3. Fiscal stimulus and the consumer

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Summary

- The recession has been associated with a substantial fall in household spending and a rapid rise in the saving rate. Partly as a consequence, the government implemented a fiscal stimulus, including a temporary cut in the main rate of VAT from 17.5% to 15% and a car scrappage scheme.

- The VAT cut has ended and the car scrappage scheme expires in February 2010. The return of VAT to 17.5% will increase prices by about 1% on average. This is likely to mean consumption is about 1% lower than it would have been had the rate remained at 15%, reversing the 1% consumption increase brought about by the temporary cut. The immediate impact on purchases may be a more than 1% fall, as consumers may have brought forward purchases at the end of 2009 that they were planning to make later to take advantage of the lower VAT rate, with a consequent reduction of purchases in 2010.

- If the government wishes to raise more revenue in the future by increasing the VAT rate further, and if the downturn proves more prolonged than anticipated, then pre-announced increases in the rate could help stimulate consumption ahead of the increases. Relative to increases in income tax, higher VAT may be an economically efficient way to raise revenue. But some may think it inequitable towards those with savings.

- The car scrappage scheme allows for up to 400,000 old vehicles to be scrapped and replaced by a new one, with a £2,000 incentive split between government and manufacturers. The scheme has been associated with a large short-term increase in car registrations compared with their 2008 levels. The largest impact may well be to encourage people to replace old cars with new rather than second-hand vehicles.

- Economic theory and studies of previous schemes suggest that there is likely to be a substantial and enduring 'payback' effect after the scheme ends. Sales will be reduced relative to a no-subsidy baseline as people have brought forward their purchases.

- The environmental benefits of the scrappage scheme are likely to be very small. Households are choosing relatively clean new cars, but may well drive them more than they drove their old vehicles.

3.1 Introduction

The current recession is the largest to have hit the UK in decades: GDP peaked in the first quarter of 2008 and has since shrunk by around 6% – a considerably greater decline than in any UK recession over the last 40 years. Real household spending peaked somewhat later than GDP (the third quarter of 2008) and has fallen somewhat less (about 4.3%

according to the latest data). Although it is not yet clear that spending has reached its trough, the fall to date is large relative to the recessions of the early 1970s and the early 1990s but not as big as in the 1979 to 1981 recession. These features are shown in Figure 3.1 and Table 3.1.

Since the peak of household spending in the third quarter of 2008, total household resources[2] have actually risen by almost 4%. Taken together, the fall in spending and rise in household resources mean a rapid increase in the household saving rate from –0.7% to +8.6% by the third quarter of 2009. This is a large change but by no means

Figure 3.1. Real GDP and household consumption expenditure, 2005Q1–2009Q3 (2008Q1 = 100)
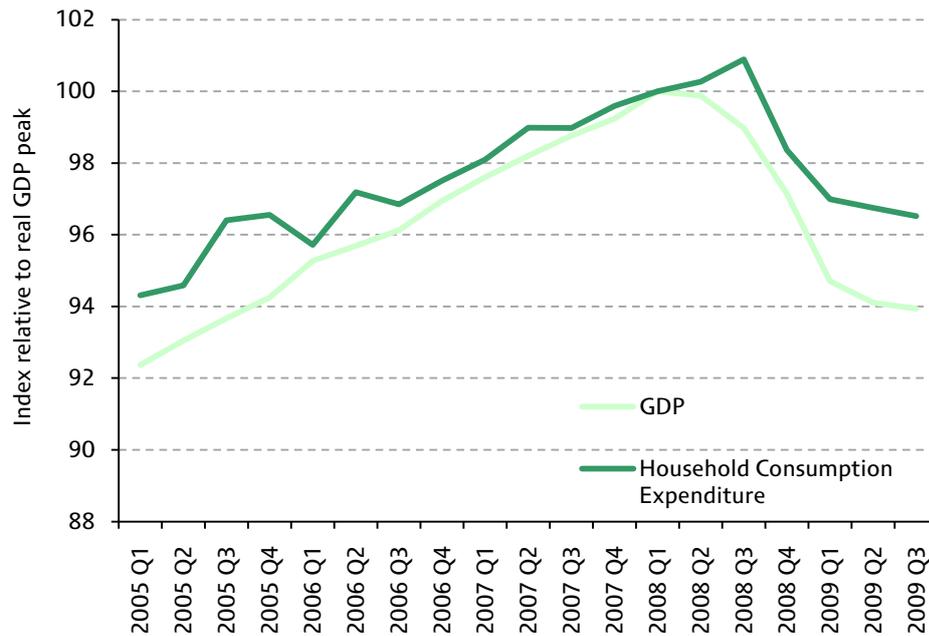
Source: ONS.

Table 3.1. Changes in real household spending and real GDP in previous recessions

| Recession period (peak–trough of real GDP)	Change in real GDP	High–low period of real household spending during recession	Change in real household spending	Change in real household resources
1973Q1–1974Q1	–3.7%	1973Q2–1973Q3	–1.3%	–1.6%
1979Q3–1981Q1	–3.7%	1980Q1–1980Q4	–6.0%	–1.2%
1990Q2–1992Q2	–2.5%	1990Q2–1992Q1	–1.8%	+3.8%
2008Q1–2009Q3[a]	–6.1%	2008Q3–2009Q3[a]	–4.3%	+3.7%

a. 2009Q3 is not necessarily the trough of the current recession but at the time of writing it is the latest quarter for which we have data.
Note: Changes in household spending and resources are shown over the period representing the high and low point for real household spending during the GDP recession (column 1).
Source: ONS.

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[2] Household resources are defined as the sum of households' gross disposable incomes and net flows into employee pension funds from employers.

Figure 3.2. Saving rate, 1970Q1–2009Q3
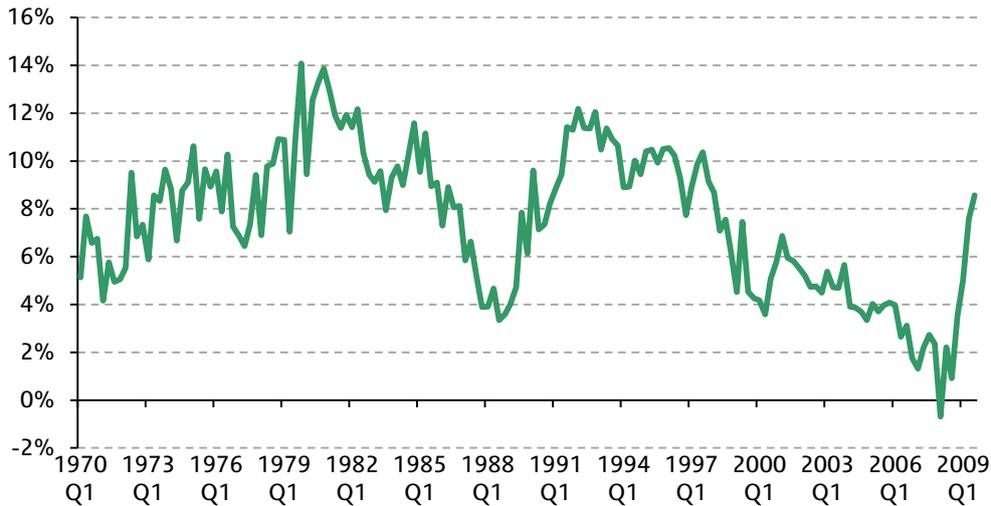
Source: ONS.

unprecedented. There was a similarly rapid rise in the saving rate in the early 1990s (see Figure 3.2) – although in the current episode the saving rate may not yet have peaked.

Over the last year, the government has taken several measures to stimulate consumption and so boost aggregate demand. The two most noteworthy policies aimed at achieving this were a temporary cut to the main rate of VAT of 2.5 percentage points, from 17.5% to 15% (at an estimated cost of £12.4 billion), and a vehicle scrappage scheme which provided a discount of £2,000 on new vehicle purchases for drivers who scrapped old cars or vans (at a cost of £0.4 billion). Both of these policies have now, or will soon, come to an end: the VAT cut ran from 1 December 2008 to 31 December 2009, and the scrappage scheme is scheduled to expire at the end of February 2010 (or sooner, if the budget is exhausted).

This chapter will look at the details and effects of both of these schemes in turn, and will look ahead to the potential impact as these consumer stimulus measures are unwound. We start in Section 3.2 by looking at the return of the main rate of VAT to 17.5%, and then in Section 3.3 we look at the car scrappage scheme. Section 3.4 concludes.

3.2 VAT changes

In the November 2008 Pre-Budget Report (PBR), the government announced a temporary reduction in the main rate of VAT from 17.5% to 15%, taking effect on 1 December 2008 and lasting until 31 December 2009. This was a sizeable stimulus, with an estimated cost of £12.4 billion or approximately 2% of revenues.[3]

In this section, we talk about the impact of these changes on household consumption, spending and purchases. These are distinct concepts. *Consumption* refers to the quantity of goods or services actually utilised over some period – for example, the number of litres of wine someone drinks each week. *Purchases* refer to the actual quantity of goods consumers buy, such as the number of litres of wine someone buys each week. By

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[3] HM Treasury, *Pre-Budget Report 2008*, November 2008, http://www.hm-treasury.gov.uk/d/pbr08_completereport_1721.pdf.

spending we mean gross nominal spending – the amount of money consumers spend over some period, including taxes. If a consumer bought an extra bottle of wine this week to be consumed at a later date, then purchases and spending would have increased but consumption would not have.

When the government introduced the VAT cut, it was hoping to help firms by stimulating purchases through lower post-tax prices. The policy could therefore still be considered a success even if total spending had remained unchanged because, with lower prices, purchases would have increased.

To the extent that the cut was passed on to consumers, it temporarily reduced the price of standard-rate goods and services. A price change of this kind affects demand through three different channels:

- First, there is an 'income effect'. The VAT cut in effect makes consumers wealthier: by lowering consumer prices, it allows consumers to purchase the same quantity of goods for a lower level of spending. Consumers may choose to save some of the resulting surplus, but they are likely to spend at least some of it on new purchases as well.

- Second, there is a 'substitution effect'. The temporary cut gives consumers an incentive to bring forward consumption from the future, when the cut expires, to the present, when prices are lower. The VAT cut operates in exactly the same way as a fall in interest rates, by effectively reducing the return on saving. There is less benefit to accumulating savings now if you will face higher prices when you come to spend those savings in the future, so rational consumers will choose to consume more today. To put it another way, by choosing to shift consumption to periods when relative prices are lower, consumers are able to increase their lifetime consumption.

- Finally, a temporary reduction in prices also stimulates purchases through an 'arbitrage effect'. Consumers will have an incentive to bring forward purchases of non-perishable goods to be stored and consumed later. For instance, a household that normally consumes five bottles of wine per month may decide to purchase and store an additional 15 bottles at the low price and then consume them over the next three months when prices are higher. In this case, consumers are not reallocating their consumption, but they are reallocating their spending and purchases to the low-price period. Arbitrage effects are likely to be particularly important towards the end of the low-price period both because of physical storage costs and uncertainty; we return to this point later when discussing the likely effects of the return of the main VAT rate to 17.5%.

In the case of the temporary VAT cut, we would expect the income effect to have been small (except for consumers who were credit constrained or myopic – see below). This is because the 13-month boost to real incomes resulting from the VAT cut only represents a very small difference to the consumer's total real lifetime income. Indeed, if consumers expected the extra government outlay involved in financing the policy to result in higher taxes in the future, the income effect could, on average, have been zero. However, the cut could still have provided a significant boost to consumption, spending and purchases through the substitution and arbitrage effects.

The effect of VAT returning to 17.5%

In the Green Budget 2009, we looked at how the temporary VAT cut might be expected to affect demand.[4] Now, as the VAT cut has expired, we will consider the impact of the return to the higher rate of VAT.

Many commentators criticised the cut when it came into effect, arguing that a change of 2.5 percentage points was too small to affect retail prices much and so would not be particularly salient to consumers.[5] Presumably, these commentators would also argue there is little effect of the rate reverting to 17.5%. We, however, argued that there were good reasons to expect the VAT cut to be an effective stimulus, and thus expect its withdrawal to have had adverse consequences for purchases and consumption.

Impact on prices

The 2.5 percentage point increase in VAT on 1 January 2010 would not have increased the overall price level by 2.5% for several reasons. The first is simple arithmetic. The VAT rate is expressed as a proportion of the price before tax. This means that a good with a pre-tax price of £100 saw its post-tax price increase from £115 to £117.50, or 2.17%.

Second, not all goods face the full rate of VAT – the cut only affected goods subject to the standard rate, not zero-rated, exempt or reduced-rated items. About 51% of pre-VAT household spending is on goods that are taxed at the standard rate.[6]

Finally, it is difficult to gauge the impact of VAT changes on consumer prices, as part of the incidence of the increase in tax will fall on producers and retailers rather than consumers. Based on a review of past research, Blundell (2009) estimated that about 75% of last year's reduction in VAT would be passed on to consumers.[7] An analysis of recent price data reported in Chirakilja et al. (2010) is consistent with this estimate.[8] This need not imply that the rate of pass-through of the VAT increase to consumers will be exactly the same – firms may be more or less likely to pass on increases in taxes than they are to pass on tax cuts, for instance. Nevertheless, pass-through of 75% seems a reasonable estimate.

Taken together, this implies the increase in the price level we would expect from the VAT increase is almost 1% (roughly 51% of 75% of 2.17%).

Impact on consumption, spending and purchases

We can use our estimate of the effect of the VAT increase on prices to try to predict the size of the various effects on consumption, spending and purchases that we discussed earlier in the section.

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[4] T. Crossley, D. Phillips and M. Wakefield, 'Value added tax' in R. Chote, C. Emmerson, D. Miles and J. Shaw (eds), *The IFS Green Budget: January 2009*, IFS, London, January 2009, http://www.ifs.org.uk/budgets/gb2009/09chap10.pdf.

[5] For example, A. Spilimbergo, S. Symansky, O. Blanchard and C. Cottarelli, *Fiscal Policy for the Crisis*, IMF Staff Position Note SPN/08/01, 2008, http://www.imf.org/external/pubs/ft/spn/2008/spn0801.pdf.

[6] T. Crossley, H. Low and M. Wakefield, 'The economics of a temporary VAT cut', *Fiscal Studies*, 2009, 30, 3–16.

[7] R. Blundell, 'Assessing the temporary VAT cut policy in the UK', *Fiscal Studies*, 2009, 30, 31–38.

[8] J. Chirakilja, T. Crossley, M. Lührman and C. O'Dea, *The Stimulus Effect of the 2008 UK Temporary VAT Cut*, 2010.

Income effect

As with the temporary cut in the main VAT rate, any income effect from the rise is likely to have been small. In the case of the cut, this was because (for forward-looking consumers not facing credit constraints) the increase in the real value of lifetime income was small, and because forward-looking consumers may have expected offsetting future tax increases. For the VAT rise, the reasoning is slightly different. The VAT cut was largely unanticipated, announced just one week before it came into effect. The timing of the VAT increase, on the other hand, was well known as it was announced along with the temporary reduction in the November 2008 PBR. We would therefore expect forward-looking consumers, aiming to smooth consumption over their lifetime, to have adjusted their consumption before the pre-announced tax change took effect. For these consumers, the only relevant response would have been due to the substitution and arbitrage effects (see below), but the tax rise itself would not be associated with any additional income effect.

For consumers who do face credit constraints, the situation is different. These are consumers who wish to consume more now, but who are unable to borrow the funds that would enable them to do so. These consumers would have experienced a pure income effect (and no substitution effect) from the fall in the real value of their expenditure associated with the tax increase. While the temporary VAT cut was in effect, they would not have been able to increase their spending, and their spending would also be unchanged after the VAT increase. A 1% increase in the price level therefore results in a 1% fall in consumption and purchases for these consumers.

A third possible group of consumers are those who are not forward looking (they are myopic). These consumers just spend their current incomes (or perhaps a fixed fraction of their current incomes) in each period. The various tax changes would not have affected the level of these consumers' spending either, but will have meant they could purchase a smaller quantity of goods once VAT rates rose, equal to the change in prices.

The total income effect of the VAT increase on consumption and purchases is therefore a permanent reduction of $p \times 1\%$ relative to a situation where VAT had stayed at a rate of 15%, where p is the proportion of consumers who are credit constrained or myopic (or both). The income effect on spending is zero, as the change in quantity is exactly offset by the 1% change in price.

Substitution effect

For those who are credit constrained or myopic, the intertemporal substitution effect of the VAT increase on consumption would have been zero. These consumers are unable or unwilling to vary their consumption to take advantage of any changes in relative prices across time, and so they will not have brought consumption forward to the period of the VAT cut.

The consumption choices of forward-looking consumers who are not credit constrained, on the other hand, would have been influenced by the substitution effect. What can we say about the magnitude of this effect? Economists refer to the magnitude of this substitution effect on consumption as the *elasticity of intertemporal* substitution (EIS). A recent survey of the empirical literature suggested that a 1% increase in prices this year relative to next would result in a change in consumption of between 0.5% and 1% (an EIS

between 0.5 and 1).[9] In the case of VAT, the upper end of this range may be appropriate. A large proportion of goods affected by the VAT cut ('standard-rated' items) were luxuries, for which it is easier to shift consumption over time. Consequently, the fall in consumption of these goods owing to the VAT increase is likely to be larger. We therefore make the assumption that the EIS for standard-rated goods and services is 1.

The substitution effect would have stimulated consumption during the VAT cut. An average price rise of around 1% relative to the period of the VAT cut implies there would have been a fall in consumption (and of purchases) of 1% once VAT was increased due to the end of this effect. As this applies only to consumers who do not face credit constraints and who are forward looking, the total impact of the substitution effect on consumption and purchases is $(1-p) \times 1\%$. Once again, due to the price changes, gross consumer spending remains unchanged.

Therefore the combined impact of the income and substitution effects is a 1% ($= p \times 1\% + (1-p) \times 1\%$) reduction in consumption and purchases after the VAT cut expired, with no change in total spending. Both groups of consumers (forward-looking, unconstrained consumers and myopic or constrained consumers) reduce consumption by the same amount, but for different reasons.

Arbitrage effect

Finally there is the arbitrage effect. This is an effect on spending and purchases (but not on consumption) which works in addition to the substitution effect for non-perishable goods.[10] It is possible to alter the timing of purchases of non-perishable goods without altering the timing of their consumption: goods such as wine can be purchased, then stored and consumed at a later date.

Naturally, there would have been no arbitrage effect for constrained or myopic consumers. For other consumers, the arbitrage effect would have been most acute just before the rate rise in January. This is because stocking up on non-perishable goods incurs costs. These include the physical costs of storage, which are smaller the shorter the storage period, as well as forgoing the 'option value' of waiting before making a purchase decision: uncertainty about the future means that it may not be sensible to stock up on something in July when circumstances six months later are unclear, but the costs of stocking up in December are smaller when the outlook a month hence is much more certain. Given the scale of the recession, and the turmoil in financial markets, these uncertainties were likely to have been a particularly important consideration.

As for the magnitude of this effect, it is difficult to judge what this may be at present. The relatively modest intertemporal price change and the high uncertainty during the recession suggest the effect might be quite modest. We do not yet have retail sales data for December 2009, so we are unable to gauge empirically any impact of the pending VAT increase on sales of non-perishables. Anecdotal reports and evidence on 'footfall'

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[9] O. Attanasio and M. Wakefield, *The Effects on Consumption and Saving of Taxing Asset Returns*, prepared for the Report of a Commission on Reforming the Tax System for the 21st Century chaired by Sir James Mirrlees, Institute for Fiscal Studies, 2008, http://www.ifs.org.uk/mirrleesreview/reports/consumption.pdf.

[10] Non-perishables are goods that can be stored for a long period. Durable goods are goods that can be used (consumed) more than once. Durables are typically non-perishable, but not vice versa: wine, for example, is a non-perishable good that is also non-durable.

(numbers of shoppers) do, however, suggest some improvement over a year earlier in sales,[11] which may imply a drop in spending on these items after the VAT rate rose.

Overall, our estimate of the effect of the VAT cut's expiration on purchases is therefore a fall in the growth rate of more than 1 percentage point. The growth of spending should also fall, though by less than purchases (because prices are rising). Finally, we estimate that consumption will grow by 1 percentage point less than it did while the VAT cut was still in effect.

Future VAT increases

There has been some speculation that VAT rates will increase beyond 17.5% going forward as part of any strategy to raise additional revenue and thereby reduce government borrowing. This subsection considers the key issues surrounding a further increase in VAT as a means to raising more revenue.

Effect on consumption, spending and purchases

Once again, the time profile of consumption responses will depend on the extent to which future VAT increases are anticipated. Consumers may react if they expect VAT to rise in the future, even in advance of any particular policy announcement.

By contrast, an immediate and unanticipated increase in the rate of VAT will have no intertemporal substitution effect on consumption, as consumers have no opportunity to bring forward purchases. This also applies to the arbitrage effect for non-perishable purchases. This means that the only impact of the change on consumption will be an income effect. Consumers will see the purchasing power of their income and savings fall and will reduce their consumption.

As before, for credit-constrained and myopic consumers, this will simply result in a reduction in the quantity of goods purchased equal to the percentage increase in prices. For unconstrained and forward-looking consumers, the income effect, which we argued was likely to be small for a temporary tax cut, may be much larger if the tax increase is perceived to be permanent. A 1% increase in prices now and forever implies a 1% reduction in the real value of the consumer's total lifetime wealth (including assets, future earnings and the consumer's investments in his or her own 'human capital' – education and skills). How this will affect consumption depends on what we assume about the nature of consumer preferences. Assuming, as seems reasonable, that households take the same percentage cut in all periods, this implies that consumption will fall by 1% today and in all future periods (meaning total spending will remain the same).

If the increase is pre-announced, or otherwise anticipated, then the income effect will commence from the date that the anticipation forms. The anticipated VAT rise leads to consumers reappraising the value of their future incomes and current savings, inducing forward-looking consumers to cut back on consumption even before the tax change comes into effect, with the aim of spreading the cut in purchasing power and smoothing their consumption over time. In addition, there will be substitution and arbitrage effects, which will tend to increase spending ahead of the tax increase. Thus in the period between the tax change being announced and it being enacted, the income effect should act to reduce spending, while substitution and arbitrage effects should act to increase

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[11] See, for example, 'Post-Christmas sales wow shoppers', 29 December 2009, http://news.bbc.co.uk/1/hi/business/8433633.stm.

spending. It is not obvious a priori which of these effects will dominate, and so it is difficult to predict the overall effect on spending in the period between announcement and implementation. After the change has come into effect, however, the consequence of all these effects taken together will be to reduce consumption, spending and purchases relative to what they would have been without the increase. In the long run, the income effect is likely to be far more important than the substitution effect as consumers will only have a short time period in which to bring forward purchases, whereas higher taxes will have a permanent downward effect on the real value of consumers' income and wealth.

Obviously, we cannot predict the magnitude of these effects on spending and consumption unless we know the size of the VAT change, the goods to which it will apply and the extent to which it will be passed on to consumers. The rate of pass-through for the temporary VAT cut was estimated to be around 75%, but for a permanent change we would expect it to be higher. Firms face costs when they raise prices (known to economists as 'menu costs'), which may mean they are reluctant to change prices if they know that the change will be reversed in a year's time. Conversely, they may be more willing to raise prices if they know the change to be permanent.

VAT increases as a stimulus

One of the advantages of a rise in VAT over an income tax increase is that if it is pre-announced, then purchases in the period before it comes into effect will be stimulated by substitution and arbitrage effects. The negative income effect (which may or may not outweigh the substitution effect overall) would apply whether income tax or VAT were increased. A plan to increase VAT could therefore provide some demand stimulus in the short term while at the same time reassuring bondholders that the government will reduce the deficit.

Distributional consequences

Some have objected to a further VAT increase as a means to raise revenue on the grounds that it is regressive, having a relatively greater effect on the poor than on the rich. Indeed, it has been reported that Gordon Brown rejected a VAT increase in the December 2009 PBR for precisely this reason.[12]

In the Green Budget 2009, we argued that the VAT in its current form is actually slightly progressive (so that the temporary cut was slightly regressive).[13] Of course, if the government is considering a number of options to raise revenue, the issue may not be whether VAT increases are progressive or regressive at all, but whether they are more or less progressive than alternative instruments. However, the government has a range of instruments by which it can guarantee the overall progressivity of the tax and benefit system. It is only sensible to consider the overall progressivity of packages of changes.

There is, however, a particular issue that arises in terms of the distributional impact of VAT increases.

Income taxes tax people as they earn money through their labour, investments and so on. Consumption taxes – such as VAT – reduce the real value of consumer spending. This

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[12] 'Gordon Brown blocked Alistair Darling's plan to increase VAT', *Guardian*, 10 December 2009, http://www.guardian.co.uk/politics/2009/dec/10/brown-darling-vat-increase-plan.

[13] T. Crossley, D. Phillips and M. Wakefield, 'Value added tax' in R. Chote, C. Emmerson, D. Miles and J. Shaw (eds), *The IFS Green Budget: January 2009*, IFS, London, January 2009, http://www.ifs.org.uk/budgets/gb2009/09chap10.pdf.

means that if a government with a tax system based wholly on income taxes were to suddenly shift to an entirely consumption-based system, there would be new double taxation of all savers. Consumers would have already been taxed (presumably) on their income before they decided to save or spend it, and those who saved would now face the prospect of being taxed again at the point when they eventually decide to spend their savings.

This is potentially economically efficient in the sense that the tax change can raise additional revenue while leaving marginal incentives to save and to work no worse than before (provided consumers do not anticipate that the government will decide to do something similar again in the future). The new consumption tax is a tax on savings that consumers have already accumulated, meaning that changes in current behaviour will not affect their liability for it. A similar argument applies to a VAT increase. If the tax change is unexpected, the government will in effect be taxing the real value of savings, which consumers have already built up. In a sense, it represents a retrospective tax on saving, which would not arise if income taxes were raised instead (as this would leave the value of consumers' current savings intact).

However, such changes may well be seen as unfair, particularly since they entail a degree of intergenerational redistribution.[14] Older workers are likely to have more savings than younger workers and so would be hit harder by a decision to increase consumption taxes.

Conclusion

The VAT cut, as we argued in last year's Green Budget, was likely to have been an effective stimulus. For this reason, we believe that the return of VAT to 17.5% will in turn have a negative impact on the growth of purchases (which we believe will be more than 1 percentage point) and on spending. We estimate that the growth of consumption will fall by around 1 percentage point.

Future increases in VAT may increase or decrease spending in the period between a change being announced and coming into effect (because substitution and arbitrage effects work in the opposite direction to the income effect). Relative to alternative tax increases – such as a rise in income tax or National Insurance – future VAT rises would boost spending between the announcement and implementation date. Once any VAT increase is fully introduced, however, it will unambiguously reduce consumption relative to the path of consumption in the absence of a tax increase. VAT increases may be an economically efficient way to raise revenue, although they impose a double taxation on those who have accumulated savings and this may be viewed as inequitable.
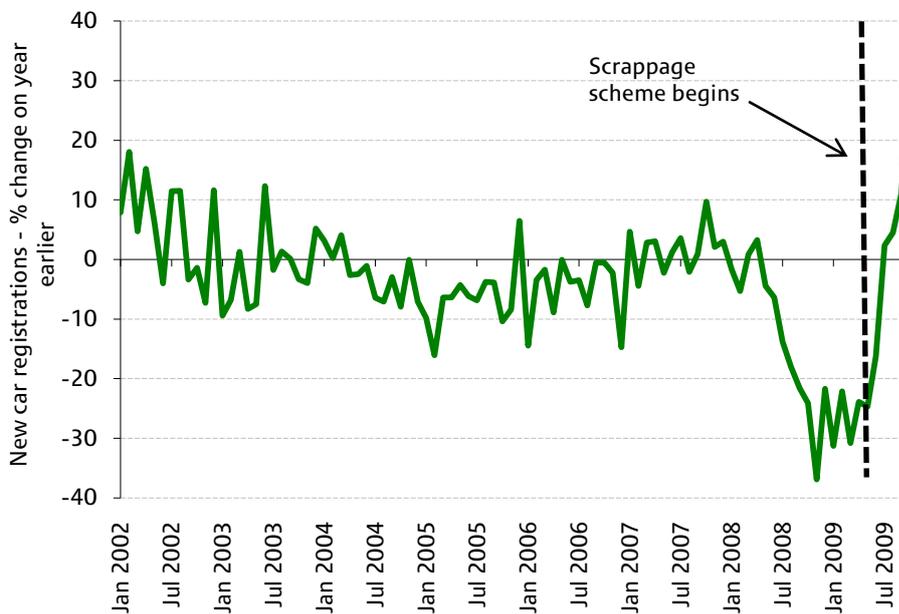
3.3 Car scrappage

In May 2009, the government launched the UK Scrappage Incentive Scheme. Under the scheme, owners of cars that are at least 10 years old or light vans at least 8 years old can receive a government subsidy of £1,000 plus a further £1,000 discount from manufacturers if they purchase a new vehicle and scrap their old one. Initially, £300 million was allocated to the scheme (allowing for the purchase of 300,000 new

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[14] For further discussion of this issue, see L. Kaplow, 'Capital levies and transition to a consumption tax', in A. Auerbach and D. Shaviro (eds), *Institutional Foundations of Public Finance: Economic and Legal Perspectives*, Harvard University Press, Cambridge, MA, 2008.

vehicles), which was scheduled to end in October 2009 or when all the funds had been used up. In September 2009, the scheme was extended by an additional £100 million and until the end of February 2010, such that if the fund is fully exhausted, 400,000 old cars will have been scrapped and replaced by new ones under the scheme.

The scheme is relatively simple in its operation. Cars first registered in the UK on or before 29 February 2000 and light vans (under 3.5 tonnes) before 28 February 2002 are eligible. The vehicle needs to have been owned for at least a year and have a valid MOT certificate and tax disc, preventing unroadworthy vehicles that would not have been driven being scrapped. Households are allowed to scrap more than one car, but can only claim one subsidy per new car purchased (so cannot claim a £4,000 discount on one new car for scrapping two old cars). The new vehicle must have been registered on or after the date of the start of the scheme, 18 May 2009, cannot have been previously registered to a different owner and must be registered to the same owner as the scrapped vehicle.

Figure 3.3. Monthly new car registrations – change on previous year

Source: Department for Transport,
http://www.dft.gov.uk/pgr/statistics/datatablespublications/vehicles/vehreg.xls.

The scrappage scheme seems to have had a noticeable effect on car registrations. As of 20 December, the Department for Business, Innovation and Skills reported that 304,598 orders had been made under the scheme, meaning that just over three-quarters of the total allocation had been used.[15] Data from the Department for Transport (DfT) show that car registrations have risen markedly since the scheme was implemented (see Figure 3.3)[16] and the Society of Motor Manufacturers and Traders (SMMT) reports that around one-fifth of new car registrations in November 2009 were made under the scheme.[17] In April 2009, the last full month before the scheme, car registrations were 23.9% lower than in April 2008, but by October 2009 registrations were 30.5% higher than in October 2008. Note, though, that this rebound partly reflects the very low base of car registrations

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[15] http://www.berr.gov.uk/whatwedo/sectors/automotive/scrappage/page51068.html.

[16] http://www.dft.gov.uk/pgr/statistics/datatablespublications/vehicles/vehreg.xls.

[17] http://www.smmt.co.uk/articles/article.cfm?articleid=20909.

in 2008 – registrations in October 2009 were 166,457, still 1% down on registrations in October 2007. By contrast, registrations of motorcycles, which were not subject to the scheme and whose registrations were also substantially lower than a year earlier in the first part of 2009, did not increase after the scheme was introduced.

In this section, we offer some thoughts on the scrappage scheme. We first look at the size of the scheme, and then consider the effects of scrappage schemes on different economic agents and markets, providing evidence on the short- and long-run effects from previous schemes, the extent to which additional VAT receipts from new car sales make the scheme self-financing, and the environmental impact of the scheme.

How large is the UK scheme?

A total of £400 million has been made available by the government for the scrappage scheme in 2009–10. To put this into some fiscal context, measures announced between and including PBR 2008 and PBR 2009 amounted to a total fiscal stimulus of around 1.6% of GDP, just under £23 billion, for 2009–10. Thus the scrappage scheme represents a small (less than 2% of the total), yet clearly targeted, part of the overall stimulus.

Another way to think about the scheme is in terms of its impact on car prices and the number of cars affected. The scheme is worth £2,000 off the VAT-inclusive price of a new car. The SMMT suggests that the average new car price is about £9,000 excluding VAT, so the subsidy is worth around 20% of the average price of a new car. A total of 400,000 new cars or light goods vehicles (LGVs) could be bought under the scheme. Figure 3.4 shows annual number of new car and LGV registrations between 1980 and 2008. Prior to the current recession, annual registrations were typically 2.5 million or more, so the scheme could account for around one-sixth of pre-crisis registration levels.

Estimates from Experian suggest that there are around 7.1 million eligible vehicles (that meet both the age and ownership criteria).[18] If the fund is fully exhausted, then 5% of the

Figure 3.4. Annual new car and light goods vehicles registrations

Source: Department for Transport, *Vehicle Licensing Statistics 2008: Data Tables*, http://www.dft.gov.uk/excel/173025/221412/221552/228038/458107/datatables2008.xls.

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[18] http://www.experianautomotive.co.uk/Latest-News/2009/April/UK_Scrappage_Scheme.aspx.

total stock of eligible cars will be replaced. Various studies,[19] and our own estimates from the British National Travel Survey (NTS), suggest that the normal, no-subsidy probability of scrapping a car that is at least 10 years old is in the order of 15–25% in a year. Thus it is highly likely that a lot of the cars that are scrapped under the scheme would have been scrapped without the subsidy. The main impact of the policy may therefore be to encourage people to replace a scrapped car with a new vehicle rather than a second-hand vehicle. A study by Leibling (2008)[20] suggests that most old cars in the UK are replaced by a slightly younger car rather than a new car. Experian data suggest that used car sales in the third quarter of 2009 were lower than those a year earlier,[21] which, coupled with the evidence on new car registrations, suggests a substitution from used to new cars resulting from the scheme. We return to this issue in the next subsection.

The UK government was not the only government to introduce such a scheme during the current recession.[22] OECD (2009) estimates of the average subsidy levels in different countries suggest the UK scheme was in the middle of the league table of generosity, at around $1,500 per car, though this only considers the £1,000 government subsidy and not the additional £1,000 discount required from the manufacturer. Most schemes were worth around $1,000–$2,000 per car, with the US and German schemes offering the most generous subsidies. The German scheme was also very generous in terms of the number of cars covered, with up to 2 million subsidies available.

In summary, relative to the size of the overall fiscal stimulus package and the number of cars sold prior to the crisis, the car scrappage policy is not particularly large, though comparable in terms of generosity to those offered in many other countries. It is, however, very precisely focused on a particular industry and it appears to have had quite substantial short-term effects on new car sales. We turn now to thinking about the effects of scrappage schemes more generally.

The effects of scrappage schemes

The scrappage policy is clearly aimed at increasing new car sales during the recession and supporting the car industry. Given the international nature of car production, the fact that similar schemes have been introduced all over the world means that the effects on the car industry are larger than they would have been had the UK introduced a scheme unilaterally – manufacturers of cars that are made fully or partly in the UK but sold overseas will potentially benefit from international scrappage schemes, just as foreign manufacturers will potentially benefit from the UK scheme if their cars are sold here. The fact that the scheme requires scrapping of an old vehicle as well as purchase of a new one suggests some environmental intention behind it in addition to the aim of supporting the car industry. In this subsection, we assess the potential effects of the scheme, and its

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[19] For example: J. Adda and R. Cooper, 'Balladurette and Juppette: a discrete analysis of scrapping subsidies', *Journal of Political Economy*, 2000, 108, 778–806; D. Leibling, *Car Ownership in Great Britain*, RAC Foundation, London, 2008, http://www.racfoundation.org/default.aspx?code=11996.

[20] D. Leibling, *Car Ownership in Great Britain*, RAC Foundation, London, 2008, http://www.racfoundation.org/default.aspx?code=11996.

[21] http://www.experianautomotive.co.uk/Latest-News/2009/December/Used_car_sales_figures_Q3_2009.aspx.

[22] For a summary of international schemes, see OECD, *The Automobile Industry in and beyond the Crisis*, 2009, http://www.oecd.org/dataoecd/57/61/44089863.pdf. A summary of past schemes is given in European Conference of Ministers of Transport, *Cleaner Cars: Fleet Renewal and Scrappage Schemes*, OECD, Paris, 1999.

withdrawal at the end of February 2010, on consumer behaviour in the car and other markets. Box 3.1 considers the environmental impact of the scrappage policy.

What is the economic rationale for a car scrappage scheme? The key justification may be that the scale of the recession, and the turmoil in financial markets, increased credit constraints for consumers, limiting their ability to borrow to finance consumption and providing scope for the government to use subsidies instead. Further, the considerable uncertainty generated by the recession creates an 'option value' to consumers to wait and see, rather than making large purchases now. Both these factors would push expenditure below levels expected even given the size of the downturn and would provide incentives for fiscal support for consumers. Whilst these reasons justify general support for consumers – such as the temporary cut in the main VAT rate – there may be reasons to think that particular support for car purchases is warranted: cars are amongst the most expensive purchases most consumers make, and such large, only partially-reversible purchases may be especially sensitive to credit constraints and uncertainty. Interestingly, similar temporary support was given for house purchases – the other large, expensive purchase most consumers make – through the stamp duty holiday. The IMF (2008) also argues that subsidies for particular purchases may be more successful in stimulating short-run demand than the equivalent amount spent on general reductions in consumption taxes because the price change will be much larger on the product affected and thus more salient to consumers.[23]

For the policy to be effective, the subsidy must be greater in value than the resale or scrap price of eligible cars. However, as car values depreciate quickly, it is unlikely that many eligible cars would fetch more than £2,000 in the second-hand or scrap market.

It is too early to give a confident assessment of the impact of the UK scrappage scheme because it is still ongoing and assessing the long-run effects will require several years of post-scheme data. Later, we will consider evidence on the effects of schemes that took place in the 1990s that will clearly be relevant to the current scheme. For now, we discuss the potential effects of the current scheme during and after its operation in terms of the impact on different groups of economic agents and the possible long-term effect on purchase behaviour.

Owners of an eligible vehicle who were planning to scrap it and buy a new car anyway receive a straight £2,000 transfer from the government and car manufacturer. There is no effect on their decision to purchase, though they may use the transfer to purchase a more expensive car than they planned without the scheme or to fund additional saving or expenditure. The more of these 'infra-marginal' sales there are, the less impact on car purchases will be generated by the scheme. As discussed earlier, however, there is evidence that most old cars are replaced by second-hand rather than new cars, and the second-hand car market is very large: the SMMT estimates there were around 7.16 million used car sales in the UK in 2008, compared with around 2.13 million new car sales.[24] Thus we would expect a large amount of substitution from used to new cars during the life of the scheme, which appears to have happened.

A crucial effect of the scheme will be on those who were planning to buy a car in the future but who now decide to purchase during the subsidy period instead. This

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[23] A. Spilimbergo, S. Symansky, O. Blanchard and C. Cottarelli, *Fiscal Policy for the Crisis*, IMF Staff Position Note SPN/08/01, 2008, http://www.imf.org/external/pubs/ft/spn/2008/spn0801.pdf.

[24] See pages 12 and 21 of Society of Motor Manufacturers and Traders, *Motor Industry Facts 2009*, http://lib.smmt.co.uk/articles/sharedfolder/Publications/Motor%20Industry%20Facts09%20-%20Final.pdf.

intertemporal shift – the substitution effect discussed in Section 3.2 – is one of the key objectives of the policy, increasing demand for new cars at a time when demand was particularly weak. However, purchases brought forward are clearly purchases lost in the future, leading to a 'payback' effect when the scheme ends.[25] This would mean sales lower than in the no-subsidy counterfactual, both in the new and second-hand car markets if some people who were planning to buy a second-hand car in the future decide to buy a new car today instead. One key question is the extent to which the scheme generates any new sales at all as opposed to merely shifting sales across time, and we examine evidence on the size of the 'payback' effect from previous schemes below.

The scheme will also have wider implications. It may change the prices of new and used cars relative to those that would have been in place without the subsidy. By generating a temporary increase in demand for new cars, the policy may increase prices of new cars for those who are not eligible for the subsidy (such as owners of cars less than 10 years old) during the life of the scheme, but lead to lower prices afterwards – following any payback effects. Some ineligible consumers may therefore prefer to *delay* purchase of a new car because of these price effects or buy a second-hand car instead. The impact on the price of second-hand cars is hard to predict, since both supply and demand are likely to fall, but, given the number of used car transactions, the wider effects on the market are clearly important. Perhaps the strongest impact will be on new young drivers looking to buy an old car as their first vehicle – presumably, this group would represent a large part of the demand for the very old, cheap vehicles that are now not being offered for sale but being scrapped instead.

There are also effects on the wider patterns of economic activity. Losers from the scheme (at least in the short term) are likely to be those services related to the used car industry such as spare parts merchants and perhaps garages. To the extent that other spending is shifted around (such as people choosing to buy a car during the subsidy period rather than a holiday or other large durable), there may be an effect on prices in other markets. Relative to the direct impact on the car markets, however, these are probably quite second-order.

There have been some suggestions that the VAT receipts generated by sales of new cars could make the scrappage scheme effectively 'self-financing'.[26] There are a number of reasons why this is unlikely to be the case:

- In the absence of the scheme, some of the new car sales would have occurred anyway, so the VAT revenues are not new.

- The scheme will shift some new car sales forward, which would have generated VAT receipts in the future. So the scheme not only shifts sales over time, but also shifts revenues, rather than creating new revenues.

- The new spending on cars may in part crowd out spending on other goods subject to VAT. VAT receipts are therefore shifted across types of spending but are not increased overall.

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[25] Note that this need not mean total observed sales fall after the policy ends. If there is strong recovery that drives a general increase in demand, it is possible that the car sales path after the scheme will not exhibit any downward trend, but this would not be evidence that there was no payback effect.

[26] See, for example, the Society of Motor Manufacturers and Traders, *The UK Scrappage Incentive Scheme: The Facts*, 2009, http://www.smmt.co.uk/articles/article.cfm?articleid=20676.

The only new revenues are those coming from expenditures that would not have happened anyway (now or in the future) and that are not the result of substitution across VATable spending groups.[27] It is therefore highly unlikely that the subsidy is self-financing.

Overall, the likely impact will be a substantial short-term spike in new car sales during the subsidy period representing a substitution from used car purchases, future car purchases and possibly other expenditures, followed by a considerable payback effect after the scheme ends reducing sales relative to a no-subsidy baseline in both the new and used car markets. The SMMT, for example, forecasts that new car sales will be less than 1.8 million in 2010 compared with 2.0 million in 2009, a fall of more than 10% that it attributes largely to the end of the scrappage scheme.[28] This would be consistent with evidence on the effects of previous international scrappage schemes, to which we now turn.

Evidence from previous schemes

Several studies have looked at French scrappage schemes in place in 1994 and 1995 that subsidised replacement of an old car with a new car. The 1994 subsidy, focused on cars at least 10 years old, was worth about 6% of the price of a new car at the time, and the 1995 subsidy was slightly more generous and available to those driving cars at least 8 years old. Adda and Cooper (2000) estimate that the subsidies increased the probability of scrapping a car at the threshold age for an 'average' household by around 5%, and that total sales increased by around 8% during the subsidy periods compared with a no-subsidy baseline case.[29] Yamamoto et al. (2004) estimate that the French schemes increased the probability of replacement of eligible vehicles by around 20% and reduced the life on the road of these cars by an average of more than three years.[30] The long-run payback effects, however, are substantial and enduring. Adda and Cooper estimate that relative to baseline levels, sales were reduced for around 15 years after the schemes ended, with a particularly pronounced drop immediately after their expiry. They also find that the schemes were not even close to being self-financing.

Licandro and Sampayo (2006)[31] examine a Spanish subsidy scheme, 'Plan Prever', that began in 1997 and offered a €480 reduction in the registration tax for people scrapping a car more than 10 years old and, within six months, replacing it with a new one. Unlike other schemes, this scheme was designed as a permanent policy, so there were no particular incentives to shift forward a replacement of an old car but distortions in the choice between new and second-hand replacements remain. Licandro and Sampayo estimate the long-run increase in demand for new cars as a result of the policy to be small, around 1% or so.

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[27] Note that second-hand cars sold through dealers attract VAT through the 'margin scheme' in which VAT is paid only on the dealer's profit from the sale. To the extent that new cars are more expensive than used cars, there may be more VAT generated from the sale of a new car, but this may crowd out other VATable spending.

[28] See the full press release available from http://www.smmt.co.uk/articles/article.cfm?articleid=21056.

[29] J. Adda and R. Cooper, 'Balladurette and Juppette: a discrete analysis of scrapping subsidies', *Journal of Political Economy*, 2000, 108, 778–806.

[30] T. Yamamoto, J-L. Madre and R. Kitamura, 'An analysis of the effects of the French vehicle inspection program and grant for scrappage on household vehicle transaction', *Transportation Research Part B*, 2004, 38, 905–926.

[31] O. Licandro and R. Sampayo, 'The effects of replacement schemes on car sales: the Spanish case', *Investigaciones Económicas*, 2006, 30, 239–282.

OECD (2009) looks at sales during and after previous schemes in France and the US and argues that evidence on the scale of the payback effects is mixed:[32] for example, a scheme in the US in 2005 in which car manufacturers offered cars for sale to the general public at prices previously reserved for their employees saw a large decline in sales after it ended, but a brief policy enacted shortly after 9/11 was not associated with any obvious payback after it expired.

Box 3.1. The environmental impact of scrappage schemes

Unlike recent schemes in France, Japan and the United States, the UK scheme contained no explicit environmental incentives such as limits on the CO_2 emissions of new cars purchased. This was strongly criticised by some commentators,[a] and the government estimated the likely environmental effects of the scheme as 'neutral or modestly positive'.[b] Given that a system for vehicle excise duty (VED) payments that varies according to CO_2 emissions already exists, it may have been relatively straightforward to include such direct incentives as part of the scheme, though it would have made it less attractive to some motorists to the extent that the range of eligible vehicles would have been constrained.

There may be some environmental benefits from replacing older, often less efficient and more polluting vehicles with newer, less polluting vehicles, not just in terms of emissions but also potentially from lower accident costs as newer cars tend to have more safety features.

There are both fixed emissions costs of motoring – coming from vehicle production and disposal – and variable costs from vehicle use. The SMMT estimates that around 85% of a car's lifetime emissions come from its use,[c] though clearly the scrappage scheme will encourage some owners to scrap usable cars earlier than they would otherwise have done, increasing the relative importance of the fixed emissions component.

The reduction in emissions from vehicle use depends on several factors, notably the emissions of the car that is scrapped compared with those of the newly-purchased replacement. The latest evidence suggests that the replacement cars emit on average 132g of CO_2 per kilometre driven, compared with 182g for the scrapped cars.[d] The emissions of cars bought under the scheme appear to be around 16g CO_2/km less than the emissions of all new cars bought, though we would not necessarily expect people participating in the scheme to be 'typical' of the average person buying a new car and thus cannot conclude from this that people taking advantage of the scheme are buying cleaner cars than they otherwise would have done.

The total amount of emissions reduction from vehicle use depends not only on the emissions of the new and old cars, but also on how much they are driven and how long the old car would have remained on the road in the absence of the scrappage policy. Although newer cars emit less CO_2 per kilometre, drivers may use their new cars more and drive further, offsetting (and potentially eliminating) any emissions gain. An approximate estimate of the total emissions reduction for a particular vehicle is therefore given by the formula:

$$\Delta CO_2 = [(E_{old} \times VKM_{old}) - (E_{new} \times VKM_{new})] \times L$$

where E is the car's emissions per kilometre driven, VKM is the annual distance driven and L is the remaining lifetime on the road of the scrapped vehicle. Using estimates of each of these parameters and multiplying by the number of cars scrapped under the

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[32] OECD, *The Automobile Industry in and beyond the Crisis*, 2009, http://www.oecd.org/dataoecd/57/61/44089863.pdf.

scheme gives us a rough estimate of the possible environmental benefit in terms of carbon emissions from vehicle use.

We assume L to be 3, based on an estimate of a typical scrappage rate for old cars of around 20%, which would mean around a 50:50 chance of a car being scrapped after three years. This matches with Yamamoto et al. (2004), who suggested the French schemes of the 1990s took cars off the road about 3.3 years earlier than would have been the case without them.[e]

We take our estimate of E_{old} and E_{new} to be 182g and 132g, in line with the latest estimates given above. The distances are estimated using data from the NTS 2002–04. We model distance driven as a function of the characteristics of the driver and the age and type of the car and estimate that drivers of cars over 10 years old drive on average 10,600km/year and those driving new cars drive around 2,500km/year further.[f] Thus we take VKM_{old} to be 10,600 and VKM_{new} to be 13,100.

Together, these estimates suggest a 'typical' scrappage under the scheme saves about 600kg of CO_2 in total. If the entire fund is exhausted, the total saving from 400,000 scrappages will be around 240,000 tonnes. To put this into context, total CO_2 emissions from cars in 2007 were around 86.5 million tonnes,[g] which suggests a total saving from the scheme equivalent to around 0.25% of annual car emissions, ignoring the potential fixed emissions costs from vehicle production. Even if we assume no effect on distance (setting VKM_{old} and VKM_{new} at 10,600), the saving is only 636,000 tonnes. The Budget assessment that the environmental benefits would be at best modest looks fair, though other gains from noise and accidents are not taken into account by these estimates.

There may be other more subtle environmental implications of the policy in terms of the extent to which new emissions-reducing technologies may be diffused through the stock of vehicles. Schemes that have been initiated just after a new technology has been developed – such as the use of diesel engines for private cars in the 1990s – have sometimes been credited with speeding up the diffusion of the technology.[h] However, by persistently reducing the age distribution of the vehicle stock, scrappage schemes could delay the diffusion of new technologies that are still in development, such as hybrid vehicles, though this will depend on precisely when such technologies start to become widespread. Thus scrappage schemes – not just for cars but also for items such as boilers – may be particularly environmentally beneficial just after the development of new technologies that significantly improve the environmental performance of new models.

a. See, for example, press releases from Friends of the Earth (http://www.foe.co.uk/resource/press_releases/car_scrappage_22042009.html) and the RAC Foundation (http://www.racfoundation.org/default.aspx?code=12502).
b. Paragraph 7.43 of HM Treasury, *Budget 2009: Building Britain's Future*, April 2009, http://www.hm-treasury.gov.uk/bud_bud09_repindex.htm.
c. Page 14 of Society of Motor Manufacturers and Traders, *Tenth Annual Sustainability Report*, 2009, http://www.smmt.co.uk/downloads/Tenth-Sustainability-Report.pdf.
d. Society of Motor Manufacturers and Traders, *Scrappage Scheme Data Analysis*, 10 November 2009, http://www.smmt.co.uk/articles/article.cfm?articleid=20705.
e. T. Yamamoto, J-L. Madre and R. Kitamura, 'An analysis of the effects of the French vehicle inspection program and grant for scrappage on household vehicle transaction', *Transportation Research Part B*, 2004, 38, 905–926.
f. This is probably an overestimate of the increase in distance driven when purchasing a new car, since households with a strong unobserved taste for driving that is not reflected in their observed characteristics are likely both to own younger cars and to drive greater distances.
g. DEFRA, http://www.defra.gov.uk/evidence/statistics/environment/globatmos/download/xls/gatb05.xls.
h. E. J. Miravete and M. J. Moral, 'Qualitative effects of cash-for-clunkers programs', mimeo, 2009, http://www.eugeniomiravete.com/papers/EJM-MJM-Clunkers.pdf.

Conclusion

The car scrappage scheme is a relatively small but focused part of the overall fiscal stimulus and appears to have had some substantial short-run impact on the sales of new cars, which had fallen dramatically during the recession. The scheme's effects are not just confined to the car industry: it may have wider general implications for different economic agents and will have long-term effects even after the policy expires at the end of February 2010. The balance of evidence from previous schemes suggests that the 'payback' effect – reduced sales of new (and used) cars after the scheme ends – is likely to be quite large and enduring. The overall ability to generate new expenditures over the long term may be small, but the short-term goal of shifting purchases forward to help cushion the car industry from the worst of the recession may well be successful. However, increases in VED that are planned over the next year, coupled with the payback effect from the end of the scrappage policy, could have a significant effect on sales in 2010. The lack of any explicit incentives to buy low-emissions vehicles built into the scheme, together with the tendency for owners of new cars to drive more, means that the environmental gains from the scheme are likely to be very modest at best.

3.4 Conclusion

Given the scale of the economic downturn, short-term fiscal stimulus policies to support household demand were desirable. This chapter has considered two such policies – a temporary cut in the main VAT rate and a car scrappage scheme – that have recently expired or will imminently do so.

The policies are very different in scale. The VAT cut affected a very large share of total spending, in particular for luxuries and durable items, and was estimated at announcement to cost £12.4 billion. In contrast, the scrappage scheme was a small policy targeted on a single sector and cost just £0.4 billion. However, they operate in similar ways, giving consumers incentives to bring forward spending to take advantage of temporarily lower prices.

Since the recession has proved more enduring than initially forecast, the danger as these policies unwind is of a substantial payback effect. Analysis in Green Budget last year and further work since then was considerably more optimistic than that of many other commentators about the potential for the VAT cut to stimulate demand. However, the converse of this is that we anticipate a negative effect from the return of VAT to 17.5%, which may slow any nascent economic recovery. Similarly, the scrappage scheme appears to have had a considerable effect on new car sales, which may be particularly driven by substitution from used to new cars amongst those choosing to take advantage of it. It may also be partly due to purchases being brought forward, meaning that a downturn in sales after the scheme ends is likely. Balancing the need to continue to support consumers through the recovery with the aim to reduce the budget deficit will be a key task for whoever forms the government after the general election.