RECOMMENDED READING

NOTE FOR RECORD

From (MA-CAPD) and (ID-GSID)

Initial evidence on the impact of the fall in the price of oil on UK GDP

This note assesses the impact of the fall in the price of oil on UK activity to date. Table 1 provides a summary.

It is, of course, too early to assess the full impact of cheaper oil on economic activity. Many channels – notably those that work through supply[1] – could take months, if not years, to operate. But some channels are expected to work more quickly. It is these channels that are the focus of this note, and in particular the response of household consumption and the extraction sector, since we have timely data for these sectors that allow us to monitor our judgements. A box considers the impact in other countries.

Overall, the incoming UK data do not make us want to change our treatment of oil in the forecast. A full explanation of this treatment can be found in and

Table 1

Channels considered	Expected short-run impact of oil price fall	Actual impact to date
Households		
Lower fuel & energy prices boost consumers' discretionary income and, subsequently, consumption	The level of consumption to be boosted by 0.1pp in Q4 and 0.3pp in Q1, consistent with a marginal propensity to consume from the real income gain of around 0.8.	Broadly in line with expectations. The boost to real incomes was roughly as expected, and consumers appear to have spent it, predominantly in Q1.
Extraction sector		
Lower prices reduce investment in the extraction sector	10% fall in extraction investment in 2015.	Small falls in both Q4 and Q1, in line with our forecast.
Lower prices depress output in the extraction sector	Little impact in the short run, but an important risk to monitor.	No obvious impact, as expected. Output has actually increased recently.
Rest of World		
Lower prices boost the real disposable income of oil consumers and reduce the income of oil producers, with the former effect dominating. World demand increases, increasing demand for UK goods and services.	Little impact on the UK in the short run, but increased world demand pushes up on UK GDP by around 0.2% over 2016 and 0.3% over 2017.	Q1 euro area data are broadly in line with the projected oil impact. Monthly data suggest the weakness in the US is temporary, and growth in Q2 will be consistent with the expected boost from oil.
Total impact on UK GDP	The level of GDP to be boosted by 0.3pp by the end of 2015.	So far, the short run impact has been broadly as expected. So there is no reason to change our view materially.

Households

Households' purchasing power has increased by around 0.4% since the fall in oil prices in mid-2014. It looks like they have largely spent the boost – in particular in Q1, when household consumption grew by 0.9% despite measured nominal income falling. In total, we think the level of consumption was 0.2%-0.4% higher than in the absence of the oil price decline, consistent with consumers having a marginal propensity to consume from the direct boost to real income between 0.5 and 1.

Lower energy prices directly increase consumers' purchasing power as they have more money remaining after paying for fuel and utilities. Chart 1 plots the changes in purchasing power associated with energy price fluctuations over time. The consumer gains when the bundle of energy goods[2] they purchased in the previous quarter costs less in the current quarter, and vice versa for losses. This measure implicitly assumes demand for energy is perfectly price inelastic in the short-term, which means the change in purchasing power can be thought of as a change in real income.

Consumers' purchasing power is estimated to have increased by around 0.2% in both 2014 Q4 and 2015 Q1, giving a total increase of 0.4%. Q1 was the biggest single quarterly gain in our sample (which goes back to 1990), and Q1 and Q2 together are the largest two-quarter cumulative gain, suggesting the most recent episode has provided the most significant gain in purchasing power from fluctuating energy prices in our sample. This is one of the reasons the share of energy in nominal expenditure is now at its lowest level since 2005 (Chart 2). The size of this direct boost to real income was broadly as expected, based on official inflation data and our short-term inflation forecast at the time of the May *Inflation Report*.

Chart 1 – Change in purchasing power on previous quarter

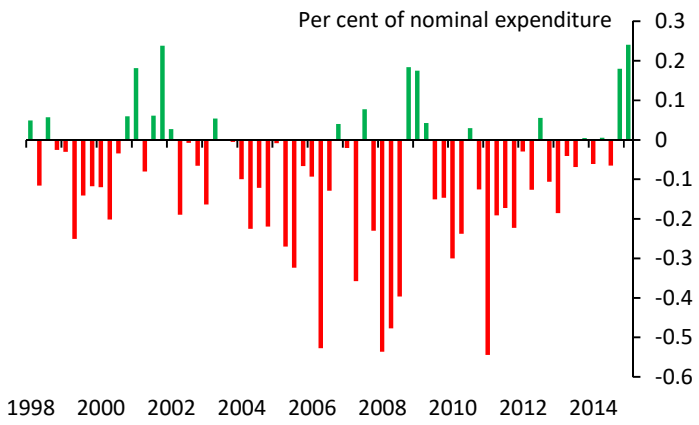
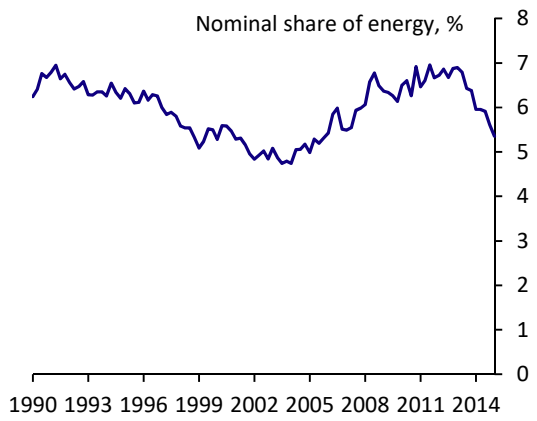


Chart 2 – Share of energy in consumption



Whether consumers spent this gain is another matter. Household consumption growth is currently estimated to have been 0.5% in Q4 and 0.9% in Q1. To estimate some possible counterfactual paths for consumption we have run a range of simple statistical forecasting models from 2014 Q3. Some of these use different measures of nominal income to try to control for its influence. These estimates suggest that the level of consumption was between 0.2% and 0.4% higher in Q1 than it otherwise would have been, although this boost came entirely in Q1. In other words, there was no boost to quarterly consumption growth in Q4, but a boost of between 0.2pp-0.4pp in Q1. The larger impacts come from the equations that control for income, since quarterly income growth was particularly weak in Q1, suggesting that consumption would have been much lower in the absence of the purchasing power gain. These estimates are consistent with consumers having a marginal propensity to consume (MPC) out of the direct income boost of between 0.5 and 1.

Our central expectation in the May *Inflation Report* for the immediate impact is within this range: we had expected a boost to the level of consumption of 0.3% by Q1, and we still expect a further 0.1% boost to the level in Q2, bringing the total level impact to 0.4%. That expectation was informed by a range of time series models and

[2] For the purpose of this note 'energy goods' includes motor fuel, other liquid fuels, and utilities (energy, gas and other fuels). Although this might overestimate the effect of the oil price fall if energy prices have fallen for separate reasons, this is offset by the likely underestimate by not including further supply chain effects.

COMPASS, and was consistent with an MPC from the direct real income boost of around 0.8 – an estimate roughly in the middle of our range.

Although the uncertainty around these estimates is inevitably large, it is reassuring that this simple approach yields similar impacts to the model-based simulations used to inform the forecast.[3] However, the latest consumption data are still relatively immature, so it is always possible the story will change as the data get revised.

As the box below explains, the UK's experience appears to be similar to that of the euro area, where retail sales and consumption growth also picked up in Q1. For US, in contrast, consumption growth is not expected to pick up until Q2, with Q1 affected by erratic factors that masked the support to consumption from higher disposable incomes.

Although the discretionary income effect is likely to be the largest effect in the short-run, there are other ways in which the fall in the price of energy might boost consumption. For example, the operating cost of durables that require energy will fall, possibly encouraging consumers to bring forward, or make additional purchases of these goods. Motor vehicles are the most obvious example of a durable which requires energy to run. Although some studies find a large role for this *operating cost effect* in the transmission of energy price shocks[4], there is little evidence of this operating cost effect in the UK to date: although three month on three month growth in private car registrations was the highest in over a year in the three months to May (Chart 3), it is still well below the rates seen in 2013, when oil prices were still at historically high levels. And the composition of consumption in Q1 does not contain any clear sign of this effect, as the strength in Q1 was quite evenly spread between components (Chart 4) – although the contribution to growth from cars was above its share in consumption (around 5%).

Chart 3 – SMMT private car registrations

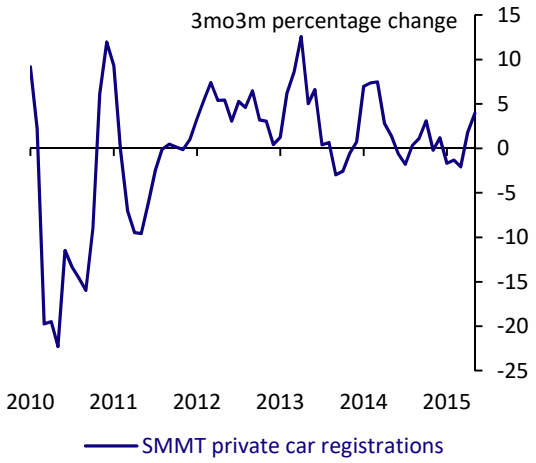
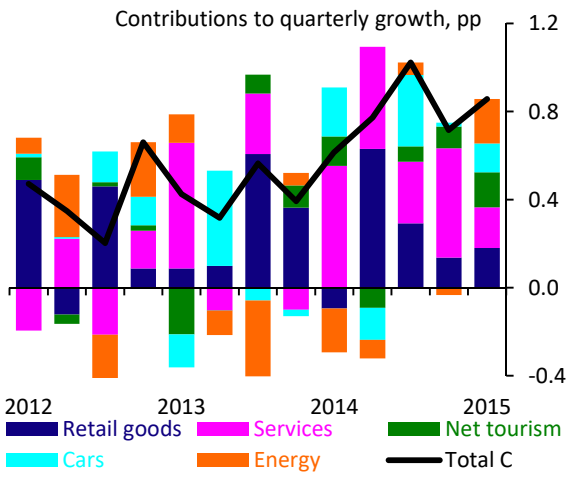


Chart 4 – Contributions to real household consumption growth



Extraction sector

Low oil prices may mean some extraction activity becomes unprofitable. We think this will primarily affect extraction investment, rather than output, in the short-run. We made an explicit judgement in the February and May *Inflation Reports* to this effect. Our expectation is broadly unchanged since then, as investment has begun to fall but output has actually increased.

Between 2000 and 2013 there was steady decline in extraction output, reflecting diminishing reserves in existing North Sea wells and a lack of investment in new wells. But that decline ended in 2013, with output of both oil and gas settling at around 3 million tonnes a month (Chart 5). The fall in the price of oil (and, to a lesser extent, gas) might lead one to expect the downward trend to reassert itself. But output has, if anything, been a little higher than before the oil price fell: output of oil in May was higher than in any month since August 2012.[5]

[3] See pg 17 of The short-run level boost to GDP is mainly due to the direct boost to consumption, although over time second round effects become more important.
[4] For example, Edelstein and Kilian (2009) find that the consumption of fuel inefficient cars in particular falls when fuel prices spike.
[5] Using in-house seasonally-adjusted DECC data.

There are several reasons to expect a muted response from output to the price of oil in the short-run. First, although North Sea production costs range from around $20 to $100 per barrel - meaning the current price should make some production unprofitable – the short-run marginal cost is likely to be much lower. Capital and, in some cases, labour, may have been committed to production well in advance, so the marginal cost of production after these sunk costs is likely to be small. Second, some sales will have been conducted on the forward market, which will ease the immediate impact for some producers.

And even if output *is* now lower than it would have been in the absence of the price fall, there appear to be separate factors pushing up production. Firstly, DECC have told us that several existing pipelines have resolved technical issues over the past few months and are only now operating at full capacity. These sorts of developments tend to drive short-run volatility in extraction output. But it may also be the case that high investment in the extraction sector over the past four years is boosting output. In 2013 we thought that high levels of investment could actually *increase* output by the end of 2015, as several new wells were expected to open and the efficiency of existing wells was being improved.[6] We now expect output of oil and gas to fall, albeit more gradually than before 2013. This expectation is similar to DECC's forecast, which was lowered slightly in February following the fall in the oil price (Chart 6). The gentle decline in output they expect would mean the sector drags on annual GDP growth by around -0.05pp from 2015, half the drag it exerted between 2000 and 2013.

Chart 5 – Monthly oil & gas production

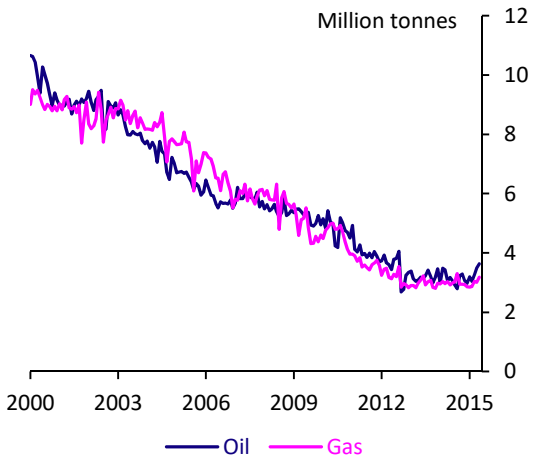
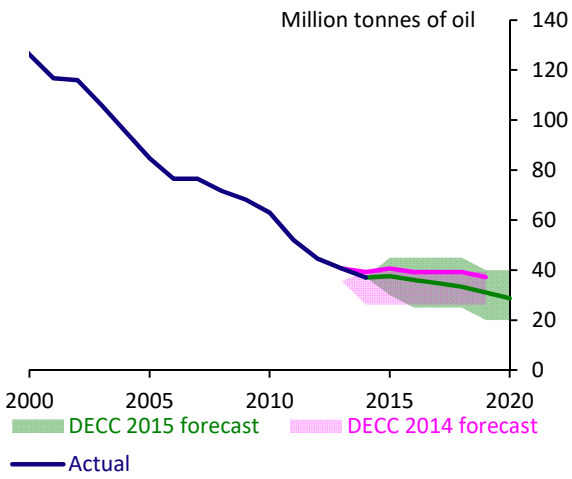


Chart 6 – DECC annual forecasts for oil output



In contrast to extraction *output*, we think the fall in the oil price will have a significant adverse effect on extraction *investment*. We made an explicit judgement in the February *Inflation Report* that extraction investment would fall by a little over 10% in 2015, with further falls in 2016 and 2017.[7] This was in part a reaction to the lower oil price. But it was also recognition that investment in the sector had been unusually high between 2010 and 2014, and various industry bodies had expected it to fall anyway. This judgement was added onto the business investment forecast, as we judged that our regular modelling framework did not account for this channel. Although the effect on total business investment was small, and partly offset in GDP by a reduction in imports, it roughly offset the positive impact from the fall in oil prices on investment in other sectors by the end of the forecast.

Since we made that judgement we have received two quarters of data on extraction investment. In 2014 Q4 investment declined by 2% and in 2015 Q1 it declined by a further 3%, dragging on total quarterly business investment growth by 0.1pp and 0.2pp respectively. These falls were roughly in line with our forecast, so did not provide us with news. As a result our forecast is unchanged: we still expect extraction investment to fall by 10% in 2015 and a little over 20% in 2016. This represents is a significant drag on business investment growth - in the May *Inflation Report* it detracted 1.3pp from calendar year growth in 2016. But the sector is sufficiently small to have only a minor effect on GDP growth – it reduces calendar year growth of GDP by 0.1pp over the same period. This is in contrast to the US, where the decline in investment is likely to be steeper and more front-loaded (see box).

[7] We revised this forecast in the May *Inflation Report* in light of new measures in the 2015 budget to reduce the taxation of profits for extraction companies, building on measures already announced in the 2014 Autumn Statement. But the qualitative expectation of a significant decline in extraction investment was unchanged.

The impact of the fall in the price of oil on world GDP

What have we assumed in our forecast?

The 50% (or around 35% over the futures curve) fall in oil prices since the summer of 2014 provides a boost of around 0.8% to the level of world GDP growth over the next three years in the international forecast. A full explanation of this forecast can be found in and

But the impact of oil should be taken in context. We also made large downside judgements to global growth during the period over which oil prices fell. These included near term weakness from the crisis in Russia, additional revisions to the outlook for euro-area and US growth, and increased pessimism over potential supply in EMEs. Some of these judgements will be reflected in the *demand-led* component of the fall in prices, although our assessment continues to be that the fall in prices was mostly supply-driven.

Overall, these judgements outweighed the boost from oil (**Chart 1**), leading us to maintain a relatively pessimistic view of the outlook for global growth. That said, lower oil prices represent one of the key drivers of growth in the May IR International Forecast, contributing a boost of around 0.6-0.7% to the level of GDP in our largest trading partners, the US and euro area respectively. As laid out in the May IEM, we would expect most of the impact of lower oil prices on GDP to come through higher consumption, as real incomes are boosted. The US and euro area forecasts were consistent with a marginal propensity to consume out of the direct income boost of roughly 0.8. That said, in the US, as in the UK, the boost from higher consumption is partially offset by reduced investment in the extraction sector. This is significantly larger than the impact built into the UK forecast, amounting to a 0.3% hit to the US economy, where 10 million barrels a day of oil are produced.[8]

Chart 1 – Revisions to the international forecast August 2014 – May 2015 *IR* (PPP-wtd)

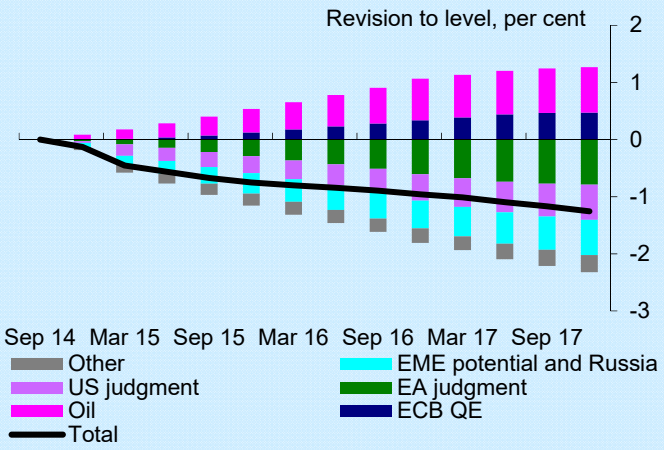
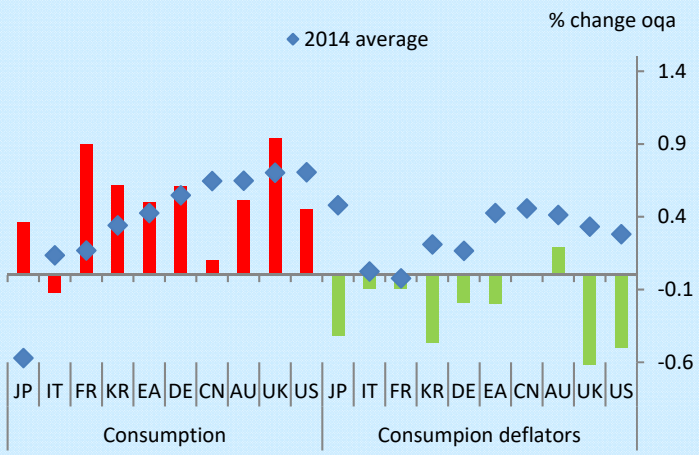


Chart 2 –Household consumption and prices in Q1



What do the data suggest about the impact of lower oil prices on global growth?

We have had just one quarter of data since the major judgements on oil were made in the February *IR*, so it is difficult to judge the impact given we do not expect the full effect of oil on GDP until around two years after the fall in prices. Indeed, only around 0.1pp of the impact on world GDP was expected to come through in Q1. Furthermore, the downside judgements we have made since the fall in prices outweigh the stimulus from oil.

In the May IEM, we highlighted evidence that the fall in oil prices had stimulated consumption in the euro area, with increased expenditure on non-fuel components of retail sales. However, there was less evidence of the boost from oil in the US where retail sales turnover fell after the most significant price falls. That could suggest

[8] See This judgment was added following the initial February *IR* forecast judgement on the impact of oil.

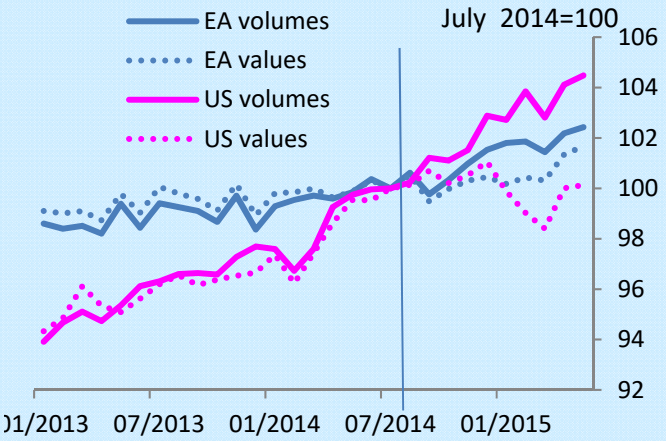
either a weak counterfactual, due to temporary factors such as the poor weather, or it might suggest that, for some reason, consumers have chosen to pocket the savings from lower oil prices rather than spend them. The picture will be clearer when we have the full data for Q2. Now, with Q1 GDP expenditure data, we can see that there is no broad-based trend towards increased consumption growth in G20 countries with available data, despite a significant slowdown in consumer price growth (**Chart 2**). The Q1 data reinforces the positive developments seen in euro-area retail sales and disappointing sales in the US observed in the May IEM. In the euro area, consumption picked up to 0.5% oqa from 0.4% in Q4, in line with our forecast. While in the US, consumption growth came in at 0.4% relative to our forecast of 0.7%.

April and May data suggest a continuation of robust retail sales in the euro area, and a partial reversal of relatively disappointing sales data in the US (**Chart 3**). Other monthly indicators in the US are also suggesting a return of consumption growth to 0.7%, and a pickup of GDP growth to 0.8%, consistent with our judgement on the boost from oil. And in the euro area, monthly data point to consumption growth remaining at around 0.5% in Q2, unchanged from Q1. This is consistent with a moderate boost of around 0.1pp to the level of GDP by Q2 from oil, which is embodied in the May *IR* forecast.

Do the data change our view of the impact of oil?

Pockets of disappointing consumption outturns went hand-in-hand with weak global growth in Q1.[9] Indeed, our current estimate of PPP-weighted world growth in Q1 is 0.2pp weaker than our forecast of 0.85% in the Feb *IR*. However, a good deal of the difference is accounted for by the large surprise in the US (0% vs 0.6% forecast), which we believe was partly due to temporary factors. Accounting for this, the data are consistent with the subdued underlying forecast for global growth, despite the boost from oil. Looking ahead to Q2, growth in our largest trading partners, the US and euro area, is set to return to rates consistent with our forecast incorporating the boost from oil.

Chart 3 – Retails sales in the US and euro area



[9] For a review of Q1 global data see the "July International Economics Monthly"