Appendix A: Forecasting public finances

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This appendix looks at the techniques used to produce the Green Budget public finance forecasts. It starts by comparing the forecasts made for borrowing in 2009–10 in last year's Green Budget and in the December 2009 Pre-Budget Report (PBR) with the eventual out-turn. It then goes on to provide more background information on the short- and medium-term public finance forecasts that are set out in Chapter 5.

A.1 The accuracy of our previous forecasts

The February 2010 Green Budget forecast was for a higher level of current receipts and a lower level of current spending than those forecasts published by the Treasury in the December 2009 PBR. The out-turn for the public finances in 2009–10 was actually even stronger than the 2010 IFS Green Budget forecast, with higher receipts and lower current spending. (See Table A.1.)

Table A.1. Comparisons of forecasts for government borrowing, 2009–10

£ billion	**HM Treasury, PBR forecast, December 2009**	**IFS Green Budget forecast, February 2010**	**Estimate, OBR, November 2010**
Current receipts	498.1	505.2	513.8
Current expenditure[a]	626.2	623.0	620.4
Surplus on current budget	–128.1	–117.7	–106.6
Net investment	49.5	49.5	49.4
Total Managed Expenditure	675.7	672.5	669.8
Public sector net borrowing	177.6	167.2	156.0

a. In line with the National Accounts, depreciation has been included as current expenditure.
Note: Figures shown in this table exclude the temporary effects of financial interventions.
Sources: Out-turn figures from Office for Budget Responsibility, *Economic and Fiscal Outlook*, November 2010 (http://budgetresponsibility.independent.gov.uk/econ-fiscal-outlook.html). Forecasts from HM Treasury, *Pre-Budget Report*, December 2009 (http://webarchive.nationalarchives.gov.uk/20100407010852/http://www.hm-treasury.gov.uk/prebud_pbr09_repindex.htm) and table 6.2 of R. Chote, R. Crawford, C. Emmerson and G. Tetlow, 'Green Budget public finance forecasts', in R. Chote, C. Emmerson and J. Shaw (eds), *The IFS Green Budget: February 2010*, IFS Commentary C112 (http://www.ifs.org.uk/budgets/gb2010/10chap6.pdf).

Table A.2 shows the breakdown of the errors in the forecasts for tax receipts contained in the December 2009 PBR and the February 2010 Green Budget. The Treasury underestimated net taxes and National Insurance contributions by £10.2 billion, while the Green Budget (which had the benefit of access to two months' additional out-turn data) underestimated them by £3.1 billion. The forecasting errors in the Green Budget were smaller for almost every major tax than those made by the Treasury – the exception being corporation tax. The largest error in the Treasury's forecast was in income tax, which it estimated would generate £5.1 billion less than it ultimately did. The largest error in the Green Budget forecast was for corporation tax, which we forecasted would generate £2.7 billion less than it actually did. Outside of net taxes and social security contributions, there was also an apparently large absolute error in both forecasts for non-tax receipts:

Table A.2. IFS Green Budget and Treasury errors in forecasting government receipts, 2009–10

£ billion	HM Treasury, PBR, December 2009	IFS Green Budget, February 2010
Income tax (net of tax credits)	–5.1	–1.8
National Insurance contributions	–0.7	0.4
Value added tax	–2.9	–0.1
Corporation tax (net of tax credits)	–2.4	–2.7
Fuel duties	0.2	0.2
Stamp duties	–0.5	–0.5
Other taxes	1.2	1.4
Net taxes & National Insurance contributions	*–10.2*	*–3.1*
Non-tax receipts[a]	–5.5	–5.5
Total current receipts	**–15.7**	**–8.6**

[a] Includes accruals adjustments on taxes, the tax credits adjustments, interest and dividends, gross operating surplus and rent; net of oil royalties and business rate payments by local authorities, the own resources contribution to the EU budget and public corporations' corporation tax payments.
Notes: Figures for tax receipts in this table are on a cash, rather than accruals, basis. Figures shown in this table exclude the temporary effects of financial interventions.
Sources: As for Table A.1.

the December 2009 PBR and the February 2010 Green Budget both underestimated non-tax receipts by £5.5 billion.

A.2 Techniques used in our forecasts

For the current financial year, three different sources of information are examined before coming to a judgement for each element of government revenue. In addition to the latest OBR forecast from the November 2010 *Economic and Fiscal Outlook*, we use information on the revenues implied by a current receipts method and by the IFS modelled approach.[1] For future years, our judgement is based on the IFS model and the latest OBR forecasts.

Information from current receipts

The current receipts method uses the information on receipts received in the current financial year compared with those received up to the same point in the previous financial year. An estimate for the whole of the current year's receipts is then calculated using the following formula:

$$\text{2010–11 forecast} = \frac{\text{Receipts received so far this year}}{\text{Receipts received to the same point last year}} \times \text{2009–10 receipts}$$

While this is useful when forecasting revenues in the current financial year, it cannot provide projections for borrowing in future years. Also, particular caution must be used when revenues are cyclical or changes have been made that may affect the timing of payments. Both of these factors are likely to have significantly affected the timing of some tax payments in 2009–10 and 2010–11.

[1] For a more detailed explanation of both these techniques, see C. Giles and J. Hall, 'Forecasting the PSBR outside government: the IFS perspective', *Fiscal Studies*, 1998, 19, 83–100.

The IFS modelled receipts approach

The IFS public finance model estimates growth in each of the taxes using forecasts for the growth in the tax base relevant to each tax, combined with an estimate of the elasticity of revenue with respect to the growth in the tax base. Information on the revenue effects of pre-announced tax changes from previous Budgets is then added in order to reach a forecast. Hence, modelled receipts can be summarised by the following formula:

2010–11 forecast = (*2009–10 receipts* × *Tax-base change* × *Elasticity*) + *Tax changes*

This technique enables forecasts to be made for future years, given the expected structure of the tax system. It should be noted that these forecasts become considerably less accurate for later years, since forecasts for changes in tax bases, estimates of elasticities and the impact of tax changes all become less accurate.

The elasticities for income tax and National Insurance contributions (NICs) are estimated from TAXBEN, the IFS tax and benefit model. For fuel, an elasticity calculated from previous IFS research is used.[2] For beer, spirits, wine and tobacco duties, we take the median elasticity found in a range of UK studies.[3] For air passenger duty and insurance premium tax, we estimate the elasticities used by the OBR for its projection and take those estimates.[4]

A.3 Forecasts for 2010–11

The Green Budget baseline forecast is a judgement based on the OBR's latest forecast contained in the November 2010 *Economic and Fiscal Outlook*, the current receipts method and the IFS modelled approach. Each of these is presented in Table A.3, and we discuss below how we have used these pieces of information to come to our judgement.

Our forecast for total receipts in 2010–11 is £2.9 billion higher than that which the OBR made in November 2010, as a result of more optimistic forecasts of revenues from income tax, National Insurance contributions, corporation tax, fuel duties and capital gains tax, slightly offset by a less optimistic forecast for VAT revenues and vehicle excise duties. We forecast that spending will be as forecast by the OBR.

Receipts from major taxes

For **income tax** (net of tax credits), we forecast receipts of £147.0 billion. This is £1.5 billion above the OBR forecast. This judgement is based on the growth in income tax receipts seen over the year to date, adjusted upwards for an expectation that relatively strong growth in bonuses (driven by higher profitability in the financial sector and the ending of the temporary bank payroll tax) in January 2011 will tend to lead to higher growth in income tax receipts towards the end of this financial year. Considerable uncertainties regarding income tax receipts this year remain, much of which should be resolved when receipts in January are known. This is because January is the month in

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[2] L. Blow and I. Crawford, *The Distributional Effects of Taxes on Private Motoring*, IFS Commentary 65, 1997 (http://www.ifs.org.uk/publications/1887).

[3] M. Chambers, 'Consumers' demand and excise duty receipts equations for alcohol, tobacco, petrol and DERV', Government Economic Service, Working Paper 138, August 1999.

[4] We take the nominal growth in receipts projected between 2012–13 and 2015–16 by the OBR for these taxes and relate this to the nominal growth in consumer spending, after adjusting for the estimated impact of any policy changes.

Table A.3. Forecasts for government borrowing in 2010–11

£ billion	**OBR Nov 2010**	**Current receipts method**	**IFS forecasting model**	**IFS forecast judgement**
Income tax (net of tax credits)	145.5	148.3[a,b]	149.1	147.0
National Insurance contributions (NICs)	98.5	98.3[a]	99.7	100.0
Value added tax (VAT)[c]	98.5	95.9[a]	99.5	98.0
Corporation tax (net of tax credits)	42.6	43.2	42.6	43.0
Petroleum revenue tax	1.5	1.5	1.1	1.5
Fuel duties	27.7	27.5	27.3	27.3
Business rates	23.8	n/a	25.8	23.8
Council tax	25.7	n/a	25.3	25.7
Capital gains tax	2.8	—	2.9	2.9
Inheritance tax	2.7	2.7	2.5	2.7
Stamp duties	9.1	9.9	8.7	9.1
Tobacco duties	9.4	9.2	9.3	9.4
Spirits duties	2.6	2.6	2.9	2.6
Wine duties	3.2	3.1	3.2	3.2
Beer and cider duties	3.7	3.6	3.7	3.7
Air passenger duty	2.2	2.1	2.4	2.2
Insurance premium tax	2.5	2.4	2.5	2.5
Customs duties	3.0	n/a	2.8	3.0
Betting and gaming taxes	1.5	1.6	1.6	1.5
Landfill tax	1.2	1.1	1.0	1.2
Climate change levy	0.7	n/a	0.7	0.7
Aggregates levy	0.3	n/a	0.3	0.3
Vehicle excise duties	5.9	5.7	5.9	5.7
Temporary bank payroll tax / Bank levy[d]	3.5	n/a	0.0	3.5
Other taxes[e]	9.0	n/a	9.0	9.0
National Accounts taxes	**526.7**	n/a	**529.9**	**529.7**
Less Own resources contribution to EU budget	–4.9	n/a	–4.9	–4.9
Interest and dividends	3.8	n/a	3.8	3.8
Other receipts[f]	24.0	n/a	28.9	24.0
Current receipts	**549.7**	**n/a**	**557.7**	**552.6**
Current spending	**655.9**	**659.7**	**655.9**	**655.9**
Current balance	**–106.2**	**n/a**	**–98.2**	**–103.3**
Net investment	42.3	39.7	42.3	42.3
Public sector net borrowing	**148.5**	**n/a**	**140.5**	**145.6**

a. Current receipts figures for income tax, NICs and VAT are on an accruals basis. Other current receipts figures are on a cash basis.

b. Current receipts figures for income tax include receipts of capital gains tax.

c. Includes VAT refunds.

d. Includes both revenues from the temporary bank payroll tax introduced by the Labour government and the new, permanent bank levy announced in the June 2010 Budget.

e. Includes licence fees and environmental levies.

f. Includes gross operating surplus of public corporations.

Note: With the exception of the 'current receipts method' (see note a), all figures are on an accruals basis. Figures shown in this table exclude the temporary effects of financial interventions.

Sources: OBR forecasts from Office for Budget Responsibility, *Economic and Fiscal Outlook*, November 2010 (http://budgetresponsibility.independent.gov.uk/econ-fiscal-outlook.html); this table is similar to table 4.6 on page 91 and also uses public finances supplementary table 1.2. Current receipts figures from Office for National Statistics 'Public sector finances: December 2010' (http://www.statistics.gov.uk/pdfdir/psf0111.pdf). Authors' calculations.

which PAYE income tax on financial sector bonuses is typically paid and also because the deadline for self-assessment income tax payments for 2009–10 was Monday 31 January. The former is likely to boost receipts relative to January 2010, as many financial sector firms have been more profitable in 2010 than they were in 2009. (Details of receipts in January are scheduled to be published by the ONS on 22 February 2010.)

Our forecast for receipts from **National Insurance contributions**, of £100.0 billion, is £1.5 billion higher than the OBR's estimate. Our forecast is based on the current receipts method (which suggests that NI receipts for the year as a whole will be £98.3 billion), adjusted upwards for an expectation that relatively strong growth in bonuses (driven by higher profitability in the financial sector and the ending of the temporary bank payroll tax) will tend to lead to higher growth in NICs receipts towards the end of this financial year.

We forecast **VAT** receipts of £98.0 billion, which is £0.5 billion lower than the OBR's forecast. The IFS model suggests that VAT receipts should be higher this year than forecast by the OBR last November. However, receipts so far this year (and, in particular, out-turns for VAT receipts in the last two months of 2010) suggest that these receipts will actually come in below the OBR's forecast. Our judgement is that, while the current receipts method probably provides a pessimistic assessment of the picture for the whole year, we nonetheless expect receipts to be somewhat lower than forecast by the OBR.

Our forecast for **corporation tax** (net of tax credits) is £43.0 billion. This is slightly (£0.4 billion) above the OBR's forecast of £42.6 billion. The current receipts method suggests that receipts for the year as a whole will come in above the OBR forecast. In addition, the oil price has been higher over the last two months than the OBR forecast. While this will tend to depress the profitability of onshore companies, it will tend to increase the profitability of, and thus revenues raised from, oil and gas producers. Overall, we expect the temporary effect on corporation tax receipts this year from the higher oil price to be positive. Taking these two pieces of information together leads us to expect higher corporation tax receipts than the OBR did. Until we have data on receipts in January 2011 (again due to be published on 22 February), when typically a large slice of corporation tax receipts is received each year, the outlook for these receipts is particularly uncertain.

Our forecast for receipts from **stamp duties** of £9.1 billion is the same as the OBR's forecast. Though this is lower than the current receipts method suggests, growth in stamp duty revenues has been slowing markedly over the last three months. Our forecast is, therefore, based on the current receipts method but building in an expectation that the slowdown in receipts continues.

For **capital gains tax**, we use the forecast from the IFS model (£2.9 billion). This is slightly higher than the OBR's forecast of £2.8 billion. Monthly out-turns for receipts of capital gains tax are not available separately from income tax receipts. We do not, therefore, have a forecast for CGT revenues using the current receipts method.

We forecast that **fuel duties** will yield £27.3 billion, which is £0.4 billion lower than the OBR's forecast. The current receipts method suggests that these receipts will total £27.5 billion, while the IFS model predicts £27.3 billion. Our judgement is based on weighing these predictions against the fact that, to the extent that higher oil prices in recent months have fed through into higher consumer fuel prices, purchases of fuel will have weakened somewhat.

Other government receipts

With the exception of vehicle excise duties (where we take the forecast from the current receipts method), we take the OBR's forecasts for 2010–11 for all other receipts.

Government expenditure

We forecast that **current spending** in 2010–11 will be the same as forecast by the OBR, £655.9 billion. So far this year, central government current spending has been growing more quickly than the OBR forecast suggests for the year as a whole. However, this is almost exclusively driven by higher-than-expected (for the year as a whole) growth in debt interest spending over the first nine months of 2010–11. Debt interest spending has grown by 55% so far this year, compared with the OBR forecast of 38% growth over the year as a whole.[5] However, debt interest payments depend almost entirely on the stock of gilts already in issuance and (in the case of index-linked gilts) on inflation out-turns from previous months. All of this information would have been available to the OBR at the time it produced its latest forecasts and we therefore have no reason to question its forecast for this item of spending. All other components of central government current spending have evolved largely as the OBR forecast for the financial year as a whole. We therefore assume that current spending turns out to be in line with the OBR forecast.

We also assume that the OBR's forecast for £42.3 billion of **public sector net investment** in 2010–11 is accurate. Over the period from April 2010 to December 2010, public sector net investment spending was 19.7% lower than it was over the same period in 2009. The OBR forecast that, over the whole of 2010–11, net investment spending would be 9.2% below its 2009–10 level. Nonetheless, our judgement is that public sector net investment for the year as a whole will be in line with the OBR's forecast of £42.3 billion. Investment spending is inherently lumpy and therefore is less likely to evolve smoothly over the financial year than other components of spending.

Government borrowing

As a result of forecasting higher current receipts and the same current spending, we forecast a **deficit on the current budget** of £103.3 billion for 2010–11. This is £2.9 billion more optimistic than the £106.2 billion deficit forecast by the OBR.

Since we forecast the same level of net investment in 2010–11 as the OBR does, our forecast for **public sector net borrowing** (£145.6 billion) is also £2.9 billion lower than the OBR forecast of £148.5 billion.

A.4 Medium-term forecasts

Any assessment of the fiscal stance should take into account the performance of the economy. Table A.4 presents the macroeconomic forecasts underlying the Green Budget forecasts for the public finances in each of the four economic scenarios used.

The Green Budget baseline scenario predominantly uses published OBR forecasts for all macroeconomic assumptions, where these are available. The exception to this is that, as discussed in more detail in Chapter 5, we assume that the oil price is temporarily higher in the near term than the OBR forecast. The OBR's macroeconomic forecasts assume that

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[5] Latest out-turns from Office for National Statistics, 'Public sector finances: December 2010' (http://www.statistics.gov.uk/pdfdir/psf0111.pdf). Forecasts from Office for Budget Responsibility, *Economic and Fiscal Outlook*, November 2010 (http://budgetresponsibility.independent.gov.uk/econ-fiscal-outlook.html).

national income will grow by 2½% in 2010–11. After that, they project growth of 2% in 2011–12, rising to between 2.7% and 2.9% per annum thereafter. This path leads to the estimated output gap being closed in 2016–17, just beyond the end of the forecast horizon.[6]

Table A.4. Alternative macroeconomic assumptions underlying medium-term public finances forecasts

Annual % change unless otherwise stated	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Green Budget baseline (OBR assumptions, November 2010)						
Gross domestic product (GDP)	2.5	2.0	2.7	2.9	2.8	2.7
Real consumers' expenditure	1.0	1.2	1.0	1.7	1.5	1.4
Employment	0.7	0.0	1.0	1.0	0.7	0.7
Real wages	–2.4	–1.4	–0.4	1.1	1.1	0.8
GDP deflator	3.1	2.5	2.2	2.7	2.7	2.7
Output gap (% of potential GDP)	–3.2	–3.3	–2.8	–2.2	–1.4	–0.7
Alternative Green Budget scenario I (Barclays 'central' case)						
Gross domestic product (GDP)	2.0	1.8	2.1	2.3	2.3	2.5
Real consumers' expenditure	0.1	–1.0	–0.5	–1.6	–1.4	–1.6
Employment	0.8	–0.2	0.4	0.5	0.9	0.8
Real wages	–3.6	–2.6	–1.5	–0.9	–0.3	0.7
GDP deflator	2.7	2.2	1.9	2.0	2.3	2.8
Output gap (% of potential GDP)	–2.5	–2.5	–2.1	–1.7	–1.1	–0.4
Alternative Green Budget scenario II (Barclays 'optimistic' case)						
Gross domestic product (GDP)	2.0	2.1	2.4	3.2	3.3	3.1
Real consumers' expenditure	0.1	–0.9	–0.6	–1.7	–1.1	–1.2
Employment	0.8	–0.1	0.4	0.4	0.9	0.8
Real wages	–3.5	–2.6	–1.4	–0.6	–0.3	0.6
GDP deflator	2.6	2.6	2.1	2.2	2.9	2.9
Output gap (% of potential GDP)	–3.4	–3.4	–3.2	–2.3	–1.3	–0.5
Alternative Green Budget scenario III (Barclays 'pessimistic' case)						
Gross domestic product (GDP)	1.9	0.6	0.9	1.7	1.7	1.8
Real consumers' expenditure	0.4	–0.3	–0.6	–2.1	–2.2	–2.9
Employment	0.8	–0.7	–0.5	–0.2	0.2	0.1
Real wages	–3.1	–2.0	–3.1	–3.3	–1.4	–1.0
GDP deflator	2.7	2.6	1.6	1.0	1.0	1.3
Output gap (% of potential GDP)	–1.5	–2.6	–3.4	–3.4	–3.4	–3.4

Sources: Authors' calculations; Barclays; OBR assumptions from Office for Budget Responsibility, *Economic and Fiscal Outlook*, November 2010 (http://budgetresponsibility.independent.gov.uk/econ-fiscal-outlook.html).

[6] Paragraph 1.9 of Office for Budget Responsibility, *Economic and Fiscal Outlook: November 2010*, states that the OBR expects the output gap does close in 2016–17 under its central forecast for growth.

The first alternative Green Budget scenario (the Barclays 'central' case) assumes that the output gap is smaller in 2010–11 than the OBR estimates and thus there is less scope for above-trend growth before inflationary pressures emerge. Under this scenario, growth in national income is forecast to be weaker in 2010–11 and in each of the next five years. Cumulative real GDP growth over the next five years amounts to 11.5% under this scenario, compared with 13.8% under the OBR's forecast. This scenario also implies that the output gap will not be closed until about 2016–17, and it contains substantially weaker real earnings growth and somewhat lower employment growth over the next five years than the OBR forecasts.

The second alternative Green Budget scenario (the Barclays 'optimistic' case) assumes that the economy grows by 2.0% in 2010–11, rising to 2.1% in 2011–12 and 2.4% in 2012–13. Thereafter, GDP growth accelerates to above 3%. This scenario assumes that the output gap in 2010–11 is larger than that assumed under the central case and slightly larger than that estimated by the OBR. This provides more scope for above-trend growth over the next few years. The output gap would still not be closed until about 2016–17 under this scenario. Cumulative real GDP growth over the next five years amounts to 14.9% under this scenario. However, despite this higher real GDP growth, this scenario still contains lower growth in real earnings and real consumer spending than the OBR's forecast, and so the pass-through of high GDP growth into higher tax receipts is relatively weak, as discussed in Chapter 5.

The final alternative Green Budget scenario (the Barclays 'pessimistic' case) assumes that the output gap is smaller in 2010–11 than the OBR estimates and that this gap actually widens over the next few years as real GDP growth remains sluggish. Real GDP growth is assumed to be 1.9% in 2010–11, falling to 0.6% next year and 0.9% in 2012–13, before rising again to between 1.7% and 1.8% for the following three years. Cumulative real GDP growth over the next five years amounts to just 7.0% under this scenario. This results in a decline in employment and a 10% real fall in earnings by 2015–16.

The outlook for the composition, level and growth of trend economic activity underlying the three Barclays scenarios is discussed in more detail in Chapter 4.

Appendix B: Calculating implicit carbon taxes

Section 11.5 estimates the real (2010–11 prices) carbon taxes implicit on different fuels for different end-users resulting from a range of different policies that are currently in place or are scheduled to come on stream by 2013–14. We use information from several sources and make a number of assumptions to derive these figures.

- Estimates of the carbon emissions per kWh from the various fuels used to generate electricity (i.e. coal, gas, nuclear) come from chapter 5 of DECC's *Digest of United Kingdom Energy Statistics* (DUKES) 2010.[1] They are the latest available estimates of emissions (2009) for each fuel type and are adjusted to include transmission losses from power stations to end-users.
- We then estimate the impact on the carbon price of different taxes and other policies. For electricity, these are the climate change levy (CCL), the Carbon Reduction Commitment (CRC), the Renewables Obligation (RO), the proposed carbon price support rates and the EU Emissions Trading Scheme (ETS). Our calculations proceed as follows:
  - For the CCL, we take the 2010–11 rates per kWh. The CCL is assumed to be uprated annually with the retail price index (RPI) so that the real cost of the CCL is the same in two different periods.
  - The CRC is levied on energy use rather than CO_2 emissions, using an assumed average for grid emissions of 541g/kWh, which is fixed for the first three years of the scheme.[2] We assume that allowances will be sold at a price of £12 per 'tonne of CO_2', as was intended by the previous government for 2012–13, and that this cost will not change in real terms by 2013–14. This implies that the CRC is equivalent to a tax of 0.65p/kWh. We assume that gas for heating is taxed at a rate consistent with £12 per tonne of CO_2 and emissions of 184g/kWh (from DUKES), implying a tax of 0.22p/kWh.
  - For the RO, we estimate the 2010–11 'tax' in pence per MWh to be 11.1% of the 2010–11 buyout price (£36.99 per MWh). This is an estimate of the increase in marginal costs facing suppliers, since almost all firms covered by the scheme purchased at least some buyouts, and 11.1% is the size of the obligation in 2010–11.[3] The buyout price is uprated annually in line with the RPI, so we assume no real change to the buyout price in 2013–14, but apply the level of the obligation of 13.4% in that year to calculate the implicit tax.[4]

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[1] http://www.decc.gov.uk/assets/decc/Statistics/publications/dukes/311-dukes-2010-ch5.pdf.

[2] See the CRC User Guide at http://www.decc.gov.uk/assets/decc/What%20we%20do/A%20low%20carbon%20UK/crc/1_20100406154137_e_@@_21934CRCPDFAWv9.pdf.

[3] http://www.ofgem.gov.uk/Media/PressRel/Documents1/RO%20Buy-Out%20price%202010%2011%20FINAL%20FINAL.pdf.

[4] See 'Calculation of the ROC Obligation' at http://www.legislation.gov.uk/ukdsi/2009/9780111473955/schedule/1. The size of the obligation is increased if the government believes that firms will be within 10% of supplying the number of Renewables Obligation Certificates (ROCs) needed to comply with the obligation; hence this figure is a lower bound on the level of the obligation in that year. See

- For the carbon price support rates, we assume a tax per tonne of CO_2 of £3 in 2013. This is the highest price in the government's 'illustrative' scenarios presented in its consultation.[5]
- For the ETS, we take the central DECC estimate of £14.10 per tonne of CO_2 in the traded sector in 2010 and £14.70 in 2013.[6] Using estimates of the CO_2 emissions per kWh, we can estimate the cost of the ETS per kWh of electricity. For example, coal-fired power generates 915g of CO_2/kWh. This is 0.000915 tonnes of CO_2, which at a price of £14.10 per tonne would cost 1.29p/kWh.

These figures exclude some government policies aimed at promoting energy efficiency such as the Carbon Emissions Reduction Target (CERT) and the Community Energy Savings Programme (CESP). These impose costs on energy suppliers that may be passed on to end-users. They are scheduled to be replaced by the Green Deal and an Energy Companies Obligation from December 2012. We also do not take account of the different VAT treatment of energy used by households (where VAT is charged at a reduced rate of 5%) and firms (where VAT is charged at the standard rate of 20%).

The RO is set to be replaced by the system of feed-in tariffs (FITs) from 2013,[7] but will continue to apply to new projects until 2017, with transitional arrangements that are supposed to ensure that existing capacity is no worse off from the change. The FITs will give an advantage to renewables and nuclear power, and can also be thought of as adding to the implicit carbon tax on non-renewables (but not discriminating between coal and gas). Since we do not as yet know the levels of support or the structure of any future FIT, we simply assume that the FIT will have the same effect as the RO would have had on implicit carbon taxes. The 'banding' of the RO could arguably affect the costs of the scheme for firms (it is difficult to say whether this increases or decreases costs for firms) and we have not attempted to account for this.

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http://www.decc.gov.uk/assets/decc/What%20we%20do/UK%20energy%20supply/Energy%20mix/Renewable%20energy/renewable%20energy%20policy/renewables%20obligation/585-RO-level-2011-12-methodology.pdf.

[5] See HM Treasury, *Carbon Price Floor: Support and Certainty for Low-Carbon Investment*, 2010 (http://www.hm-treasury.gov.uk/d/consult_carbon_price_support_condoc.pdf).

[6] http://www.decc.gov.uk/assets/decc/what%20we%20do/a%20low%20carbon%20uk/carbon%20valuation/1_20100610131858_e_@@_carbonvalues.pdf.

[7] See Department of Energy and Climate Change, *Electricity Market Reform: Consultation Document*, 2010 (http://www.decc.gov.uk/assets/decc/Consultations/emr/1041-electricity-market-reform-condoc.pdf).

Appendix C: Headline tax and benefit rates and thresholds

	2010–11	2011–12[a]
Income tax		
Personal allowance: under age 65	£6,475 p.a.	£7,475 p.a.
aged 65–74	£9,490 p.a.	£9,940 p.a.
aged 75 and over	£9,640 p.a.	£10,090 p.a.
Married couple's allowance, restricted to 10%:		
at least one spouse or civil partner born before 6/4/35	£6,965 p.a.	£7,295 p.a.
Basic rate	20%	20%
Higher rate	40%	40%
Additional rate	50%	50%
Tax rates on interest income	10%, 20%, 40%, 50%	10%, 20%, 40%, 50%
Tax rates on dividend income	10%,[b] 32.5%,[b] 42.5%[b]	10%,[b] 32.5%,[b] 42.5%[b]
Starting-rate limit	£2,440 p.a.	£2,560 p.a.
Basic-rate limit	£37,400 p.a.	£35,000 p.a.
Higher-rate limit	£150,000 p.a.	£150,000 p.a.
Income limit for personal allowance	£100,000 p.a.	£100,000 p.a.
National Insurance		
Lower earnings limit (LEL)	£97 p.w.	£102 p.w.
Upper earnings limit (UEL)	£844 p.w.	£817 p.w.
Primary threshold (employee)	£110 p.w.	£139 p.w.
Secondary threshold (employer)	£110 p.w.	£136 p.w.
Class 1 contracted-in rate: employee – below UEL	11%	12%
– above UEL	1%	2%
employer – below UEL	12.8%	13.8%
– above UEL	12.8%	13.8%
Class 1 contracted-out rate: employee – below UEL	9.4%	10.4%
(salary-related schemes) – above UEL	1%	2%
employer – below UEL	9.1%	10.1%
– above UEL	12.8%	13.8%
Corporation tax		
Rates: small companies' rate	21%	20%
standard rate	28%	27%
Capital gains tax		
Annual exemption limit: individuals	£10,100 p.a.	£10,600 p.a.
trusts	£5,050 p.a.	£5,300 p.a.
Standard rate	18%	18%
Higher rate[c]	28%	28%
Inheritance tax		
Threshold	£325,000	£325,000
Rate for transfer at or near death	40%	40%
Value added tax		
Registration threshold	£70,000 p.a.	£73,000 p.a.
Standard rate	17.5%/20%[d]	20%
Reduced rate	5%	5%
Excise duties		
Beer (pint at 3.9% abv)	38p	40p[e]
Wine (75cl bottle at 12% abv)	169p	178p[e]
Spirits (70cl bottle at 40% abv)	666p	703p[e]
20 cigarettes: specific duty	235p	253p[e]
ad valorem (24% of retail price)	135p	135p[e]
Ultra-low-sulphur petrol (litre)	57p/58p/59p[f]	62p
Ultra-low-sulphur diesel (litre)	57p/58p/59p[f]	62p

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	2010–11	2011–12[a]
Air passenger duty		
Band A (up to 2,000 miles): economy	£11/£12[g]	£12[h]
club/first class	£22/£24[g]	£25[h]
Band B (2,001–4,000 miles): economy	£45/£60[g]	£60[h]
club/first class	£90/£120[g]	£125[h]
Band C (4,001–6,000 miles): economy	£50/£75[g]	£80[h]
club/first class	£100/£150[g]	£155[h]
Band D (6,001 or more miles): economy	£55/£85[g]	£90[h]
club/first class	£110/£170[g]	£175[h]
Betting and gaming duty		
Gross profits tax	15–50%	15–50%
Spread betting rate: financial bets	3%	3%
other bets	10%	10%
Insurance premium tax		
Standard rate	5%/6%[i]	6%
Higher rate (for insurance sold accompanying certain goods and services)	17.5%/20%[d]	20%
Stamp duty		
Land and buildings:		
residential threshold	£125,000	£125,000
non-residential threshold	£150,000	£150,000
rate: up to threshold	0%	0%
threshold–£250,000	1%	1%
£250,000–£500,000	3%	3%
£500,000–£1,000,000	4%	4%
above £1 million	4%	5%
Stocks and shares: rate	0.5%	0.5%
Vehicle excise duty		
Graduated system (for new cars from 1 March 2001)	£0–£435 p.a.[j]	£0–£450 p.a.[j]
Graduated system (first-year rate from April 2010)	£0–£950 p.a.[k]	£0–£985 p.a.[k]
Standard rate (for cars registered before March 2001)	£205 p.a.	£210 p.a.
Small-car rate (engines up to 1,549cc)	£125 p.a.	£130 p.a.
Heavy goods vehicles (varies according to vehicle type and weight)	£170–£1,910 p.a.	£175–£1,975 p.a.
Landfill tax		
Standard rate	£48 per tonne	£56 per tonne
Lower rate (inactive waste only)	£2.50 per tonne	£2.50 per tonne
Climate change levy		
Electricity	0.470p/kWh	0.485p/kWh
Natural gas	0.164p/kWh	0.169p/kWh
Coal	1.281p/kg	1.321p/kg
Liquefied petroleum gas	1.050p/kg	1.083p/kg
Business rates		
Rate applicable for low-value properties[l] in: England	40.7%	42.5%
Scotland	40.7%	42.5%
Wales	40.9%	42.7%
Council tax		
Average rate Band D council tax in England and Wales	£1,420 p.a.	Councils to set
Income Support / income-based Jobseeker's Allowance		
Single (aged 25 or over)	£65.45 p.w.	£67.50 p.w.
Couple (both aged 18 or over)	£102.75 p.w.	£105.95 p.w.
Basic State Pension		
Single	£97.65 p.w.	£102.15 p.w.
Couple	£156.15 p.w.	£163.35 p.w.
Winter Fuel Payment: for those aged 60–79	£250	£200
for those aged 80 or over	£400	£300
	Continues	*Continues*

Continued

	2010–11	2011–12[a]
Pension Credit		
Guarantee credit for those over female State Pension Age:		
single	£132.60 p.w.	£137.35 p.w.
couple	£202.40 p.w.	£209.70 p.w.
Savings credit for those aged 65 or over:		
threshold – single	£98.40 p.w.	£103.15 p.w.
threshold – couple	£157.25 p.w.	£164.55 p.w.
maximum – single	£20.52 p.w.	£20.52 p.w.
maximum – couple	£27.09 p.w.	£27.09 p.w.
withdrawal rate	40%	40%
Child Benefit		
First child	£20.30 p.w.	£20.30 p.w.
Other children	£13.40 p.w.	£13.40 p.w.
Child Tax Credit		
Family element	£545 p.a.	£545 p.a.
Baby element	£545 p.a.	n/a
Child element	£2,300 p.a.	£2,555 p.a.
Disabled child element	£2,715 p.a.	£2,800 p.a.
Working Tax Credit		
Basic element	£1,920 p.a.	£1,920 p.a.
Couples and lone-parent element	£1,890 p.a.	£1,950 p.a.
30-hour element	£790 p.a.	£790 p.a.
Disabled worker element	£2,570 p.a.	£2,650 p.a.
Childcare element:		
maximum eligible cost for one child	£175.00 p.w.	£175.00 p.w.
maximum eligible cost for two or more children	£300.00 p.w.	£300.00 p.w.
proportion of eligible costs covered	80%	70%
Features common to Child and Working Tax Credits		
First threshold	£6,420 p.a.	£6,420 p.a.
First threshold if entitled to Child Tax Credit only	£16,190 p.a.	£15,860 p.a.
First withdrawal rate	39%	41%
Second threshold	£50,000 p.a.	£40,000 p.a.
Second withdrawal rate	1 in 15	41%
Maternity benefits		
Sure Start Maternity Grant	£500	£500
Statutory Maternity Pay: weeks 1–6	90% of earnings	90% of earnings
weeks 7–33	£124.88 p.w., or 90% of earnings if lower	£128.73 p.w., or 90% of earnings if lower
Maternity Allowance	£124.88 p.w.	£128.73 p.w.

a. 2011–12 figures take pre-announced values where available and estimated results of standard indexation otherwise.

b. Offsetting tax credit available, which reduces marginal effective tax rates to 0%, 25% and 36.11%.

c. Rate applies to higher- and additional-rate taxpayers from 23 June 2010.

d. The 17.5% rate applied before 4 January 2011; the 20% rate applied from that date.

e. Assumes RPI inflation of 3.5% in September 2011 as per the Office for Budget Responsibility, *Economic and Fiscal Outlook*, November 2010. Assumes pre-tax price of cigarettes rises by RPI.

f. Rates changed in October 2010 and January 2011.

g. The higher rate applied after November 2010.

h. Assumes Band A rates rounded to nearest £1 and other rates rounded to nearest £5.

i. The 5% rate applied before 4 January 2011; the 6% rate applied from that date.

j. Highest rate applies only to cars registered on or after 23 March 2006. For cars registered before this date, the highest rates are £245 and £255 for 2010–11 and 2011–12 respectively.

k. Higher first-year rates apply only for cars with emissions of 166g/km or greater (Band H and above).

l. Applies where rateable values are less than £21,500 in Greater London, £15,000 in the rest of England, £29,000 in Scotland and £5,000 in Wales. In 2010–11, a supplement of 0.7% is payable on higher-value properties.

Sources: See next page.

Sources:
http://www.hm-treasury.gov.uk/d/junebudget_press_notice2.pdf;
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http://www.voa.gov.uk/business_rates/rating-multipliers.htm;
http://www.communities.gov.uk/publications/corporate/statistics/counciltax201011;
http://www.scotland.gov.uk/Topics/Government/local-government/17999/11199/brief-guide;
http://wales.gov.uk/docs/statistics/2010/100325sdr412010en.pdf.

For descriptions of the tax and benefit systems, see S. Adam and J. Browne, *A Survey of the UK Tax System*, IFS Briefing Note 9, 2009 (http://www.ifs.org.uk/bns/bn09.pdf) and W. Jin, P. Levell and D. Phillips, *A Survey of the UK Benefit System*, IFS Briefing Note 13, 2010 (http://www.ifs.org.uk/bns/bn13.pdf) respectively.

For a summary of the main tax measures introduced in each Budget and Pre-Budget Report since 1979, see http://www.ifs.org.uk/ff/budget_measures.xls.

For estimates of the effects of various illustrative tax changes on government revenues, see table 1.6 of HM Revenue & Customs, *Tax Expenditures and Ready Reckoners*, http://www.hmrc.gov.uk/stats/tax_expenditures/menu.htm.

Appendix D: Abbreviations

ACE	Allowance for Corporate Equity
AME	Annually Managed Expenditure
APD	air passenger duty
BBC	British Broadcasting Corporation
BCC	British Chambers of Commerce
BHPS	British Household Panel Survey
BIS	Department for Business, Innovation and Skills
BRC	Budget Responsibility Committee
CAA	Civil Aviation Authority
CBI	Confederation of British Industry
CBO	Congressional Budget Office (US)
CCC	Committee on Climate Change
CCL	climate change levy
CCS	carbon capture and storage
CDS	credit default swap
CERT	Carbon Emissions Reduction Target
CESP	Community Energy Savings Programme
CFC	Controlled Foreign Companies
CGT	capital gains tax
CIPFA	Chartered Institute of Public Finance and Accountancy
CO_2	carbon dioxide
COFOG	Classification of the Functions of Government
CPB	Central Planning Bureau (Netherlands)
CPI	consumer price index
CRC	Carbon Reduction Commitment
CSR	Comprehensive Spending Review
CTB	Council Tax Benefit
CTC	Child Tax Credit
DB	defined benefit
DC	defined contribution
DCLG	Department for Communities and Local Government
DCLG:LG	DCLG: local government
DECC	Department of Energy and Climate Change
DEFRA	Department for Environment, Food and Rural Affairs
DEL	Departmental Expenditure Limit
DfT	Department for Transport
DMO	Debt Management Office
DUKES	Digest of United Kingdom Energy Statistics
DWP	Department for Work and Pensions
EC	European Commission
ECO	Energy Company Obligation
EEA	European Economic Area
ETS	Emissions Trading Scheme
EU	European Union

EYF	End-year flexibility
FFS	fair fuel stabiliser
FIT	feed-in-tariff
FRS	Family Resources Survey
FVI	Fiscal Vulnerability Index
GB	Green Budget
GDP	gross domestic product
GG	general government
GHG	greenhouse gas
GIMF	Global Integrated Monetary and Fiscal Model (IMF)
GNI	gross national income
HGV	heavy goods vehicle
HMRC	Her Majesty's Revenue and Customs
HMS	Her Majesty's Ship
HMT	Her Majesty's Treasury
HP filter	Hodrick–Prescott filter
ICAEW	Institute of Chartered Accountants in England and Wales
IFS	Institute for Fiscal Studies
IMF	International Monetary Fund
IP	intellectual property
IPSPC	Independent Public Service Pensions Commission
ISA	Individual Savings Account
IT	income tax
LASFE	Local Authority Self-Financed Expenditure
LFS	Labour Force Survey
METR	marginal effective tax rate
MPC	Monetary Policy Committee
MTOW	maximum take-off weight
NAO	National Audit Office
NAWRU	non-accelerating wage rate of unemployment
NHS	National Health Service
NHS PAM	NHS practices allied to medicine
NI	National Insurance
NICs	National Insurance contributions
NIESR	National Institute of Economic and Social Research
NPA	Normal Pension Age
OBR	Office for Budget Responsibility
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
OFMDFM	Office of the First Minister and Deputy First Minister (Ireland)
OLS	ordinary least squares
ONS	Office for National Statistics
OTS	Office of Tax Simplification
PAYE	Pay-As-You-Earn
PBR	Pre-Budget Report
PCT	Primary Care Trust

PFI	Private Finance Initiative
PLC	public limited company
PSBR	public sector borrowing requirement
PSNB	public sector net borrowing
PSNI	public sector net investment
PTR	participation tax rate
QE	quantitative easing
RAI	Risk Appetite Index
RDEL	resource Departmental Expenditure Limits
RHDI	real household disposable income
RO	Renewables Obligation
Rossi	retail price index excluding rent, mortgage interest, council tax and housing depreciation
RPI	retail price index
SMEs	small and medium-sized enterprises
SPA	State Pension Age
STICERD	The Suntory and Toyota International Centres for Economics and Related Disciplines
TAXBEN	IFS tax and benefit model
TFP	total factor productivity
TLRC	Tax Law Review Committee
TME	Total Managed Expenditure
UEL	upper earnings limit
UK	United Kingdom
UKIPO	United Kingdom Intellectual Property Office
UN	United Nations
US	United States
VAT	value added tax
VED	vehicle excise duty