**Annex A: Modelling student loan repayment**

**Introduction**

1. In an earlier report (Thompson et al, 2010b) we examined the assumptions behind the Government estimates of the cost of providing loans, the ‘RAB’ charge. Our analysis made use of the Department for Business, Innovation and Skills (BIS) ‘Ready Reckoner’, a tool, originally requested by the Browne Committee, designed for making comparisons between policy options. Since then, with the policy decisions made, Government has developed and refined its estimation methods. On 30 August 2012 BIS made available a ‘simplified student loan repayment model’ and a guide to accompany it. They can be found at the link below:-

[www.bis.gov.uk/policies/higher-education/research-analysis](http://www.bis.gov.uk/policies/higher-education/research-analysis).

1. As the name implies, this model is a simplified version of the one used by Government to make their official RAB estimates. The simplified model only considers young home graduates from three-year degree level courses who started in 2012, and it ignores the impact of early repayments, death and disability, and so on. However the simplified model does enable us to assess the sensitivity of the RAB estimates to the assumptions underlying both simplified and full models.
2. In addition, earlier this year, the Institute of Fiscal Studies published a further report into the financial implications of the new higher education student support and funding arrangements (Chowdry et al, 2012).
3. In this annex we review our assessment of the RAB estimates in the light of these new sources of information. There are ten sections:

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**Full and the simplified models - common key elements**

1. Both the full and simplified models involve the same five stages. (See page 4 of the model guide for an outline.) BIS have provided HEPI with further details about the construction of the two key data sets underpinning the estimations, the ‘percentile path’ matrix and the ‘income distribution’ matrix.

Percentile paths

1. These data consist of simulated individuals (20,000 for the simplified model, typically ten times that many for the full model), showing for each individual his or her percentile of the income distribution for each year of the repayment period. Apart from the number of individuals, this path matrix is the same for simplified and full models.
2. Incomes of HE qualifiers are taken from the British Household Panel Survey (1991-2008). Incomes are recorded for all qualifiers including those unemployed or out of the labour market, so the lower percentiles will typically correspond to zero incomes. No adjustments are made for part-time working and no information about employment status is recorded. Individual values for successive pairs of years are then used to derive the distributions of income percentiles for the second year for each set of characteristics defined by age, sex and percentile in the first year.
3. The individual cases of the path matrix are generated by first assigned a percentile at random, and then selecting at random from the distribution defined by age, sex and the first percentile, to give the percentile for the following year. The process is repeated using this percentile from the second year to derive the percentile for the third, and so on, until the end of the repayment period.

Income distribution

1. These data consist of average earnings (2009 prices) by age and sex. The simplified model has one set of data for graduates. The full model has two, one for graduates and one for other undergraduate qualifiers. There are no other attributes specified in the derivation of these data. The data source for ages 24 and older is the Labour Force Survey (2001-2009). Student Loan Company (SLC) data was used for the younger ages. This is possible because few of these former students have fully repaid, and advantageous because the LFS is a little sparse at these ages.
2. The values from 2001 to 2008 are adjusted to 2009 in line with the changes in average earnings. No weightings are applied even though for some age values the numbers of graduates will greatly differ for different LFS surveys.

Loan assumptions

1. With the default settings, the average loan is set at £11,700 which includes a fee loan of £7,000.For the sensitivity analysis we have not changed the default setting, though our most recent estimate of fees for 2012 was £8,234. If we assume that this converted to am £8,234 fee loan, that is all those taking a fee loan took a 100 per cent loan, giving a total loan of £12,434 we get an increase in the RAB charge of 1.4 per cent.

**Differences between full and simplified models**

1. The differences are:-

|  |  |
| --- | --- |
| **Simplified** | **Full** |
| Home graduates from three-year degree level courses. HE entry aged 18 in 2012, graduate 2015, first liable to repay loan 2016. | Varying course lengths and age of entry and leaving, different earnings matrices for degree and sub degree qualifiers, separate estimates for non-completers and EU former students. |
| Single sum borrowed for each of three years. Default set at £11,700 for each year. | Range of loan values and loan take up patterns. |
| Ignores early repayments, death and disability | Models early repayments, death and disability |
| Sets proportion of females at 55% | Proportions of females estimated from SLC data. |
| RAB (base version) 30.1% | RAB 32% (base version) |

1. The simplified model was not created to give the best overall estimate of the RAB. BIS report in the guide to the simplified model that it gave a value two percentage points lower than the full model with default parameters. The simplified model is better viewed as a tool to carry out sensitivity analysis, to clarify the key processes that are common to full and simplified models, and to explore the uncertainties in the RAB estimates.
2. For this reason the simplified model has not been modified to give a more accurate estimate of the RAB, for example by changing the proportion of females[[1]](#footnote-1). All the results reported here use the simplified model as originally published by BIS with the default settings, apart from any changes specifically mentioned. This should make comparisons with other analyses more straightforward without compromising the usefulness of the simplified model to carry out ‘what if’ analysis.
3. The model does not give consistent results with the percentage female parameter set to 55 per cent. Rerunning a calculation gives different answers which can, through rounding, change the value to a whole percentage, and which also makes it difficult to measure the sensitivity of the RAB to small changes. It is unclear why it was constructed in this way, because all the functional randomisation is done in preparing the matrix of pathways which are then held in a static table. To avoid these variations, the values in this annex were calculated by first setting the percent female variable to 100 per cent, and then to 0 per cent, and combining the values assuming 55 per cent female.
4. The simplified model focuses on a common group of former students. The data sets for this group are larger and less problematic than for those groups that are only included in the full model. This is particularly true of non-completers and non-UK EU former students, where setting the parameters is largely a question of judgement. The features ignored by the simple model, like early repayments, necessarily rely on data from the SLC and HMRC about the current loans, and, clearly, there will be a large degree of uncertainty in extrapolating to the new system with the much large loans and different repayment regulations. From this we may conclude that the uncertainties in the estimate of the overall RAB, as calculated by the full model, will be greater than the uncertainties found for the simplified model.

**Former students’ earnings in 2016**

1. When the repayment conditions were announced in 2010, the repayment and high interest earning thresholds were set at £21,000 and £41,000 in 2016 prices, the first year for repayments of the new arrangements. After that these thresholds are to be updated annually in line with average earnings. This means that the cost of the loans over the long term is sensitive to graduate earnings in 2016. We first consider the forecasts for inflation from 2012, and then look at how earnings of recent graduates have changed since 2009.

Impact of inflation

Table 1: Changes in inflation assumptions to 2016

|  |  |
| --- | --- |
| Percentage point increase (decrease) in RPI for each year 2012-2016 compared to values used in BIS model. | RAB |
| (2.0%) | 34.0% |
| (1.0%) | 32.0% |
| 0.0% | 30.1% |
| 1.0% | 28.2% |
| 2.0% | 26.4% |

Earnings assumed to follow changes in inflation. E’ = (1+E)\*(1+RPI’)/(1+ RPI)-1 , where E, RPI are original earnings change and inflation, and E’, RPI’ are the altered vales. RAB values calculated using simplified model with all other parameters unchanged.

1. Announcing the threshold levels in 2016 prices had the advantage of showing a large difference with the then current threshold for repayment of £15,795, but it meant that the real value of the thresholds would depend on the rate of inflation up to 2016. Table 1 shows the impact of changes in the inflation rate assumptions for 2012 to 2016.
2. In recent years it has proved difficult to forecast inflation over the short term, so, as we can see from the range of RAB values in table 1, this introduces some uncertainty in the long term cost of student loans. After 2016 the RAB is insensitive to the inflation rate, so we will not have to wait long to find out how these uncertainties will be resolved.

Estimates of graduate earnings in 2016

1. The earnings data are derived from LFS surveys and SLC data from 2001 to 2009, with values for years 2001 to 2008 indexed by average earnings to 2009. From 2009 to 2016 these earnings are again increased in line with average earnings.
2. The HESA Destination of Leavers from Higher Education (DLHE) Survey provides information on qualifiers about six months after graduation. The most recent information relates to those who typically qualified in the summer of 2011, and reported earnings for as of January 2012. These data show that for this group of qualifiers the earnings growth is low.

Table 2: Changes in average (cash) earnings from DLHE survey and BIS model

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 2009 | 2010 | 2011 | 2012 |
| BIS model | 2.25% | 1.76% | 1.90% | 3.27% |
| DLHE | 2.22% | 0.93% | 0.23% | 0.20% |

DLHE values show growth in average earnings (mostly for mid January) from the previous year. Population: English domiciled undergraduate qualifiers from full-time undergraduate programmes of study registered at a UK HEIs, who provided a full response to the DLHE survey, including their salary, and reported that they were employed full-time in paid work in the UK. From unpublished work carried out by HEFCE. BIS values are September earnings used in their loan repayment models.

1. The BIS and DLHE values in table 2 are not exactly comparable, both with respect to the populations and the exact time periods the changes refer to, but the DLHE figures are consistently lower, which suggests that earnings in 2016 may be lower than expected. The BIS model assumes that graduate earnings will continue to grow through to 2016 with an average growth rates in cash earnings of 4.3 per cent pa. This seems very optimistic in the current financial climate.
2. It is possible that those who graduate in 2015 will catch up when the economy starts to grow, but it is also possible that, on average, their long term career prospects are affected by a difficult start. Repayments in the early years of the new loans scheme will probably be lower than expected, whether there will be long term effects is unclear.

**Long term average earnings assumptions**

1. The Ready Reckoner model used the Treasury assumption that the mean long run growth in real incomes would be 2 per cent per annum[[2]](#footnote-2). The current forecasts use the Office for Budget Responsibility (OBR) assumptions of 1.31 per cent pa mean growth from 2021.[[3]](#footnote-3). Up to 2017 OBR projections are used[[4]](#footnote-4) and between 2017 and 2021 the values are simple interpolations between short-term and long term figures.
2. These much less optimistic assumptions significantly reduce the estimated graduate incomes at the end of the repayment period. In our previous analysis we highlight the headline figure of £99,500 pa for mean non-zero earnings for male graduates in the final year of the repayment period. Table 3 shows the comparable figures for the new model with the new and old average earnings assumptions.

Table 3: Mean male earnings 2045 (2016 prices)

|  |  |
| --- | --- |
| Ready Reckoner (graduates and other former students) | £99,500 pa |
| Simplified model, OBR average earning assumptions1 | £76,500 pa |
| Simplified model, 2 per cent pa average earnings increase from 20212 | £90,100 pa |

(1) Taking the average of the non-zero percentiles from the age x percentile matrix for age 51 (sheet ID), inflating by the ‘Nominal wage index for 2009’ (sheet Global) and deflating by the RPI. NB the figure may include a small number of individuals from the lowest non-zero percentile (11 per cent.) (2) Earnings and inflation assumptions for 2009 to 2020 as in original simplified model

1. Table 4 shows the RAB values for different long term average earning assumptions using the simplified model. We show the values for males and females as well as the overall figure, because their earnings profiles are so different.

Table 4: RAB values with different long term earnings assumptions

|  |  |  |  |
| --- | --- | --- | --- |
| Annual increase in real average earnings from 2021 | RAB | | |
| Male | Female | All |
| 0.00 % pa | 17.2% | 47.3% | 33.8% |
| 1.31 % pa (2012 OBR assumption) | 14.5% | 42.8% | 30.1% |
| 2.00 % pa (earlier Treasury assumption) | 13.4% | 40.6% | 28.4% |

1. The 2012 OBR growth assumption is currently used by BIS and is the default value in the simplified model. This replaced the previous assumption of 2 per cent growth and results in an increase in the RAB charge of 1.8 percentage points.
2. The impact on the RAB of the changes in long term earning assumptions is dampened by the consequent changes to the thresholds for repayment and for the higher interest payment. We also show the extreme and apparently unrealistic assumption of zero growth increase in real average earnings from 2021. While such a scenario may seem implausible, we will see that it may not be unrealistic when we consider the future career growth in earnings for graduates. However, what we see here is that even with zero long term growth in average earnings, the effect on the RAB is modest. Again this is because the thresholds would be lower.
3. The simplified model, and, to our knowledge all the other RAB estimates for the new loan scheme, have assumed that the long term earnings growth has applied equally to all earnings levels. However, there is evidence of increasing dispersion in UK graduate earnings (Green et al, 2010, and O’Leary et al, 2011). In the USA the top 10 per cent of college earners have accounted for nearly all the growth in earnings over the last three decades (Brown et al, 2011).
4. The RAB values in table 5 are all based on the same overall average earnings growths, for each age and sex, as used by BIS, but the lower percentiles have zero through to average growth. Only the distributions of the long term general increase in average earnings are changed. The ‘career’ growths following age and experience remain the same.

Table 5 Effect on RAB of unequal distribution of OBR average earnings growth from 2021

|  |  |  |
| --- | --- | --- |
| Growth level for low growth group as percentage of average | Low growth group | |
| Up to 80th percentile | Up to 90th percentile |
| 0% | 35.7 | 37.2 |
| 25% | 34.3 | 35.4 |
| 50% | 32.8 | 33.5 |
| 25% | 31.4 | 31.8 |
| 100% | 30.1 | 30.1 |

1. The results in table 5 may at first seem counter intuitive. Zero per cent long term growth for 90 per cent of the former student population increases the RAB change by more than seven percentage points, while, we see from table 4 than zero grow for all the population only lifts the RAB by less than four percentage points. However, the redistribution of growth does no effect the average earnings and hence, the thresholds are not lowered. Hence the larger impact on the RAB.

**Career growth in earnings**

1. Figures 1a and 1b show the lower quartile, median and upper quartile of the earnings of former students from aged 22, when they are liable to make their first repayments, to aged 51, the last year for repayments before any outstanding balance will be written off.
2. These earnings do not correspond to the figures usually published. They include those individuals with no earnings, through unemployment or by not being in the labour market. No adjustments are made for part-time working. This needs to be understood when comparing the figures for men and women. For example, about a third of the women aged 38 have zero income, whereas for men the figure is 7 to 8 per cent. The resulting much lower average earnings for women leads to the much higher loan costs.
3. The coloured lines shown in figures 1a and 1b are the best fit quadratic curves. These are not part of the BIS model and are included to give a better sense as to how earnings change with time. The scatter of the data points reflects the difficulty of estimating the earnings of graduates for individual ages[[5]](#footnote-5). For men, and also for women in the higher earning percentiles, we see large increases in earnings through the first 10 to 15 years of the repayment period. This, combined with the much higher loans to cover the new fees and maintenance, leads to large proportions of the repayments being expected at the back end of the repayment period.

Figure 1a: Male graduate earnings by age (2016 prices)

Figure 1b: Female graduate earnings by age (2016 prices)

Figures 1a and b notes

Black lines show the repayment and maximum interest thresholds.

Green, orange and red lines and points show the lower quartile, median and upper quartile earnings (zero earnings included). Lines are best fit quadratic fits of data from BIS model based on 25, 50 and 75 percentile data from the ID sheet. Values were increased in line with average earnings and deflated by the RPI, values from the Global sheet.

1. Table 6 shows the Net Present Value (NPV) of the repayments in the last 20, 15 and 10 years as a percentage of the NPV of all the expected repayments. Even though the repayments made towards the end of the repayment period will have higher discounting, they represent a large part of the expected repayment NPV, and a much larger part than the loans made hitherto (Thompson et al, 2010). This means the RAB estimates will be sensitive to earnings estimates far into the future, leading to increased uncertainty as to what the loan costs will turn out to be.

Table 6: Percentage of total NPV of repayments made towards the end of the repayment period

|  |  |  |  |
| --- | --- | --- | --- |
| Period | %NPV of all repayments | | |
| Male | Female | All |
| Last 20 years (after 2026) | 68% | 69% | 69% |
| Last 15 years (after 2031) | 39% | 48% | 44% |
| Last 10 years (after 2036) | 18% | 29% | 24% |

1. The crucial question is, will the career growth in earnings shown in figures 1a and 1b be realised over future decades, both in terms of the overall average earnings increases, and the distribution of those increases?
2. As we have argued previously, there are reasons to believe that the figures may exaggerate the career earnings growth that occurred historically, because the figures for the end of the repayment period are based on individuals who entered higher education in the late 1960s and the 1970s when the participation rate, the API, was about 14 per cent, whereas the figures for the beginning of the repayment period are based on individuals who entered in the 1990s and 2000s when the participation rate had more than doubled. Table 7 illustrates this point by showing when graduates were aged 18.

Table 7: Year aged 18 for cohorts used to estimate graduate earnings

|  |  |  |
| --- | --- | --- |
| Age at data collection | Year of data collection | |
| 2001 | 2009 |
| 22 | 1997 | 2005 |
| 51 | 1968 | 1976 |

1. Even if the career growth figures do accurately reflect what happened historically, the assumption that these earnings growth curves will be maintained in future decades is requires some justification.
2. The response to this point has been that the graduate premium has held up through the growth in participation[[6]](#footnote-6). It is the case that, following the very rapid expansion in the late 80s and early 90s, the graduate premium held up, or even increased, against expectations of many commentators. However, this picture has gradually changed with later cohorts, from those typically entering higher education in the late 90s, when the graduate premium started to fall, especially for women. In addition, the dispersion of earnings has increased, so that those in the higher earning profiles have not seen this decline[[7]](#footnote-7). There are a variety of explanations as to why this change has occurred, but an important context is the increasing proportion of the total stock of those with higher education qualifications, even after the growth in participation slowed down. Figure 2 shows the current proportions of man and women with higher education qualifications by age.
3. Clearly, even if they current participation rate remains the same, and even if mature first time participation is negligible, the proportion of the population with higher education qualifications will increase in future decades will increase as the older age groups are replaced by the younger. All other things being equal, this will mean that graduates average earnings will be closer to average earnings, leading to an increase in the RAB charge of about one to two percentage points. That would not happen were non-graduate earnings to fall relative to graduates, by about 15 per cent. That would maintain the differential.
4. More significant than the impact on the averaging arithmetic, is the fact that even with flat participation rates, ‘graduate’ employment will have to continuous increase if the premium is to be maintained.

Figure 2: Proportions with higher education qualifications by age

Figure 2 notes: Source LFS April June 2012. Percentage Degree level qualification including foundation degrees, graduate membership of a professional institute, PGCE, or higher. The curve cubic through data points for each age.

1. Finally we have to take seriously the analysis presented in the ‘Global Auction’ (Browne et al, 2010) which suggests that the same factors that have held down the earnings of non-graduates in the past will increasingly hold down the earnings of most graduates. These factors include increased competition from low cost economies and the routinisation of much graduate work in a way analogous to the replacement of craftsmanship by mass production.
2. If the career growth in earnings is not maintained, how will this affect the RAB? It is impossible to give a precise answer; that would entail predicting what would happen to earnings over the next three decades. But we can get some idea from the figures presented in table 5. This referred to scenarios with different long term average earnings, but the career growth and this long term growth are only model constructs. Former students will see changes in their earnings over their working lifetimes; they will not distinguish between the two elements of this change used to estimate it in the model.
3. The zero growth for 90 per cent of the graduate population looks like an extreme case in the context it was first presented, but considered as a part of the overall growth in earnings through a repayment lifetime it is less so. The average earnings (taken from the BIS model data) for the lowest 90 per cent of males shows an increase of 315 per cent over the 30 year repayment period. Introducing zero long term growth as shown in table 5 reduces this to 204 per cent. This would increase the RAB costs from 14.5 to 21.1 per cent, an increase of 6.6 per cent.
4. This ‘what if’ result is somewhat crude, but the scenario is not implausible. It illustrates why the RAB estimates are uncertain, and probably optimistic.

**Changes in individual earnings from year to year**

1. The earning distributions for each of the thirty years of the potential repayment period are not the only determinant of the RAB, even if we leave aside early repayments, deaths, etc. Each individual former student will have a year on year pattern of changing earning levels, and this pattern will also determine the RAB level. In general, the more former students move their position in the earnings distribution from one year to the next, the lower the RAB. This is because there will be less variation in ‘lifetime’ earnings than the variation for individual years
2. This can be illustrated by comparing the RAB found using the year to year paths used in the simplified model with two extremes. In one case each former student is at the same percentile of the earnings distribution for each of the thirty years. At the other extreme the position in the earnings distribution for any given year is independent of the positions in other years. Note that these scenarios would never occur in practice, they are used here simply to illustrate how an increased correlation between year to year earnings can have an impact on the RAB.

Table 8: Effect of pathways on the RAB

|  |  |  |
| --- | --- | --- |
| As in simplified model | Each year’s earnings at the same percentile of the earnings distribution | Each year’s earnings independent of other year’s earnings |
| 30.1% | 40.1% | 19.8% |

1. We can see that there is a big difference in the RAB values between the two extremes. It suggests it may be important that the model predicts the pathways that former students will take. Given that the pathways from earning percentile to percentile depend only on the earnings for one year, and no other information, it is possible that the year to year changes are greater than they were and will be, and this would be likely to lead to an underestimation of the RAB.

**Estimates by the Institute for Fiscal Studies (IFS)**

1. In response to our earlier conclusions about the uncertainties inherent in RAB estimates, the estimates made by the IFS have been cited as providing independent confirmation of the official figures[[8]](#footnote-8).
2. The first point to make is that, though Government and IFS estimation differ in detail, they have a similar approach. Both use the British Household Panel Survey (BHPS) to generate the year on year changes in earnings, both adjust these earnings using the Labour Force Survey data, and both then further adjust these values using long term assumptions about average growth in earnings. One of the potentially most important differences is in the generation of pathways from the BHPS. The IFS have a much more sophisticated approach which aims to take account of long run correlations in individuals’ earnings. We might expect this to lead to less year to year volatility in the earnings used in the estimation which in turn is likely to lead to a higher RAB estimate, though whether the difference made would be material is unclear.
3. The central RAB estimate from the most recent IFS study was 33 per cent, very close to the full model estimate of 32 per cent, corresponding to our simplified model estimate of 30 per cent. These two estimates are based on different long term earnings growth assumptions. The BIS RAB estimate is based on the OBR assumptions about long term growth in earnings from 2021 which, when adjusted for RPI inflation, is 1.3 per cent pa. The central IFS estimate used a 2.0 per cent pa assumption of real earnings growth from 2018. For the short term growth assumptions both BIS and IFS use OBR estimates, though it appears that the IFS are using lower earnings growth values. However, as we have seen, up to 2016 it is the cash rather than real change in average earnings that are important, and the IFS only present their real earnings growth assumptions.
4. In addition to this central estimate – based on an average annual long term earnings growth rate of 2 per cent now no longer used by the Government in its calculations - the IFS calculated RAB values under optimistic and pessimistic assumptions. The pessimistic RAB reduced the long term earnings growth assumption from 2.0 to 1.5 per cent, closer to the 1.3 per cent now used by BIS. Their pessimistic short term earnings growth is based on the projections produced for the IFS ‘Green Budget’. These are somewhat counter-intuitive with three of the six year to year changes showing the pessimistic assumption having higher growth, though the changes over the whole seven year period are just 0.4 per cent and -2.7 per cent for central and pessimistic assumptions respectively. With these pessimistic assumptions IFS calculates RAB value of 37 per cent.
5. It is important to appreciate that the pessimistic estimate does not involve any changes in the assumption that the historic career growth in earnings due to age and experience rather than the average growth through time, will continue into the future. Also, the earnings growth assumptions are still applied over the whole population. It is just these assumptions - that career earnings growth will be maintained and that there will be no change in the dispersion of earnings - that we have argued are unsafe, and lead to low calculations of the RAB charge.
6. The IFS authors, aware of the uncertainties in their assumptions, warn against treating their projections as predictions. Here is what they say in their most recent report.

“It is worth emphasising that our earnings simulations are not predictions of the future; they are instead simulations based on a series of assumptions. Predicting the earnings of future graduates poses more severe challenges, in particular because the distribution of earnings of future graduates is likely to change due to underlying changes in the economy” (Appendix 4, page4)

1. Of course if we are to reassure former students that their loan conditions will not be changed, and future taxpayers that the savings promised will materialise, we are forced to make predictions.

**Checks of RAB estimates made by OBR**

1. The Minister for Universities and Science, David Willetts, explained that the RAB estimates by BIS had been checked by the OBR (BIS Committee, 12 June 2012). HEPI sought clarification about these checks with BIS, and we asked whether anything had been published about what was undertaken. We were informed that the OBR provided BIS with their macro-economic forecasts and other assumptions which were then fed into the RAB modelling. Subsequently, BIS presented the results of their modelling giving the OBR the opportunity to challenge the methodology and underpinning assumptions. Following this meeting the student loan projections were then incorporated into the Fiscal Sustainability report. (See Office of Budget Responsibility, 2012b.)
2. These checks, whilst providing some reassurances, in particular that the BIS model was consistent with the OBR macro-economic assumptions, do not provide grounds for changing our assessment of the uncertainty associated with the RAB estimate.

**Conclusions**

1. We previously concluded that the official RAB estimates were uncertain, and that they looked optimistic. Most have at least accepted that they are uncertain, but, at the same time, increased confidence in the estimates have been asserted, in part because BIS have developed and refined their estimation procedure and also because the Institute for Fiscal Studies appeared to have come up with similar figures.
2. The release of the loan cost ‘Ready Reckoner’ in 2010 represented a new level of openness by Government in sharing the details of the technical work that goes on in support of policy development, and with the publication of their current model, albeit in a simplified form, that high standard of accountability and transparency has been maintained. This we applaud. We also acknowledge the improvements that have been made in the estimation method which are apparent from both the simplified model and the descriptions of what the full model does.
3. However, our original conclusions were based on an assessment of the inherent difficulty of the estimation process. We found that large parts of the repayments are only expected to be received ten or twenty years after the repayments start in 2016, so that the estimation involves predicting incomes far into the future. It is this inherent difficulty, rather than any failings of those carrying out the analysis, that led us to treat the RAB estimates with scepticism. There are some findings to support our view that the RAB estimates are likely to be optimistic, but, still, it is based on judgement more than evidence. In particular the assumption that students entering higher education in 2012 will on average enjoy the growth in earnings over their working lifetime that is assumed in the BIS model, and the further assumption that the dispersion of former students’ earnings will remain unchanged, seems to us to be unwarranted. Lower average growth and higher dispersion are more likely, with the consequence of a higher RAB charge than has been estimated by Government.

**References**

1. References cited here listed after the main section of the report

1. The overall figure assumes 55 per cent females, following the BIS default assumption, though based on the numbers of students this does not take into account the differences in completion rates for men and women. If we take a value of 58.3 per cent females (Thompson et al,, 2010), then the overall RAB value would increase by about 0.9 percentage point. [↑](#footnote-ref-1)
2. This was how the real average earnings growth was described in the Ready Reckoner documentation, though the calculation was consistent with a value of 1.95 per cent pa. See HEPI, 2010. [↑](#footnote-ref-2)
3. OBR, 2012b, page 64, table 3.5. OBR publish an assumed cash increase in earnings = 4.75 per cent pa, and an RPI = 3.40 per cent pa. This implies real increase in earnings of 1.31 per cent pa if we use the RPI as our deflator. NB the cash increase in earnings was derived from an assumption labour productivity and ‘GDP deflator’ (2.50 per cent pa). The RPI is used to set interest rates and was also used to allow for inflation in relating the cash and the real earnings growth assumptions in the Ready Reckoner model. [↑](#footnote-ref-3)
4. These are similar to those published by the OBR in their March statement (OBR 2012a, Economic and fiscal outlook supplementary fiscal tables, tables 1.4 and 1.5). NB the column headings in the model are one year later than those in the OBR tables, so the '2012' column to represent inflation during the 2012-13 year and so the 2012 column contains the 2013Q1 OBR projection.). BIS received revised figures, including for 2017, to more decimal places, directly from OBR. [↑](#footnote-ref-4)
5. We carried out a RAB estimate using best fit quadratic curve values with the simplified model. There was no material change to the RAB estimate. [↑](#footnote-ref-5)
6. The Minister of State for Universities and Science, David Willetts (Willetts, 2011) cited a report by PricewaterhouseCoopers (this was confirmed to be PWC, 2007) to support his claim that ‘it [the graduate premium] has held up well over the past few years.’ The PWC report claims that two studies demonstrate that ‘there has been no erosion of the graduate earnings premium since the mass expansion of higher education’. The first of these studies (Dearden et al, 2004) was based on a cohort aged 18 in 1988, the second (McIntosh, 2004) combined different cohorts, the youngest of which were aged 18 in 1988 or 1989. Both studies there refer to cohorts most of whom entered higher education before the rapid expansion took place, or at least was completed. [↑](#footnote-ref-6)
7. See Green et al, 2010, and references therein and also O’Leary et al, 2011. Much of the literature is concerned to try and isolate the impact of higher education from other factors, to make a ‘like for like’ comparison between those with and without higher education qualifications. But for an assessment of the impact on the RAB, these issues do not concern us. All that matters are the earnings of those who have taken out loans, both absolutely, and relative to average earnings. [↑](#footnote-ref-7)
8. “The independent Institute for Fiscal Studies, however, following a more sophisticated methodology, estimates the resource accounting and budgeting (RAB) charge to be around 30 per cent” Minister for Universities and Science, David Willetts, (Willetts, 2012). [↑](#footnote-ref-8)