 2.17 shows how Australian wheat production fell in both 2006 and 2007. While it is too early to attribute this to climate change, it provides an example of the potential future risks to global food production, discussed later in this chapter.

Chart 2.17: Australian Wheat Production



Source: Goldman Sachs Commodity Index (GSCI)

Policy driven developments

2.81 Alongside the weather-related supply shock, a number of countries have responded to high food prices by introducing policies aimed at reducing prices domestically. These have ranged from generally positive measures such as reducing import tariffs, to costly consumer subsidies and harmful beggar-thy-neighbour export restrictions that achieve their short-term aims at the expense of further raising world prices while dulling domestic supply responses. IMF analysis suggests that recent export restrictions in some of the major rice exporters may have accounted for as much as half of this year's price increases.

2.82 In the wheat market, export restrictions in Argentina, Russia, Ukraine and Kazakhstan affected around a third of the supply to the global wheat market. Ukraine's ending of its export ban has contributed to recent falls in global wheat prices, emphasising the damaging effect of beggar-thy-neighbour strategies. Table 2.1 sets out a number of examples of these policies.

Table 2.1: Policy measures introduced by selected countries

Export restrictions e.g. export bans and increased export taxes	Argentina, Bolivia, Brazil, Cambodia, China, DRC, Egypt, Guinea, India, Indonesia, Kazakhstan, Pakistan, Russia, Ukraine
Price measures e.g. subsidies	Bangladesh, China, Colombia, Ecuador, Egypt, Mexico, Morocco, Pakistan, Peru, Zambia

Wider structural issues **2.83** In addition to the temporary supply side effects described above, there are a number of areas where the specific structural characteristics of the agricultural sector tend to make it more vulnerable to price volatility.

2.84 One aspect of this is that for some food types, such as rice, the world market is particularly thin. For example, for the period 1998-2002, the proportion of world rice production traded internationally (4 per cent) was much less than for maize (14 per cent) and wheat (17 per cent).¹⁷ In thin international markets, even relatively limited supply shocks in a significant producing country can have a proportionately much greater impact on the balance between international demand and supply.

Openness **2.85** In many parts of the world, there are market restrictions on openness, while agricultural land, labour and capital markets do not function as efficiently as they could. This matters because it will affect the level of agricultural production in the face of any given set of international prices, and the speed with which global agricultural supply responds to changes in those prices. This includes the Common Agricultural Policy (CAP) in the European Union (EU), as discussed in Box 2.5.

Box 2.5: The role of the Common Agricultural Policy

A significant part of the CAP is geared towards keeping EU agricultural market prices higher than they would otherwise be. In particular, the import tariffs necessary to support this system are still very high. Whilst the average tariff for non-agricultural goods is 4 per cent, for agricultural goods it is around 20 per cent, with tariffs of 70 per cent or more not uncommon for core CAP commodities such as sugar, dairy and beef.

A combination of the CAP and agricultural trade barriers cost EU consumers approximately €43 billion in 2006. In the UK the average household spends 10 per cent of its expenditure on food, rising to 15 per cent for the poorest households. In poorer Member States food accounts for an average of 30 per cent or more of household income.

Because the CAP isolates the EU market from global prices, the impacts of the CAP on the EU and international prices are distinct. Whilst the CAP and EU agricultural import tariffs have not been a cause of EU price inflation, they do mean that the recent food price inflation has been from a higher base.

Global prices may be modestly tempered by the over-production that results from protecting EU farmers from global markets. But this is not positive for global food security, however, as (together with higher levels of international price volatility caused by the CAP) it tends to disincentivise production elsewhere around the world, particularly in the developing world.

Improving productivity **2.86** The level of productivity is a critical factor in determining long term supply. The past half-century has seen dramatic improvements in agricultural yield growth, with, for example meat and sugar production having increased over six-fold. However, in recent years there has been a slowing down of growth in cereal yields, which poses a significant challenge for the agricultural community in a number of ways.

2.87 Firstly, there is widespread disparity across the globe in the quality of the infrastructure to produce and transport food, impacting on food wastage and productivity. Post-harvest crop losses have been reduced significantly in the past 50

¹⁷ Food and Agriculture Organisation of the United Nations

years. Nevertheless, about 25 per cent of total food products are still lost worldwide during the post-harvest period.¹⁸

2.88 Secondly, there is insufficient investment in research. A US Department for Agriculture study showed that 75 per cent of the growth of US agricultural productivity between 1949 and 1991 was due to public investment in agricultural research and development and infrastructure. Developing countries invest only 0.56 per cent of their agricultural GDP on research and development (R&D) – including donor contributions – and only around 6 per cent of total global private investment spend takes place in the developing world, compared to over half in industrial countries. There are many reasons for this – including weak enforcement of property rights and overall investment climates, trade distortions and scale effects, particularly for smaller countries. With over 90 per cent of global R&D conducted in developed countries and the research agenda shifting away from productivity towards environmental issues, food quality and safety, the traditional spillovers that have benefited poor countries cannot be taken for granted.

2.89 Thirdly, there are challenges in developing the next generation of innovations to improve agricultural yields. Conventional plant breeding has improved yields dramatically in recent decades, and there will need to be continued progress in the development of more productive conventional crops. Alongside this, genetically modified (GM) technology is an additional tool that could provide significant benefits in the future, for example through crops with improved yields under high stress conditions or higher vitamin content. Current GM crops have improved insect-resistance and weedkiller-resistance traits which make cultivation easier for farmers in crops such as soybeans, maize and oilseed rape. Several developing countries are already growing the existing types of GM crop, and it is their farmers who would stand to benefit most from further GM traits that are under development such as drought-resistance.

Land use and environmental sustainability

2.90 There are also increasing uncertainties and limitations to the amount of new land that can be taken into cultivation over the long term, in particular in terms of environmental sustainability in responding to climate change. These issues are discussed in more detail in Chapter 3.

2.91 Much of the world also suffers from poor water resource management. Good irrigation is critical to food production, especially in countries with variable and limited rainfall, which, as this document has shown is likely to be increasingly common under the effects of climate change.

Managing agricultural risk

2.92 By its very nature agriculture relies on climatic and biological processes, which give rise to yield variability and supply lags, which are likely to be intensified with climate change. A wide range of options exist that allow farmers to manage risk. But many farmers, particularly those in developing countries often do not have access to the more sophisticated capital markets or scope for economic diversification.

Other commodities

2.93 Increased demand from China has been a clear driver of the strong increases in industrial metals in the past five years. IMF analysis finds that China was responsible for more than 50 per cent of the growth in world consumption of industrial metals between 2002 and 2005. These high growth rates, in excess of China's contribution to world GDP

¹⁸ *Encyclopaedia of Pest Management*, Edited by D. Pimental, Cornell University, 2002

growth over the period, highlight the intensity of commodity-reliant industrial production within China's expansion. China has surpassed the EU and US in terms of its share of demand for many key metals, and is now estimated to account for around a third of industrial metals consumption overall.¹⁹ However, hard commodities are a key input into manufacturing and Chinese production has helped keep goods prices down in OECD countries.

2.94 The sharp rise in industrial metals prices over the period is also the result of an inability of supply to rapidly respond to increasing demand. Low and falling real prices of industrial metals throughout the 1990s led to underinvestment and a limited expansion of capacity. While investment has since increased, long lag times mean that this new supply is only now coming on-stream. This has also been exacerbated by several short-term supply shocks in key producing countries, including miners' strikes, legal challenges to projects, and other unanticipated disruptions.

FORWARD LOOKING ANALYSIS OF COMMODITY MARKETS

General

Forecasting uncertainty

2.95 Commodity prices are notoriously hard to forecast, even over relatively short period. Analysts usually follow two broad approaches. One strategy is to look at the prospects for growth in a range of fundamental drivers of demand and supply, which will jointly determine prices. An alternative approach is to use data from financial market futures contracts to derive the implied price of commodities. Both methods have caveats: supply fundamentals, in particular, are often very difficult to disaggregate from one another, while futures contracts have typically been very unreliable as forecasting instruments.

2.96 In the UK, HM Treasury requires a forecast of oil prices to underpin Budget and Pre-Budget Report public finance projections. It uses a forecasting assumption that is audited by the National Audit Office and is based on the consensus view of external forecasters presented in *Forecasts for the UK economy: A comparison of independent forecasts*. At the time of Budget 2008, the average independent forecast was for oil to average US\$83.8 a barrel during 2008. The latest average, published in May 2008, is for oil prices to average US\$101.5 per barrel during 2008 and US\$93.1 in 2009.²⁰

2.97 There has been a marked increase in market uncertainty regarding the future path of commodity prices. This is partly a result of the recent increase in daily price changes in commodity prices.

2.98 Notwithstanding these difficulties, on balance experts and the market are not predicting significant further rises in commodities prices over the rest of the year, although in the case of oil there is a particularly wide range of uncertainty. The overall picture for commodities reflects the expected moderation in world GDP growth as a result of the credit crisis that originated in the US housing market in the summer of 2007 and the wider macro-economic impacts of high oil prices. This should, all else equal, lead to lower demand for commodities and therefore lower prices.

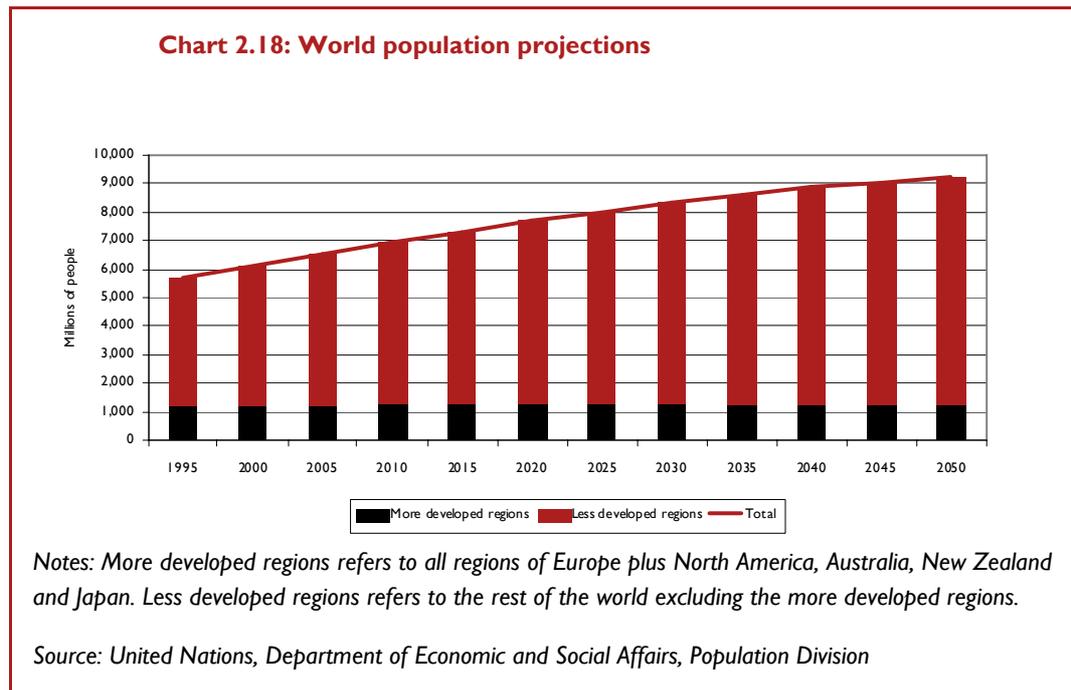
¹⁹ World Bureau of Metal Statistics

²⁰ See www.hm-treasury.gov.uk

2.99 In their recent *World Economic Outlook*, published in April 2008, the IMF expected commodity prices to remain at the current levels for the immediate future. Their forecast is for the prices of energy, food and agricultural raw materials to remain flat up to the end of 2009. Metals prices are forecast to increase in the very short term and then to start falling gradually from the second half of 2008. Futures markets are consistent with this forecast.

**Fundamentals
of demand
rising**

2.100 Beyond this, the fundamentals of demand are not expected to moderate significantly. Population growth is projected to remain high: chart 2.18 shows that by 2050, world population is expected to be 40 per cent higher than in 2005, relative to population growth of about 30 per cent between 1985 and 2005.



2.101 Significantly, much of the increase in population and productivity, and therefore the expansion in world economic activity, is expected to come from the emerging and developing economies. The most recent IMF forecast of GDP growth between 2008 and 2013 confirms that most of the increase in world output is expected to come from the emerging economies.²¹

**Importance of
resource
efficiency**

2.102 As set out earlier in this chapter, as these economies have a greater energy intensity of production, so commodity demand should be expected to increase significantly. This may be moderated by the impact, particularly in more advanced economies, that higher prices may have on incentives for consumption efficiency and preferences for commodity-intensive goods. Overall, as population growth and rising incomes are comparatively given, the rate of improvement in resource efficiency will be a critical variable factor in determining future demand – with improved energy efficiency and diversification of energy sources key.

**Supply
challenges**

2.103 These future demand growth factors will mean that it will be an ongoing challenge for supply to match demand at affordable prices. This will be particularly the case if there are any positive demand surprises, which will leave suppliers subjected to the usual slow responses in production and extraction.

²¹ *World Economic Outlook: Housing and the Business Cycle*, International Monetary Fund, April 2008

2.104 As set out earlier in this chapter, there are significant long-term challenges constraining responsiveness of supply in both food and oil markets, which will determine if increased demand expectations can be met without significant increases in prices. For example:

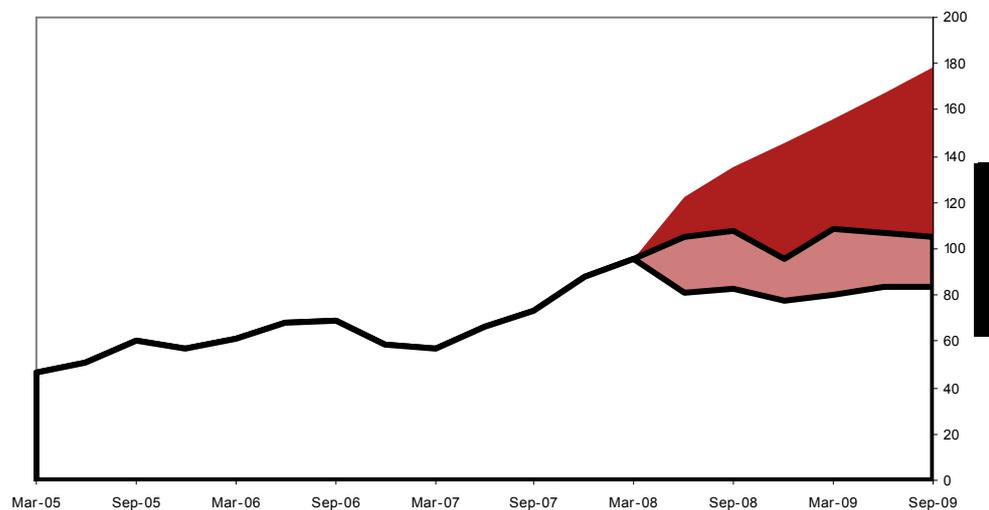
- without further **openness**, commodity markets will struggle to meet increased demand, and be prone to volatility;
- **barriers and disincentives to investment** threaten future food and particularly energy security. There are a number of informational, political and regulatory barriers that are limiting the ability of new investment in supply;
- **existing inventories and resources** will need to be managed in a more productive way; and
- a key challenge will be to deliver significant **technological progress** to improve the efficiency of production of both energy and food.

Oil

Short term

2.105 As with commodities generally, the short-term outlook is subject to considerable uncertainty. Uncertainty exists over demand growth, the potential for additional delays in bringing new supply on-stream, short-term supply disruptions and currency movements. As Chart 2.19 illustrates, these combine to make the short-term price outlook difficult to forecast with any accuracy, as the wide distribution of the independent forecasts show.

Chart 2.19: Spread of Independent Forecasts for Crude Oil Prices



Source: Bloomberg

2.106 Several factors point to a possible falling back in prices towards the end of 2008, including an expected decline in demand growth in OECD countries, reductions in subsidy levels in several developing countries, including Malaysia and India, and an additional 1.9 million barrels of oil per day, equivalent to a 3.8 per cent increase in non-

OPEC supply, which is expected to come on-stream by the end of the year.²² This is illustrated by the average of independent forecasts for the end of 2008, which show a slight decline on current prices. However, balanced against this, upside risks remain, including the risk of short-term supply disruptions, such as from the hurricane season on production in the Gulf of Mexico, and delays in additional capacity coming on-stream, which compound the difficulty in forecasting prices with a high degree of certainty.

Medium term

2.107 The IEA has estimated that world oil demand in its ‘reference scenario’ (i.e. with little improvements in energy efficiency) will grow by 12.7 million barrels per day, almost 15 per cent, by 2015, with over 85 per cent of demand growth expected to come from the emerging markets.²³ This is illustrated by table 2.2. However, these projections were made before the rapid price increases of the last nine months and therefore should be viewed as an upper bound.

Table 2.2: Medium-term demand growth projections

	2005	2006	2007	2008	2015	2007-2015 Growth rate
	million barrels/day					
World	83.78	84.69	85.81	86.84	98.5	14.8%
OECD	49.67	49.34	49.09	48.76	50.8	3.5%
Non-OECD	34.12	35.34	36.72	38.09	47.7	29.9%
of which:						
China	6.69	7.21	7.54	7.94	11.1	47.2%
India	2.58	2.64	2.79	2.92	3.7	32.6%
Middle East	5.99	6.22	6.51	6.82	7.9	21.4%

Source: *World Energy Outlook 2007: China and India Insights*, International Energy Agency, November 2007; *Oil Market Report*, International Energy, May 2008

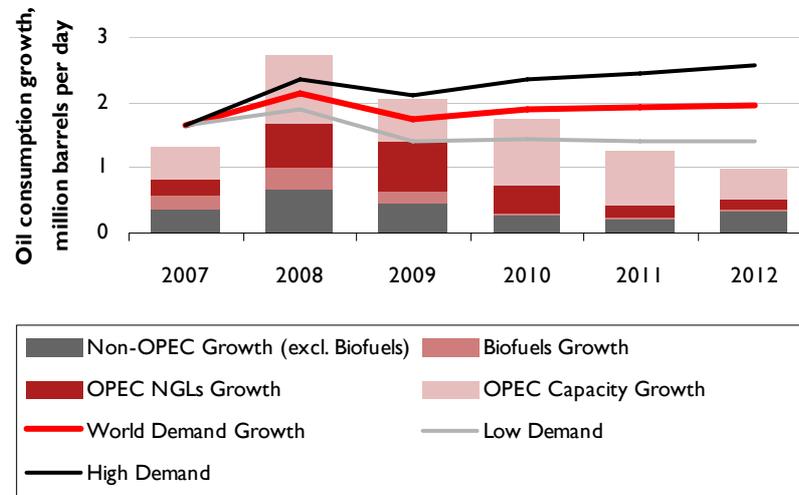
2.108 Continuing high prices should encourage improved energy efficiency from consumers, especially in advanced economies, and a greater incentive to develop alternative energy sources. Indeed, while delays in demand-side responses are to be expected, history demonstrates the potential for them to have a significant impact on demand as illustrated by the 38 per cent decline in the oil intensity of the G7 economies between 1980 and 1986. This underlines the value of an ambitious resource efficiency strategy.

2.109 As Chart 2.20 indicates the current supply tightness may ease towards the end of this year and into 2009, but given the level of planned future investment there may need to be additional production capacity of around 12.7 million barrels per day in order to avoid a supply crunch by 2015. Even under the IEA’s ‘alternative scenario’ in which increased energy efficiency reduces oil demand by more than 4 per cent by 2015, the need for additional production capacity of nearly 8 million barrels per day in 2015 is still forecasted.

²² *Oil Market Report*, International Energy Agency, June 2008

²³ *World Energy Outlook 2007: China and India Insights*, International Energy Agency, November 2007

Chart 2.20: Medium-Term Growth Balance



Source: *Medium Term Oil Market Report*, International Energy Agency, 2007; *Oil Market Report*, International Energy Agency, June 2008

2.110 The forthcoming publication of the IEA's Medium-Term Oil Market Report, due in July, should provide further clarity. At present, the medium term outlook for prices is for them to moderate from recent real highs on the back of improving energy efficiency reducing demand and improved certainty concerning the supply outlook and global climate change policy, which should facilitate investment planning. However, prices are expected to remain higher than historical real averages due to increased costs of production, tightness in input markets and increasing geological complexity of oil fields.

Long term 2.111 Projections out to 2030 illustrate the continued importance of emerging markets in driving forward demand growth. The IEA projects that emerging markets will account for around 90 per cent of the 30.5 million barrels per day demand growth expected by 2030.²⁴ Oil demand in China alone is expected to grow by 9 million barrels per day by 2030. The contribution from the advanced countries is predicted to become increasingly marginal as their efforts to reduce the energy intensity of production and diversify their energy mixes materialise. However, the actual rise in demand will depend to a large extent on the energy intensity of future economic growth in the emerging markets, especially in light of the technological catch-up potential available to them.

Supply faces a continuing challenge 2.112 In the longer term, there is the opportunity and time for supply to respond to demand more effectively. The IEA estimates that under its 'reference scenario' over US \$5.4 trillion of investment will be needed for oil supply to meet demand by 2030. This is mostly required for upstream development, including the replacement of capacity that will become obsolete. Over half of global energy investment will be needed in emerging markets. China alone will require US \$3.7 trillion of investment across all energy sources. Even under the IEA's optimistic 'alternative scenario', the overall net investment will still be in excess of US \$5 trillion.²⁵

²⁴ *World Energy Outlook: China and India Insights*, International Energy Agency, November 2007

²⁵ *Ibid.*

2.113 The lack of reserves (i.e. the peak oil scenario) should not in itself be a constraining factor for this production. Proven oil reserves continue to increase, and have grown by 15 per cent over the last decade;²⁶ with the IEA's analysis demonstrating that there are sufficient reserves to meet rising demand at least out until 2030.²⁷ Rather it is the underlying market conditions and the associated barriers and disincentives to investment, discussed earlier in this chapter, such as limitations on access and the increasing complexity of reserve exploration and exploitation that are the most significant constraining factors. Overcoming these will therefore be critical in determining long-term upward pressure on prices.

Other energy

Natural Gas 2.114 The short-term outlook is subject to considerable uncertainty, given the link between oil and gas prices and the added importance of weather in determining heating demand.

2.115 In the longer term, the IEA assumes the global demand for natural gas will increase by an average of 2 per cent per year up to 2020, with the demand growing at the fastest rates in emerging countries, notably China. The increase in demand for gas as forecast by the IEA is primarily due to the global power sector, which is assumed to account for more than half the increase in primary gas demand worldwide.²⁸

2.116 There have been substantial increases in proven reserves over the past two decades with large increases recorded in Russia, central Asia and the Middle East.²⁹ Production of gas is expected to grow with regional variations with increases in production levels from Middle East and Africa. However, the gas sector faces similar challenges to the oil sector in terms of investment, with the IEA estimating that it will require more than US \$4 trillion of investment to meet growing demand.³⁰

Coal 2.117 The demand-supply balance within the coal market is expected to improve by around 2010, putting downward pressure on coal prices. However, in the longer term, the strength of Chinese and Indian coal demand will add increasing pressure on producers to increase supply, with the IEA forecasting that US \$600 billion will be required by 2030.³¹

2.118 Over time, coal prices are expected to grow in line with oil and gas prices due to the opportunities for substituting between the different fossil fuels but will become increasingly sensitive to environmental restrictions on coal-burning and developments in clean technology.

Food

Short term 2.119 Global food price inflation is expected to moderate over the course of the year due to increased supply responding to higher prices, improved weather conditions and expected moderations in oil prices. Indeed, prices of some food commodities, have already started to decline in April after reaching peaks in March, with the Food and

²⁶ BP Statistical Review of World Energy, BP, June 2007

²⁷ World Energy Outlook: China and India Insights, International Energy Agency, November 2007

²⁸ Ibid.

²⁹ BP Statistical Review of World Energy, BP, June 2007

³⁰ World Energy Outlook: China and India Insights, International Energy Agency, November 2007

³¹ Ibid.

Agriculture Organisation of the United Nations (UN-FAO) food price index declining for the first time in 15 months. Nevertheless, in the face of high energy prices, continued diversion of crops for biofuels in the US and the EU and strong demand from emerging and developing economies, the current cycle of high prices is likely to last longer than previous cycles.

Medium term 2.120 Over the medium term, global production and consumption patterns will continue to shift, with developing countries expected to dominate production and consumption of most commodities by 2017, according to the *OECD-FAO Agricultural Outlook*.³²

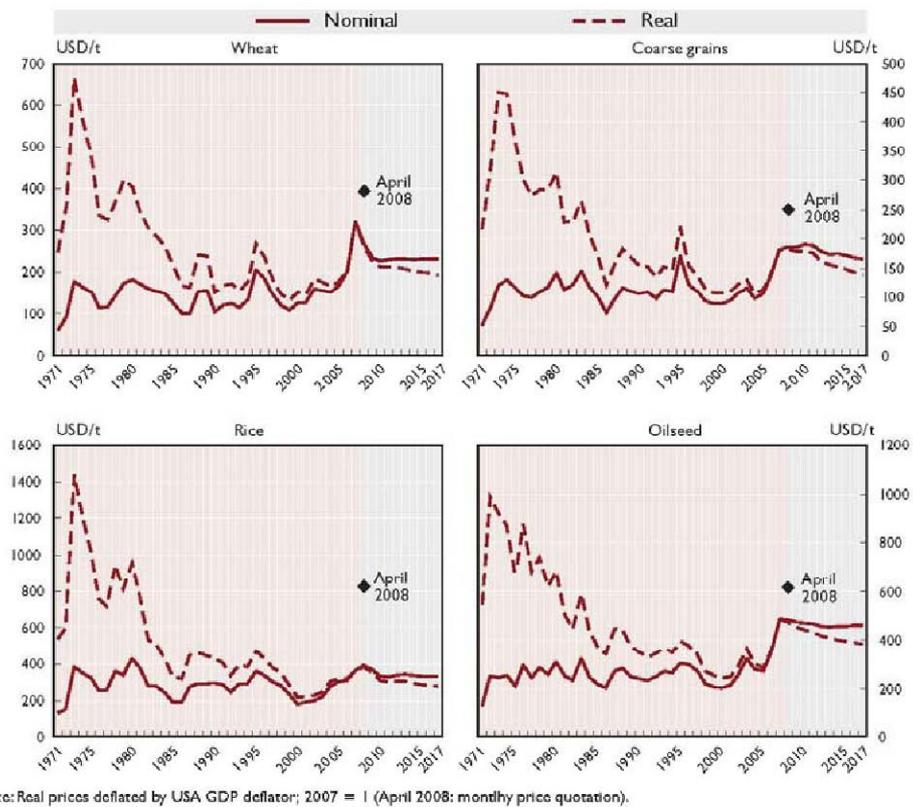
2.121 Against this background, and given the factors set out earlier in this chapter and discussed in more detail in this section, the consensus of experts and market expectations is that prices will resume their decline in real terms, but it is unlikely that nominal prices will return to the levels experienced over the previous decade. Research from the OECD and UN-FAO estimates that average nominal prices for the period 2008 to 2017 will be around 30 per cent higher for sugar, 40 to 60 per cent higher for wheat and maize, and over 80 per cent higher for vegetable oils, compared to the period 1998-2007.³³ Nevertheless, in the longer term, prices are expected to resume their decline in real terms, but not to the extent witnessed in the past.

2.122 In addition, with many agricultural commodity supplies continuing to be tight and inventory levels remaining low, the possibility of further sharp price increases continues to present an upside risk.

³² *OECD-FAO Agricultural Outlook 2008-2017*, OECD and UN-FAO, June 2008

³³ *Ibid.*

Chart 2.21: Food commodity prices, 1971-2007 with projections to 2017



Source: OECD and FAO Secretariats

Long term 2.123 Population growth, rising incomes and changing diets in developing countries will remain the largest source of demand growth in agriculture. It is estimated that to meet projected demand cereal production will need to increase by 50 per cent and meat production by 80 per cent between 2000 and 2030.³⁴

2.124 Historically, agricultural productivity increases have outpaced population growth, hence decreasing prices. However, a combination of climate change, higher prices for energy and inputs such as fertiliser presents a significant challenge to the world's agricultural sector as it strives to meet the expected increase in demand. Box 2.6 underlines some of the long-term impacts of climate change on agricultural production. The extent to which the sector is successful in meeting this demand will affect the price of food, the level of real incomes around the world and hence household food security.

³⁴ World Development Report 2008: Agriculture for Development, World Bank, October 2007

Box 2.6: Impact of climate change on agricultural production

The eventual impact of climate change on global food production is uncertain, but there are serious downside risks. The International Food Policy Research Institute believes that 'climate change risks will have adverse impacts on food production, compounding the challenge of meeting global food demand'. It estimates that the aggregate impact on cereal production between 1990 and 2080 might be small (a decrease of less than 1 per cent) but notes that within this aggregate there is likely to be wide inter-regional variability, with the poorest being hardest hit. The prevalence of extreme weather events will increase yield variability and uncertainty.

Decreased yields are expected in warmer/low latitude areas of the world as global average temperatures increase. Increased yields are expected initially in colder/higher latitude areas, but such increases are likely to be reversed in some such areas as global temperatures increase by 3°C and more. Developed countries, including the EU, and Latin America are expected to see gains in production for warming up to 3°C, but reductions of up to 22 per cent are likely in South Asia, and food import dependency is projected to rise in many regions of the developing world. By 4°C, entire regions may be too hot and dry to grow crops, including parts of Australia. Agricultural collapse across large areas of the world is possible at even higher temperatures, but clear empirical evidence here is still limited.

Climate change will leave at risk the many millions of small scale subsistence farmers in Africa and South Asia whose yields will be adversely affected. Not only will average yields change, but the variability of yields is expected to increase too, with the distributions of pests and disease moving in response to climate change.

Source: *Climate Change 2007: synthesis report*, Fourth Assessment Report of the International Panel on Climate Change (IPCC), November 2007; *Climate Change 2007: Impacts, Adaptation and Vulnerability*, Contribution of Working Group II to the Fourth Assessment Report of the IPCC, November 2007; and *The Economics of Climate Change: The Stern Review*, N. Stern, October 2006

Supply faces a continuing challenge **2.125** This chapter has already discussed a number of the challenges structural supply facing agricultural markets, including a lack of openness and restrictions in some agricultural markets; poorly functioning agricultural land, labour and capital, markets; the level of expenditure on research and development; environmental factors around utilising the world's agricultural land resources to best effect; and the limited development of risk markets. These are long term challenges. The extent to which these are overcome will play an important part in helping to reduce the upward pressure on agricultural commodity and food prices through increased demand in the long term.

Other commodities

2.126 The prices of most industrial metals are expected to moderate in the short to medium term in line with slower world growth, and as new capacity comes on-stream. However, several forecast price declines have not been realised in recent years, highlighting the sensitivity of the market to even small changes in supply and demand because of low inventories and limited spare capacity. While prices are expected to moderate in the medium term, they may remain at an elevated level over a longer time horizon, sustained by continued strong underlying demand for industrial inputs, especially from the emerging markets.

CONCLUSION

2.127 This chapter has shown that commodity prices have, on average, fallen in real terms over the past 50 years, as supply kept up with the substantial increases in demand. This trend has been punctuated by a number of significant supply shocks.

2.128 In recent years prices have risen sharply, starting with non-food commodities and more recently food. This has been driven by strong demand growth, and continuing supply problems caused by short-term shocks, and longer-term market inefficiencies that are affecting the ability of supply to respond.

2.129 Commodity prices are notoriously hard to forecast, even over relative short periods, especially oil. Going forward, on balance the expert views and market expectations reviewed here suggest that real prices are likely to remain higher than their historical averages, if lower than today's, with continuing and perhaps more frequent spikes, driven by continuing strong demand and slow supply response.

2.130 For energy markets, with demand driven by rising population and economic growth, efficiency of use will be an important factor determining the level of demand. Improvements in supply-side efficiency will be an important factor in determining the speed of the supply response.

2.131 Chapter 3 goes on to set out the impact and risk of continuing high prices, underlining the importance of a coherent international policy response with a framework for enabling stable, secure and sustainable global commodity markets. Chapter 4 goes on to set out the UK's vision for what that framework should look like.

3

IMPLICATIONS FOR THE INTERNATIONAL COMMUNITY

Social, economic, political and environmental impacts

3.1 This chapter builds on the analysis of the recent commodity price rises and future market trends carried out in Chapter 2, and examines the global implications and risks of higher and potentially more volatile commodity prices. It looks at the widespread social, economic, political and environmental implications of high and volatile prices, and underlines the importance of a coherent international policy response, which will be discussed in Chapter 4.

Social impacts

Food and energy security

3.2 Rising food and fuel prices are felt disproportionately by the poorest in society. Up to 90 per cent of the household income of the poorest families in developing countries is spent on food and the landless poor in rural areas can be as badly affected as those in towns and cities. As prices for these goods increase, in the short term, until other prices and wages adjust or policies reduce the impact, real incomes will be eroded. Similarly, in the advanced economies, the poorest people spend a larger proportion of their income on commodities.

3.3 As prices rise, food and energy security are threatened as the affordability of these basic necessities declines. Box 3.1 sets out the UN's definition of food and energy security.

Box 3.1: Food and energy security at international level

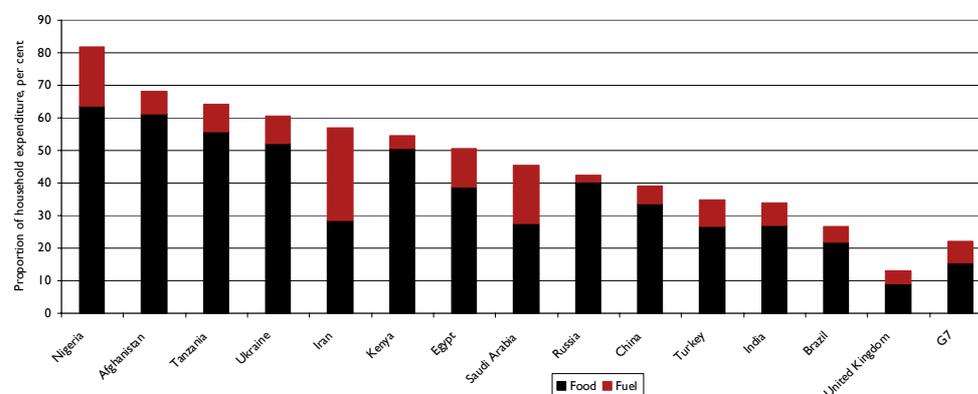
The UN's Food and Agriculture Organisation defines **food security** as a state in which:

"...all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life".

The UN's Economic Commission for Europe defines **energy security** as:

"the availability of usable energy supplies, at the point of final consumption, at economic price levels and in sufficient quantities and timeliness so that, given due regard to encouraging energy efficiency, the economic and social development of a country is not materially constrained".

Chart 3.1: Proportion of household expenditure spent on food and fuel in selected countries



Source: *World Economic Outlook: Housing and the Business Cycle: International Monetary Fund, April 2008:*

3.4 High food and energy prices threaten to put back the advances in poverty reduction made over the last ten years and the achievement of the Millennium Development Goals (MDGs). Public expenditure on health, education and other social programmes can also be squeezed by the rising cost of food and fuel subsidy programmes.

Box 3.2: the Millennium Development Goals:

The Millennium Development Goals are a set of ambitious international development goals that were agreed at the United Nations Millennium summit in September 2000, to be achieved by 2015.

- 1: Eradicate extreme hunger and poverty
- 2: Achieve universal primary education
- 3: Promote gender equality and empower women
- 4: Reduce child mortality
- 5: Improve maternal health
- 6: Combat HIV/AIDS, malaria and other diseases
- 7: Ensure environmental sustainability
- 8: Develop a global partnership for development

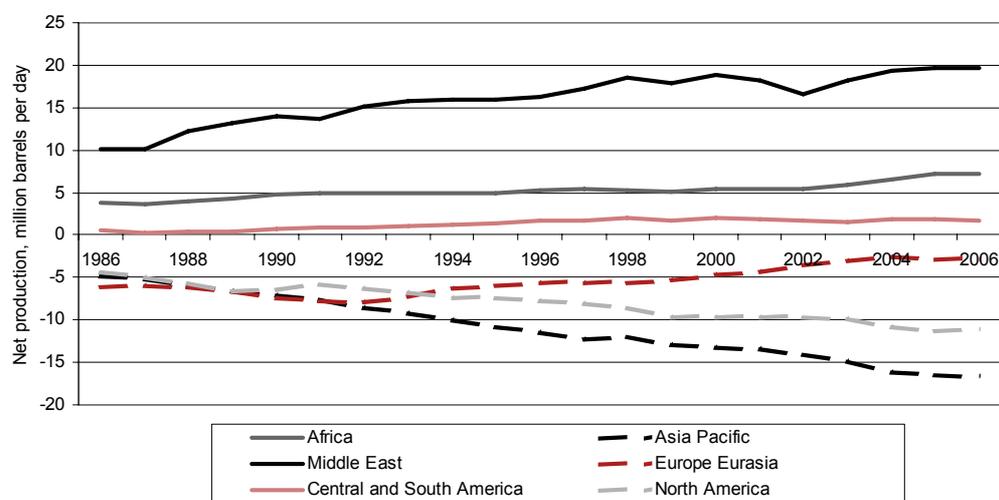
3.5 The achievement of the MDGs could be endangered both directly and indirectly by high commodity prices. As food prices rise, the amount of food consumed by the poorest in society will decrease and so will hunger (MDG1). As people switch their spending towards basic staples such as cereals, expenditure on other foodstuffs and non-food items such as education and health will be squeezed (MDGs 2, 4, 5 and 6). Public expenditure on health, education and other social programmes can also be squeezed by the rising cost of food and fuel subsidy programmes. Decreasing levels of nutrition can also impact on the ability to concentrate, cognitive development in children and resistance to disease. The greatest impact will be felt not only by the poorest, but also by vulnerable groups such as women who will tend to be affected most severely (MDG3).

3.6 Higher commodity prices are likely to have a disproportionate impact on low income and vulnerable households in developed countries. This is particularly true of energy costs. For example, in the UK in 2005-06 households spent, on average, 2.1 per cent of their income on fuel and power, but those on lower incomes spent substantially more, with households in the lowest income decile spending 9.2 per cent. Around half of households in England in the lowest decile are estimated to be fuel poor, defined where where a household needs to spend more than 10 per cent of income to achieve an adequate standard of warmth. Vulnerable groups such as pensioners, who make around half of the fuel poor, are also more likely to be more exposed to increasing fuel prices. Lower income groups also spend a larger proportion of their income on food – on average 16 per cent of total expenditure for the lowest decile is on food and non-alcoholic drinks compared to 10 per cent for households as a whole.

Redistribution 3.7 Some countries are endowed with significant natural reserves of commodities; others benefit from geographic traits and climatic conditions that facilitate their production. This is important, as it means that increasing commodity prices have the effect of redistributing income and wealth from those who buy commodities to those who sell them. However, the generalised nature of price rises across energy, food and metals mean that quantifying the specific impacts for different parts of the world is not straightforward; for example, countries which are net exporters of energy may be net importers of food. This redistribution of income will have an impact on people's welfare immediately, but could also affect countries' economic growth going forward.

3.8 As an example of this, the redistributive nature of high energy prices is illustrated in Chart 3.2. The Middle East remains by some margin the region that produces the most oil. High oil prices have dramatically increased revenue from exporting this resource. Conversely, the rapid growth of Asian emerging markets, particularly China, has positioned the Asia Pacific region as the largest net consumer. High oil prices are redistributing income away from this region to the energy producers. In recent years, a number of previously significant oil-producing countries have become net importers of oil, for example Indonesia.

Chart 3.2: Net oil production by region



Source: BP Statistical Review of World Energy, BP, June 2007

3.9 More generally, advanced economies and less developed countries, which tend to be net importers of both food and energy, are feeling the negative effects of high commodity prices. In less developed countries, rising prices will present an opportunity for some of the poor, notably those farmers who are able to produce a surplus after feeding their families, to sell their produce for a higher income, but only if the enabling environment is sufficient. However, only a small proportion of those in extreme poverty (with incomes of less than one dollar a day) are net sellers of food. This is particularly the case in Africa, where a recent World Bank analysis for Zambia, for example, demonstrated how a 10 per cent increase in the price of maize, would lead to a percentage increase in rural poverty four times as great as that in urban areas.¹

3.10 Amongst emerging markets the patterns are more mixed, depending on countries' trade patterns. Latin American countries such as Argentina, Brazil, Chile and Venezuela with significant commodity exports are benefiting from current price trends. Large importers such as China or Turkey are being negatively affected.

3.11 Overall, by redistributing income away from less developed countries, and some of the large Asian countries which still have significant populations on low incomes, elevated overall commodity prices are having a substantial negative impact on global poverty.

Macroeconomic implications

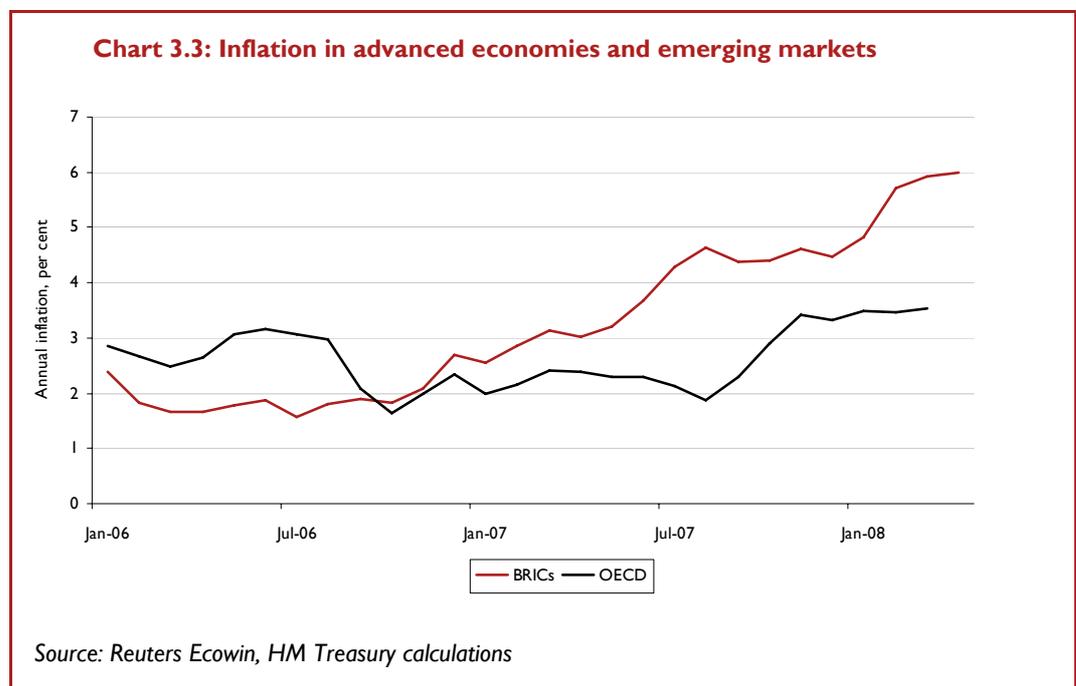
3.12 The macroeconomic implications of commodity prices will depend on a number of factors. Both rises and unsustainable falls could pose risks to stability. At a national level, commodity price rises may feed through into inflation and add to balance of payments pressures. However, the impact varies enormously from country to country. Globally, the redistribution of income from consumer to producer regions can also impact on global imbalances.

¹ *Implications for Higher Global Food Prices for Poverty in Low-Income Countries*, M. Ivanic and W. Martin, The World Bank Development Research Policy Research Working Paper 4594, April 2008

Relative prices and resource allocation

3.13 In a market economy, with fully flexible prices and unchanged monetary policy, a shock to prices in a particular sector (such as food or energy) should result in a change in relative prices, leaving the aggregate price level unchanged. However, other non-commodity prices may not adjust immediately, and there can be an effect on general inflation for some time. If the price of a good or service rises faster than the general rate of inflation it provides a signal to potential suppliers that the good or service is becoming relatively scarcer, and provides an incentive for producers to increase their supply of this good or service and to profit from the higher prices. It also provides an incentive for consumers to reduce their consumption of this relatively higher priced good or service. These relative price movements therefore attract resources to a given activity so that resources are allocated to their most efficient and productive use. The increase in commodity prices should be viewed through the same lens: high commodity prices are signalling to existing and potential producers profit opportunities in supplying these commodities and to consumers to reduce or change their consumption.

3.14 The speed with which an economy reacts to relative price signals has important implications for growth and inflation at the macroeconomic level. The more flexible an economy, the more quickly resources can be reallocated in response to changing price signals and the stronger output growth may be while inflation at the macroeconomic level remains stable. As set out in Chapter 2, there are many factors that will delay or dampen the response to relative price changes, which, in the case of rising commodity prices affecting retail food and energy prices, has meant that these items have added to inflationary pressure and contributed to higher consumer price inflation across the world.



3.15 As demonstrated by Chart 3.3, average inflation across advanced economies exceeded 3½ per cent in March 2008, up from less than 2 per cent at the start of 2007. Across the BRICs countries (Brazil, Russia, India and China), inflation has risen consistently since late 2006 and reached 6 per cent in April this year. Food and energy prices have been important contributors to headline inflation in emerging markets; the increase in headline inflation in China from 3 per cent one year ago to 8½ per cent in April 2008 was almost all accounted for by rising food prices.

3.16 In the last year, commodity price inflation has made an important and growing contribution to headline inflation across advanced economies. In the UK, US, Japan, Germany, France and Italy, the contribution of rising food and energy prices was at least 50 per cent of headline inflation rates over this period. In the past, food and energy prices only contributed around a third to headline inflation. If the contribution from other commodities, and the indirect effect through the production chain, were also factored in this share could have been higher still.

3.17 The extent to which monetary authorities are successful in meeting the challenge of rising inflationary pressures will depend, in part, on the effectiveness of their monetary policy frameworks. One concern is that in some emerging market and developing countries, where inflation has been increasing strongly, these frameworks are sometimes not very clear and the policy instruments available to the authorities may not be very effective.

Implications for consumer price inflation

3.18 Whether short-term inflationary pressure from higher commodity prices feeds through to higher general price inflation depends on how it affects inflation expectations and wage growth, and the response of monetary policymakers. If households and businesses view higher commodity prices as temporary and inflation expectations are well anchored, then businesses are less likely to pass on the additional costs in full to consumers, and workers are less likely to demand higher wages to compensate for the costs that are expected to be passed on. Alternatively, if workers try to maintain real incomes by bidding up wages in response to higher current inflation and higher expected inflation, costs for business increase further generating further inflationary pressure, something most large advanced economies experienced in the mid-1970s and early 1980s.

Balance of payments difficulties

3.19 In the short term, rising commodity prices are straining some countries' balance of payments positions by increasing the cost of their imports. For example, the UN FAO has identified 19 countries where large (more than 5 per cent of GDP) pre-existing current account deficits coincide with an expected increase in the cereal import bill of more than 1 per cent of GDP. In 11 of these 19 countries, more than one in five people are undernourished, a further illustration of the link between rising prices, macroeconomic, socioeconomic and political security concerns. In the medium term, this may increase the risk of these countries experiencing a balance of payments crisis in which the cost of borrowing becomes unsustainable, with the associated loss of jobs and output.

Global redistribution of income

3.20 In the short term, the redistribution of income between countries currently taking place could impact upon global economic growth through different countries' preferences for spending or saving additional income. For example, high energy prices are transferring income from advanced economies, where saving rates are low, to the oil producers of the Middle East, where saving rates are higher. This has led to the rapid accumulation of wealth in this region, which could lower global growth in the short term. However, the capitalisation of the various Sovereign Wealth Funds with excess oil revenues provides a mechanism to reinvest these funds back into the US and Europe and a greater opportunity for productive investment, including domestically in economic development and diversification.

Box 3.4: Impact of commodity prices on trend growth

It is difficult to assess the impact of higher commodity prices on potential output in real time, particularly in light of uncertainty over the persistence of higher prices. However, if prices for key inputs into production, such as oil or energy, were permanently higher, this could increase the cost of supply, and therefore limit the rate at which output could grow without inflationary pressures. In the 1970s, shocks in energy prices in particular were accompanied by sharply slowing growth and rising inflation, a phenomenon that came to be known as 'stagflation'

However, there are reasons to suppose that the impact of energy and other commodity prices on economic performance will be less severe than in the past, particularly in advanced economies. Experts cite greater flexibility in labour markets and improved credibility of monetary policy as factors that have helped limit the impact of the sharp energy price rises seen between 2003 and 2005 on performance in advanced economies.^a They also cite the declining share of energy as an input into economic activity as limiting the impact on economic performance relative to earlier periods.

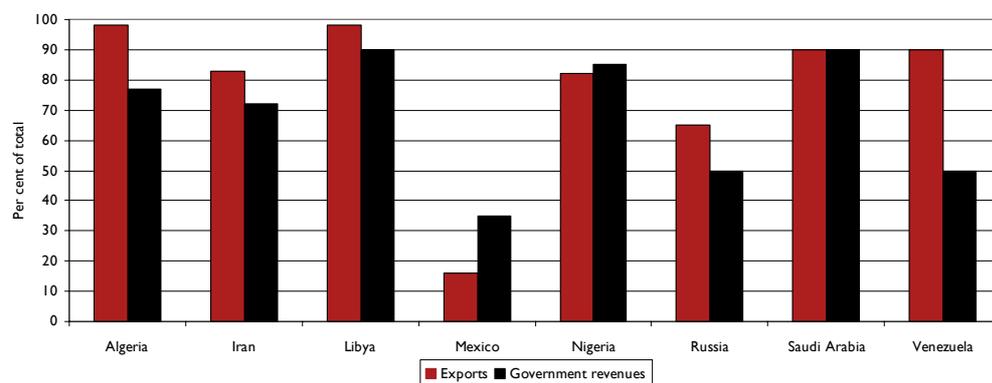
^a *The Macroeconomic effects of oil shocks – why are the 2000s so different from the 1970s?*, Blanchard and Galli, 2007

3.21 Finally, it is important to consider the economic impact of commodity prices in the broader context of globalisation. In addition to raising living standards in the emerging economies themselves, the integration of the large emerging markets into the world economy has resulted in many important benefits for advanced economies, such as access to much cheaper manufactured goods. Any negative impacts from higher commodity prices caused by increasing demand in these newly integrated countries must be set against these benefits.

Fiscal impacts

3.22 Changes in commodity prices have effects on public finances. The production and consumption of commodities is often subject to taxation, and is an important source of government revenue. Some countries operate subsidies, or place price caps on the prices of energy and food. For these governments, expenditure usually rises alongside commodity prices as they must increase subsidies.

Revenues 3.23 Governments often levy taxes on the production and export of commodities, and on profits made by commodity firms. Indeed in many producing countries, as set out in Chapter 2, the energy sector is entirely or partly owned by the state – so higher prices have translated directly into higher government revenue. Chart 3.4 shows the contribution of the energy sector in selected producer countries' economies to exports and to government revenues. In those countries where income from commodities is a substantial part of government revenue, volatility in prices will have an important impact on fiscal stability.

Chart 3.4: Contribution of the energy sector to selected countries' economies in 2007

Source: Various Article IV consultations, International Monetary Fund

3.24 In advanced economies, commodity prices affect public finances primarily through the tax base. Rising input costs will tend to reduce profits, potentially reducing corporation tax receipts. As higher prices change consumption patterns, with people spending a higher share of their income on food, and less on other goods, which tend to attract a higher rate of consumption tax in advanced economies, indirect tax revenues can be adversely affected.

Expenditure 3.25 All countries which have expenditure-based policies to address food and fuel security will be affected by changes in commodity prices. The impact on expenditure will be greatest in those countries with direct food and fuel subsidies. Many emerging and developing countries subsidise certain food staples and energy to facilitate access to basic goods for the poor. Countries including Vietnam, South Korea and Ecuador have introduced further policies in this area in recent months. Rising food and fuel prices will raise the budgetary cost of providing such subsidies. Indeed, fiscal pressures have built up in a number of countries in recent months, including Pakistan, Cuba and Morocco where subsidies could cost up to 10 per cent of GDP in 2008.

3.26 Despite their short term impact, subsidies are an inefficient way to tackle poverty, as they distort markets, hinder the working of the price mechanism, and are ineffective in targeting those most in need. In general, untargeted subsidies tend to benefit most the urban middle classes, because of their higher consumption. Targeted transfers to the poor are the most effective and least distorting responses.

3.27 As we have seen, commodity price rises can also boost government revenue, and as such give more scope to invest and intervene to support growth for those countries which benefit. This has been the case in Mexico, where oil revenue was used to finance a programme of infrastructure investment and measures to support businesses equal to around US \$9 billion, or 1 per cent of GDP.

Political and security impacts

Falling real incomes **3.28** The essential importance of commodities to family wellbeing, especially in poorer countries, means that price rises have immediate implications for political and social stability. Sir John Holmes, UN Under-Secretary General for Humanitarian Affairs, has warned that “the security implications should not be underestimated”.

3.29 Already in 2008 rioting has taken place in a number of countries including Cameroon, Niger, Mozambique, Cote d’Ivoire, Burkina Faso, and Senegal in protest at high food prices. Demonstrations have on occasion turned violent and led to fatalities, as in Haiti, Yemen, Egypt and Morocco. In producer countries, high prices can also generate tensions between social groups over the sharing of the commodity windfall. Vulnerable groups within society, defined by gender, age or disability, can also suffer disproportionately. Where prices remain high and volatile, many experts predict more instability. The Vice-President of the UN International Fund for Agricultural Development has expressed concern that social unrest may become common in more parts of Africa, and the World Bank estimates that a further 33 countries are at risk of social instability.

Rising tensions **3.30** Research has demonstrated the strong linkages between commodity production and conflict, particularly in less developed countries, including from competition for control of commodities and the income from them. This reinforces the need for the transparent accounting of commodity revenues and strong institutional frameworks to ensure that state commodity earnings are used responsibly and effectively. Going forward, the pressure on natural energy resources caused by increased demand, and the concentration of those resources in a limited number of countries in parts of the world that are often struck by geo-political tensions, is another factor that could affect global security.

3.31 When the social implications of high commodity prices negatively affect the popularity of governments, knee-jerk policy responses become a danger. In response to surging commodity prices many countries have introduced trade restrictions in an attempt to limit domestic price rises, as illustrated in Chapter 2. While such measures can help contain domestic prices in the short term, they have strong long-term negative effects. At a global level these beggar-thy-neighbour measures damage the world economy by restricting trade flows and adding to price pressures faced by food importers. Domestically, they damage the countries themselves by distorting the incentive for producers to increase production, and for consumers to reduce demand. In addition, protectionist policies can lead to retaliation and the adoption of tit-for-tat measures by other countries. Protectionism and trade barriers impose significant costs on the world economy; the World Bank estimates that the total liberalisation of trade in goods would be worth around \$290 million by 2015.

Impact on the natural environment and climate change

3.32 Commodities are natural resources. Oil and metals are taken from underneath the Earth’s surface, and crops for food are cultivated on it. The way in which the processes of extraction, production and consumption are managed have direct impacts on the natural environment – impacts which intensify as global demand increases and which will need to be carefully managed.

**Complex
impact on
emissions**

3.33 The net effect of the high commodity prices on overall global greenhouse gas (GHG) emissions is unclear. However, in the long run, tackling climate change can have mutually reinforcing benefits for commodities markets, for example:

- improving resource efficiency helps reduce emissions and demand for commodities;
- developing alternative sources of energy helps diversify supply and in turn should increase security and reduce the risk of price shocks; and
- tackling climate change should reduce the risk of increased weather-related shocks, and introducing adaptation policies will help reduce countries' exposure to them.

3.34 In the shorter run, the relationship is more complex and less clear. For example, high oil prices tend to encourage improved efficiency and substitution towards other fuels, including low carbon or renewables. On the other hand, high oil and gas prices can lead to substitution to coal and non-conventional sources of oil, which tends to increase GHG emissions. In the case of transport (which accounts for the bulk of oil demand in OECD countries), despite some evidence that higher prices are changing consumer behaviour by, for example decreasing demand for the least fuel efficient vehicles, substantial switching towards cleaner fuels with demonstrably lower emissions is limited in the short run because of the lack of commercially available alternatives. As outlined in the Stern Review, the regulatory framework for managing greenhouse gas emissions, in particular the development of global carbon pricing, will play the key role in determining how these issues develop.

3.35 At the same time, there are wider tensions to be managed, notably those related to land use in the context of increasing food production: including protecting rainforests, the use of irrigation and the development of biofuels. As agricultural production increases, it is important that it happens in a way that is as carbon efficient as possible, since agriculture itself already accounts for 14 per cent of global emissions.

3.36 In general, we can expect markets to provide efficient incentives for more food production relative to other economic uses for land. However, there will be cases where market failures may result in undesirable outcomes in terms of environmental sustainability. The most serious risk is that higher demand for food increases incentives to cut down forests, thus increasing global greenhouse gas emissions and climate change. Deforestation already accounts for around a fifth of mankind's contribution to greenhouse gases in the atmosphere.

3.37 Chapter 2 set out that high oil prices were encouraging the development of biofuels to replace oil in transport. There are now growing concerns over the indirect impacts of biofuels, with evidence that certain biofuels have greater potential to reduce greenhouse gas emissions than others, and in the extreme that some biofuels' production could actually increase carbon emissions.

CONCLUSION

3.38 This chapter has set out the implications and risks of continuing high and volatile commodity prices. It has shown that the risks are substantial, with potentially widespread social, economic, political and environmental impacts.

3.39 Rising commodity prices have been a contributory factor to social unrest across the globe, and impacted negatively on poverty – particularly amongst the most vulnerable and in the poorest countries. Going forward, high prices threaten the achievement of the Millennium Development Goals.

3.40 Rising commodity prices have been an important contributor to inflation around the world, affecting all countries. They have led to a redistribution of income between countries, benefiting those selling commodities, and also contributing to the persistence of global imbalances. Public finances have been affected by commodity prices through both revenue and expenditure.

3.41 Political stability in a number of countries around the globe has been threatened as people have protested against the cost of key commodities – and the World Bank and others are anticipating further threats to security in the future.

3.42 Finally, rising demand for commodities is having an impact on the natural environment, which if poorly managed, could have severe implications for the fight against climate change and wider environmental sustainability.

3.43 The widespread nature and severity of these risks underlines the importance of a coherent international policy response with a framework for enabling stable, secure and sustainable global commodity markets. Chapter 4 goes on to set out the UK's vision for what that framework should be.

4

ENSURING STABLE, SECURE AND SUSTAINABLE GLOBAL COMMODITY MARKETS

Prospects for commodity markets

4.1 This document has drawn together the current expert and market expectations for the short, medium and long-term prospects for commodity markets. Forecasting commodity markets is extremely difficult, even over relatively short-term periods and especially as regards the oil market. However, Chapter 2 set out that on balance the expert views and market expectations reviewed suggest that prices in real terms will remain higher than their historical averages, if lower than today's levels, with continuing and perhaps more frequent shocks, driven by continuing strong demand and a slow supply response. Chapter 3 set out the economic, social and political risks of unstable and sustained higher prices.

4.2 This underlines the importance of a coherent international policy response. The world's economies have responded successfully to commodity shocks in the past. Against this background, the overarching aim of the international community's policy agenda should be to ensure stable, secure and sustainable global commodity markets.

Stable markets

4.3 Volatile and high prices can have negative impacts across a wide range of economic, social, political and environmental indicators. Of course, as in any functioning market, price signals must be able to drive appropriate demand and supply responses – and the international community cannot seek to remove all volatility. However, as Chapter 2 set out, a number of factors across energy and food markets are driving demand on the one hand, while limiting the supply response on the other. The international community can drive forward better functioning markets by focusing policies on removing those barriers and providing a stable framework for demand and supply to meet more effectively.

Secure markets

4.4 Commodities play an essential role in both the wider economy and in consumption patterns across the globe. Volatility and insecurity in commodity markets are felt more keenly by people than for many other goods and services. Delivering energy and food security are fundamental concerns for all governments. This is commonly addressed at household and community level through national government policies. The desire for energy and food security has led to nationalisation of energy resources and protectionism in agriculture. However, with current high global food and energy prices and country-level insecurity, this is an international challenge and the international community must act quickly to encourage global dialogue.

Sustainable markets

4.5 The increased global demand for commodities over the coming decades will have significant implications for the global environment unless managed properly. It will require coordinated international action to ensure that increased production is undertaken in an environmentally sustainable manner. Chapter 3 set out some of these issues. For many economies, managing the transition to a food and resource efficient world will involve spin-off benefits, such as improvements in local air quality, reduced energy use and a more diversified fuel supply that can alleviate security concerns. However, it will also involve challenging transitional judgements, such as the optimum future use of coal, the exploitation of non-conventional sources of oil, changes in consumer and commercial behaviour, and the optimum use of land, including forestry management and biofuels production. Ensuring a market-based response to climate change, with a price for carbon, as well as allowing the market to set prices in other commodities, should be central to tackling these trade-offs in a fair and efficient way.

A principled framework to guide policy responses

Aim and objective 4.6 To best achieve the aim of ensuring stable, secure and sustainable global commodities markets, the objective of the international community's policies should be to enable these global markets to work as efficiently and effectively as possible. That requires:

- encouraging the most efficient level of demand, recognising the necessity of improved energy efficiency, environmental sustainability and reducing carbon dependency;
- enabling supply to respond as effectively as possible through technological improvements and providing a business and regulatory environment that encourages investment in sustainable supply; and
- increasing capability to respond to increased volatility and more frequent supply shocks.

Short, medium and long-term action 4.7 It requires action in the short-term to address immediate drivers of current price increases, and in the medium and long-term to address underlying causes of inefficiency in the commodity markets.

National, regional and international action 4.8 It also requires a principled framework for policies. This document focuses on the collective priorities for the international community, but there is also a key role for national governments. Box 4.1 sets out the policy framework that the UK is following domestically to deal with both the immediate drivers of high prices and underlying structural problems. The remainder of this chapter sets out the six core principles against which the international community should take action to ensure stable, secure and sustainable global commodities markets:

- maintaining economic stability;
- promoting openness;
- encouraging cooperation;
- supporting innovation and investment;
- ensuring fairness; and
- mitigating and adapting to climate change, especially increased resource efficiency.

Box 4.1: UK Government policy framework for stable, secure and sustainable food and energy markets

Improving energy and fuel efficiency to reduce costs to consumers and businesses is a UK Government priority. This is in addition to existing policies, including income measures to support the most vulnerable members of society. Over time, increasing the diversity of energy supplies and pursuing technological improvements also reduces exposure to international volatility in fossil fuel prices.

The UK's domestic policy response reflects the same principles that underpin the analysis of an effective international response set out in this document:

- maintaining economic stability: a stable macroeconomic framework that delivers low inflation and sound public finances;
- promoting openness: UK energy and retail markets are open and competitive, with strong, independent economic regulators to provide certainty for investment decisions. Consumers can switch suppliers to choose the best value deal for them. The UK continues to pursue an end to Pillar I of the CAP and an ambitious Doha Development Agenda agreement at the WTO, both of which would result in lower domestic food prices;
- encouraging cooperation: the Government works with Great Britain's six main energy suppliers to encourage and support them to target their collective annual spend on social assistance effectively. Suppliers have agreed to triple their collective contribution to £150 million by 2011, and the Government is taking steps to share data with suppliers to improve targeting;
- supporting innovation and investment: ongoing investment into the development and commercialisation of low-carbon energy technologies, including establishing the £400 million Environmental Transformation Fund, and partnership with the private sector through the Energy Technologies Institute;
- ensuring fairness: the Government's welfare reforms reflect its aims of eradicating child poverty, supporting families, and ensuring security for all in old age. Pensioner households also receive Winter Fuel Payments worth at least £200. Recognising the pressures on pensioners, such as higher energy bills, Budget 2008 announced an additional one-off £100 payment for households with someone aged 80 or over and £50 for households with someone aged 60 or over; and
- mitigating and adapting to climate change: the long-term targets and carbon budgets being introduced by the Climate Change Bill, alongside domestic policies and support for the reform of the EU Emissions Trading Scheme, will provide a credible, long-term carbon framework. A key element of this is incentives to improve energy efficiency, including for vehicles, homes and businesses.

I. MAINTAINING ECONOMIC STABILITY

4.9 Chapter 3 has set out the effect that poorly functioning commodity markets can have on global economic growth, and the associated risks to inflationary pressures, real income growth, political stability and poverty that can be the result of volatile and high prices.

A macro-economic and fiscal framework for stability

4.10 A framework for maintaining macroeconomic stability in both developed and developing countries is an essential underpinning element of the international community's strategy for ensuring stable, secure and sustainable commodity markets, and maximising resilience to short-term price shocks. This requires sound long-term macroeconomic policies, based on transparency and accountability. Central banks have a primary role in maintaining low and stable inflation rates through appropriate monetary policy, with the credibility of these policies critical to anchoring inflation expectations, in particular during periods of commodity price disturbances.

4.11 It is also essential that, in responding to the pressures placed on their economies from high oil prices, countries take forward responsible fiscal policies based on sustainable long-term growth, including, as appropriate, through the removal of fuel price subsidies, and the IMF has a role to play in advising all policy makers to support an appropriate resolution to these challenges.

Role for the international institutions

4.12 Going forward, active monitoring of the risks from global current account imbalances arising from commodity price fluctuations is needed. To support this, the IMF must continue its role in helping the international community to form a shared view of the trends, risks and the appropriate policy responses, working closely with other international organisations, central banks, finance ministries and other national authorities. The IMF should integrate its analysis of the impact of rising commodity prices into its surveillance activities, and help its members to respond to these challenges through its policy advice.

4.13 International institutions should also continue to enhance their capacity to provide financial support to countries facing instability through the provision of adequate and targeted shocks assistance. Recently, as food prices have remained high and fuel prices continue to escalate, there has been a marked acceleration in the number of countries seeking assistance, for example through an augmentation of their IMF Poverty Reduction and Growth Facility. The international financial community now needs to redouble its efforts and work with international institutions, including the IMF, the World Bank, and Regional Development Banks, to ensure rapid responses are delivered, with all countries able to take advantage of the appropriate financing facilities.

4.14 Looking to the medium term, the international financial institutions, as well as bilateral donors, also have a role to play in continuing to support developing countries' capacity to establish and implement sound macroeconomic frameworks, through capacity building and sharing of best practice.

Policy responses: maintaining economic stability

Short-term:

- improving the international community's existing shocks facilities, including simplifying the process for accessing the IMF's Exogenous Shocks Facility;
- supporting the IMF to integrate analysis of impact of rising commodity prices on balance of payments, and help its members to respond to these challenges through its policy advice.

Medium/long-term:

- increasing the support given by international financial institutions to support developing countries in establishing sound macroeconomic frameworks.

2. PROMOTING OPENNESS

4.15 A renewed momentum to open up global markets and remove price-distorting policies is a critical part of the action needed to tackle the factors impacting on an effective and efficient supply response to demand that were set out in Chapter 2 – and remains the best way of delivering continued long-term growth and prosperity for all.

A new world trade deal

4.16 The most urgent priority for action to secure the benefits of increased global trade is to make progress and secure a breakthrough in the Doha Development Agenda (DDA) trade talks. An ambitious deal is an essential part of a sustainable long-term solution to the current global food challenges. It will also help increase resilience to shocks by mitigating geographic-specific risks, including from climate change – if there is a constraint on supply in one region, alternative suppliers can fill the gap. More broadly, a successful agreement would provide a significant boost to the global economy at a time of economic uncertainty and is a critical element of any strategy to reduce global poverty and achieve the Millennium Development Goals. Given this, it is crucial that all parties to the negotiations show the necessary flexibility and political will to deliver a successful outcome.

Removing distortions and protectionist policies

4.17 Alongside efforts to reach a long-term multilateral deal on trade, countries should resist distortions and protectionist measures, aimed at tackling immediate price shocks domestically, but which exacerbate price increases internationally. Action to reduce the impact of such measures should include:

- removing artificial restrictions on supply;
- lifting export restrictions, in particular on food;
- phasing out harmful subsidies, including on fuel; and
- lowering tariff barriers, including on agricultural products.

These steps should be supported by international financial institutions, with the IMF providing guidance on how developing countries can move away from distortions and protectionist measures in a manner that minimises any impact on the most vulnerable, including through its forthcoming work on best practice for reform of fossil fuel subsidies.

Achieving efficient commodity markets **4.18** In the medium term, renewed effort should be focused on removing a number of longer-term structural problems and harmful policies that are reducing the capacity of global commodity markets to respond to price signals. In the global food market that means reform of the Common Agricultural Policy in the EU, as set out in more detail in Box 4.2, and agricultural reform elsewhere in the OECD. For example, the OECD estimates that agricultural support (as measured by the Producer Support Estimate – PSE) was worth 11 per cent to farmers in the US in 2006, compared to 32 per cent in the EU. The PSE figures in other OECD countries such as Japan (53 per cent), and Korea (63 per cent) are also very significant.

Box 4.2: Reform of the Common Agricultural Policy

The UK's CAP Vision aims: by 2015 to 2020, to have cut agricultural tariffs to the levels that prevail on industrial goods, to have eliminated all market management measures such as intervention and export subsidy, and all direct payments, which costed taxpayers €36 billion in 2007 - with remaining agricultural spending focused on securing public benefits that the market would not otherwise provide.

The immediate priority is to agree an ambitious, balanced WTO deal reducing agricultural tariffs that offers a real opportunity to make the global agricultural trading system fairer, more efficient, and more resilient in the face of any future production problems around the world.

The UK supports the end of export subsidies and export taxes. Although used very rarely, abolishing export taxes would reassure global markets that the EU will not seek to withhold exports and would send the right global signal on the need to keep markets open.

We also need, this autumn, to agree the EU's CAP Health Check. Permanent elimination of set-aside, for example, could lead to a modest reduction in the EU price for cereals of up to 5 per cent. Eliminating dairy quotas could lead to a substantial decrease in prices in EU Member States of up to 11 per cent.

Whilst the decisions to suspend set-aside and import duties on grains are welcome, there is scope for the European Commission to look at what it can do in respect of other relevant policies that, at a time of significant food price inflation, are still being used to keep EU prices higher than they would otherwise be.

Broader openness and economic reform **4.19** Beyond this, renewed focus on wider economic reform across economies is needed to improve the performance of factor markets, drive competition and efficiency, facilitate the better management of price risk, and lead economic growth to lift more citizens out of food and fuel poverty.

4.20 For example, in the EU, delivering energy market liberalisation following agreement of a legislative package by EU energy ministers is an urgent priority that will improve the single market. This will help lower electricity and gas prices for consumers.

4.21 More broadly, the first single market monitor into the retail sector, including groceries, will help identify any other barriers to an efficient and effective food market for Europe's citizens.

4.22 The developed world must also continue to play a leading role in building the capacity of developing countries to respond to new market opportunities. In particular, aid for trade can play an important role in building infrastructure to enable countries to compete in global markets, but also help to transport goods, including food, within their own countries. It can also provide assistance to countries facing significant short-term adjustment costs arising from preference erosion, loss of tariff revenue or higher food import prices. The G8 should meet its 2005 commitment to increase trade-related assistance by \$4 billion.

Openness to investment

4.23 Wider economic reform should also be supported by openness to investment, both by producers and consumers. Openness to international capital, resources and technology in producing countries will lead to the most efficient exploitation reserves. Similarly, there also needs to be an openness to capital flows from producers. The growth in sovereign wealth funds (SWF) is an example of how these countries are seeking to recycle their income from commodities into long-term investments in other countries. Limiting investment from SWFs will lower the expected returns on their assets and in turn reduce the opportunity cost of delaying commodity extraction, discouraging growth in oil supply. SWFs, working through the IMF, are developing a set of best practices for SWFs that will increase transparency. Recipient countries, working through the OECD, are making progress on a set of best practice principles to give investors clarity. Together these initiatives are important and should build confidence between states and facilitate free flows of investment.

Policy responses: promoting openness

Short-term:

- agreeing an ambitious Doha Development Agenda world trade deal;
- phasing out distortionary food and fuel policies, with guidance by international organisations of how to manage transition;
- delivering liberalisation of EU energy markets through the legislative package agreed by all member states;
- achieving regulatory reform of EU agriculture through the CAP Health Check; and
- agreeing an aid for trade deal as part of the conclusion of the world trade negotiations.

Medium/long-term

- reforming distorting agricultural support mechanisms in the EU and across the OECD; and
- increasing openness to global investment flows by producers and consumers, including access to Sovereign Wealth Funds.

3. ENCOURAGING COOPERATION

4.24 As the global economy becomes ever more interdependent and financial and commodity flows between global producers and consumers increase through openness and fair trade, so cooperation and information-sharing between countries becomes an increasingly important part of the global response, to avoid volatility and to build up trust in markets.

Increased dialogue **4.25** Open and constructive dialogue is essential if the causes of high and volatile prices and their impact are to be tackled. To help achieve this, the shape and role of the international institutions needs to be reformed. This should include offering countries such as China, India, South Africa, Mexico, Brazil and other emerging countries a greater role on the international stage, including with the G8, the IMF and the World Bank, alongside wider reform of the United Nations. Developing regional institutions have a role to play as well, including the EU, the Association of South East Asian Nations, and the African Union.

4.26 Specifically on oil, increased dialogue between producers and major consumers including the EU, will help foster shared understanding of both the demand and supply-side actions needed to mitigate high oil prices, including actions to increase energy efficiency and expand supply. The UK welcomes the recent call by Saudi Arabia to this end.

4.27 On food, the independent external evaluation identified a number of issues for the FAO management to address. Key to this will be a fully operational strategy linking the organisation's goals with its actions and programmes. The administrative and managerial systems should be modernised and made more transparent and efficient so the organisation can perform more effectively.

More transparency **4.28** Greater transparency across all parts of the commodity market – from information on harvest predictions to local farmers through to the production capacity of the major energy producing countries – can also play a role in helping all sides gain a better understanding of trends in supply and demand. Chapter 2 set out areas where limited information is impacting on the market.

4.29 In the oil market, the International Energy Forum should be supported in taking forward its work to improve and extend the coverage of the Joint Oil Data Initiative (JODI). Consumers can play an important role by more regular publication of inventories data. The IEA's analysis of the economic impacts of higher oil prices will help further improve understanding of the medium and long-term impacts of higher oil prices on the global economy. Increased membership and implementation of the Extractive Industries Transparency Initiative (EITI) will help increase understanding of the volumes and uses of oil revenues and improve the functioning of the market.

4.30 In financial markets, as set out in Chapter 2, the only available data to examine the role of investment activity in commodity markets is the US CFTC's data on 'non-commercials'. This represents only a subset of investment activity. Within the EU, the European Commission is reviewing its existing financial regulatory framework for commodity and exotic derivatives, including looking at what sort of business should be regulated, and market integrity issues such as conduct of business, transparency and market abuse. This will report at the end of 2008, and the UK has recently set out its priorities for this work, concluding that there is no evidence of market failures justifying increased financial transparency regulation. However, there remains a need for sufficient information on financial flows into commodity derivatives to ensure interested parties have an accurate understanding of market developments. The first step is to ensure best use of existing information sources, sharing where appropriate, and the Bank of International Settlements (BIS) and IMF are well-placed to work across the international financial community to facilitate this.

Policy responses: encouraging cooperation

Short-term

- enhancing dialogue and cooperation between major oil consumers and producers; and
- improving the accuracy and coverage of JODI and strengthening the implementation of the Extractive Industries Transparency Initiative (EITI).

Medium/ long-term

- reform to the shape and role of the international institutions; and
- improving financial market transparency through BIS and IMF to facilitate use of existing sources of information on financial flows into commodity derivatives.

4. SUPPORTING INNOVATION AND INVESTMENT

4.31 Stability, openness and cooperation are essential components to help strengthen market forces and restore sustainable demand-supply balances and should be the focus of international policy interventions. But the international community also has a role to play in introducing targeted policies to mitigate demand growth and manage the supply response – encouraging investment and research, focusing on more efficient production and distribution, and driving forward technological change. Chapter 2 set out how barriers and disincentives to investment and innovation are affecting the market.

Getting the investment framework right

4.32 Given the scale of output and productivity growth and technological innovation that is needed to meet predicted future demand for commodities outlined in this paper – a 50 per cent increase in grain production by 2030 and a 30.5 million barrels per day increase in oil over the same period – it is critical to ensure that national, regional and international policies work together to deliver a fundamentally sound framework for investment.

Reducing barriers to investment

4.33 This effort must start by removing barriers to investment. The International Energy Forum's (IEF) work on examining the barriers to investment should be prioritised, and the IEF should continue to lead on increased cooperation between international oil companies, national oil companies and service companies on how to best manage the increasing costs, complexity and risks of large investment projects, and on the sharing of technological expertise.

4.34 This analysis will support a strengthened international dialogue to address barriers to investment, enable an agreed understanding of the levels of investment required, including in refining capacity and human capital and expertise, and enable better action to address this. As part of this, the oil and gas industry, universities and research centres should also work together to promote a global skills initiative and help address the current shortages of skilled technicians.

4.35 Reducing barriers to investment is equally important on food, especially in developing countries, where investment in infrastructure such as roads and irrigation is vital. Developing countries have a responsibility to strengthen their own investment environment, for example, by strengthening land and property rights, improving regulatory regimes and tackling corruption. Donor countries can assist in removing barriers to investment. For example, the Private Infrastructure Development Group (PIDG) facilities have been extremely successful in helping to mobilise additional private investment in projects covering agriculture, water and transport among others.

**Incentivising
innovation**

4.36 To meet the need for agricultural research directed to poor, smallholder farmers will require a doubling of total international investment. Increased investment is an essential foundation for enabling innovation to respond to the need for increased supply. That is why the UK is calling for an International Partnership for Agriculture and Food to bring the international community together and to make sure that our aspirations are backed by resources and result in achievement.

4.37 The Consultative Group on International Agricultural Research (CGIAR) is central to achieving this ambition. With improved funding arrangements and clearer articulation with regional and national research systems, the CGIAR will warrant doubling of funding to become a billion-dollar-a-year organisation. Alongside this, to protect against agricultural risk acting as a disincentive to investment in countries without strong capital markets, priority should be given to assessing whether it is possible to manage their risk in an exchange in a different country.

4.38 Public policy should encourage all forms of innovation that support the aim of increasing agricultural productivity on a sustainable basis. In addition to conventional approaches, biotechnology, including GM, has the potential to make agricultural production more efficient and sustainable. Subject to future research, biotechnology could increase crop resilience to pests, diseases and consequences of climate change (e.g. drought); increase yield per crop planted, and lead to more efficient use of nutrients (e.g. nitrogen). Over time biotechnology has the potential to increase supply in feedstock markets and so lower prices in both grain and meat markets.

4.39 In order to take advantage of technological innovations in GM research and development – while maintaining the existing high level of EU safety standards – the operation of the EU's existing regulatory regime for GM products should be improved, including speeding up procedures for importing safe GM feedstocks. This would ensure that the regime does not act as a disincentive to the potential development and use of beneficial GM crops.

Policy responses: supporting innovation and investment

Short-term

- working with oil producing countries and companies to overcome constraints on increased supply;
- implementing G8 initiatives on enhanced energy technology research, development and demonstration; and
- improving the operation of the EU regulatory regime for genetically-modified organisms (GMOs).

Medium/ long-term

- doubling international investment in agricultural research through the Consultative Group on International Agricultural Research (CGIAR). The UK has announced a doubling of UK funding to agricultural research, to US \$800 million over the next 5 years;
- supporting the IEF and others in removing barriers to investment in the energy industry, including a skills initiative for the oil and gas industry.

5. ENSURING FAIRNESS

4.40 The impacts of food and fuel inflation are not felt equally throughout the world, as set out in Chapter 3. Across all countries, developed or developing there will be a need for sound policies to support those most at risk. It is important that these policies are offered as general support and are designed to minimise distortions to the markets themselves. The World Bank has described such social protection schemes as the “first best” option for addressing food security. The UK announced additional funding of US \$44 million for the Ethiopia safety net and US \$64 million for social protection in Mozambique and Bangladesh.

Food aid 4.41 International institutions providing immediate food aid, in particular the World Food Programme (WFP), should be properly resourced and may need to be given additional support during periods of high food prices. In this regard the swift international response to the WFP’s recent appeal for increased funding is extremely welcome. Where possible, providers of food aid should look to source the food locally in order to encourage agricultural development.

4.42 Rapid response financing facilities such as the World Bank, the International Fund for Agricultural Development and Regional Development Banks should assist countries in need of policy support and assistance with the procurement of agricultural inputs, in particular fertilisers and seeds, and their affordability by poor farmers.

Long term aid 4.43 Longer-term aid is needed to address the broader issues that make individuals, households and countries vulnerable to increasing prices, for both food and oil. For example, long-term, predictable financing for education is essential for providing the human capital needed to sustainably raise incomes. Measures that support inclusive growth will in turn improve access to food and energy, reducing the insecurities experienced by the poor. The international community must live up to its commitments on Official Development Assistance (ODA).

Policy responses: ensuring fairness

Short-term

- resourcing properly effective humanitarian assistance through the World Food Programme. The UK has provided \$60 million to the recent WFP appeal; and
- improving provision of cheap seeds and fertilisers ahead of the next planting season;

Medium/ long-term

- doubling of agricultural production in Africa and agricultural growth rates in South Asia. In both Africa and Asia, agriculture must be a driver of growth and poverty reduction; and
- delivering international commitments on Official Development Assistance (ODA).

6. MITIGATING AND ADAPTING TO CLIMATE CHANGE

4.44 Moving to a sustainable low-carbon economy will provide greater security to global commodity markets, by encouraging better resource efficiency and greater supply diversity. But coordinated international action is required if we are to make the global transition to a food and resource efficient economy. This international action must comprise both measures to move to a carbon constrained economy as well as support for adaptation to climate change

4.45 Action to mitigate against climate change will form part of the international community's policy response to ensure sustainable commodity markets. Diversification of energy supplies towards low carbon sources will improve security of supply. Existing renewable technology, carbon capture and storage and nuclear must all be a large part of a solution, supplemented by international research and development of alternative energies, such as those explored in IEA roadmaps on 17 key technologies. For developing countries, the international community must provide financial and technical assistance to support low carbon and climate resilient economies, which are protected from some of the impacts of high commodity prices. The Strategic Climate Fund will provide funding to this end.

4.46 Moves towards resource efficiency and improved emissions intensity will help to reduce and stabilise demand. Recent agreement to the IEA's 25 recommendations on energy efficiency is an important development, and further ambitious international cooperation will be required.

4.47 Climate change will increasingly affect agricultural production through changes in temperature, rain patterns and increased severe weather events. The effect of this will fall disproportionately on low-income developing countries. These countries must be assisted in adapting to climate change, so that they are provided with more secure and stable access to food.

4.48 An ambitious global climate change deal is needed that places all countries on a low-carbon growth path, and which addresses the challenges faced by adapting to climate change. Such a deal, which must enable countries to reduce emissions at the least cost to their growth and development ambitions, should be mindful of Stern's conclusion that a 1 per cent of GDP invested now in tackling global climate change will save us 5 to 20 per cent later. At its core must be market-based incentives, that put a cost on carbon, such as the global carbon market, for private finance to drive investments into lower-carbon technologies. Late last year, all countries agreed to launch negotiations, which should conclude by end 2009, under the UNFCCC 'Bali Action Plan', for a global deal to succeed the Kyoto Protocol, which expires in 2012.

Land use and biofuels **4.49** As set out earlier in the document, balancing competing demands for land use presents a particular challenge for commodity markets in the context of climate change, including protecting rainforests, the use of irrigation and water sustainability, and the development of biofuels. A number of recent policies and commitments have been put in place to encourage the production and use of biofuels in particular.

4.50 In light of recent concerns over the sustainable use and production of biofuels, the UK Government has commissioned an independent review of the impacts (direct and indirect) of biofuels, including implications for land use and food production. The Gallagher review is due to report in late June. It will ensure that policy decisions are taken on the best possible evidence basis and should provide useful information for the re-examination of EU and international biofuels policy and related targets, including a full assessment of the impact on global food prices.

Policy responses: mitigating and adapting to climate change

Short-term

- securing agreement to the Strategic Climate Fund, assisting low-carbon and climate-resilient growth for developing countries;
- implementing measures within the EU to substantially reduce emissions by 2020, increase energy efficiency and deliver up to 12 carbon capture and storage demonstration plants;
- examining the impact of biofuels on food production; and
- implementing the recent G8 Energy agreement to take forward the IEA's 25 recommendations on energy efficiency.

Medium/ long-term

- agreeing an ambitious international deal on climate change reached by the end of 2009;
- developing the global carbon market, including through the linking of emissions trading schemes;
- increasing international commitment to accelerate the development and deployment of low-carbon technologies; and
- incorporating mitigation and adaptation strategies within national development plans.

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