



making business sense

Assessing the alternative funding structure for Higher Education in England

A review of an alternative model for higher education funding in England as proposed by the National Union of Students

**A draft report for the National Union of Students
May 2009**

centre for economics and business research ltd

Unit 1, 4 Bath Street, London EC1V 9DX
t: 020 7324 2850 f: 020 7324 2855 e: advice@cebr.com w: www.cebr.com

Disclaimer

Whilst every effort has been made to ensure the accuracy of the material in this report, neither the authors nor the centre for economics and business research ltd will be liable for any loss or damages incurred through the use of this report. The authors of this report are cebr managing economist, Ben Read and economist, Benjamin Williamson.

London, May 2009

Contents

1. Introduction	4
2. Future earnings	5
3. The payment mechanism	6
4. The formulae in practice	7
5. Estimating individual contributions	8
6. Estimating total contributions	10
7. Areas for further review	12

1. Introduction

About the report

This report presents an assessment of the alternative model for Higher Education funding in England, as proposed by the National Union of Students¹.

Specifically this report aims to:

- Estimate the payment profiles and total contributions for different earners resulting from the proposed payment mechanism
- Estimate the revenue profile for the exchequer from the proposed payment mechanism
- A 'health-check' and review of the formulae behind the payment mechanism given its intended use

We have made no attempt to argue for or against the proposed, alternative system of funding. Instead it is the intention of this report to affirm that the payment mechanism works as it is intended to, as well as to forecast the effects of the introduction of the proposed funding system on graduates and the exchequer.

Structure of this report

- Section two of this report describes the different earnings profiles for graduates. Payment contributions under the proposed system are expected to increase with future incomes.
- Section three introduces the payment mechanism and reviews its dynamics.
- Section four describes key assumptions for different input variables in the payment mechanism.
- Section five presents results for individual contributions profiles for different income levels and occupations.
- Section six examines the total level of contributions to the exchequer and compares the proposed system to the existing system.
- Finally, section seven highlights some areas in need of further review, resulting from the 'health-check' of the formula, given the foundations of the alternative funding structure.

¹Towards a New Structure for Higher Education Funding in England, under development

2. Future earnings

This section describes the shape of the expected graduate lifetime earnings profiles. The information is necessary in order to calculate the expected contributions from an individual and the sum of all contributions from graduates.

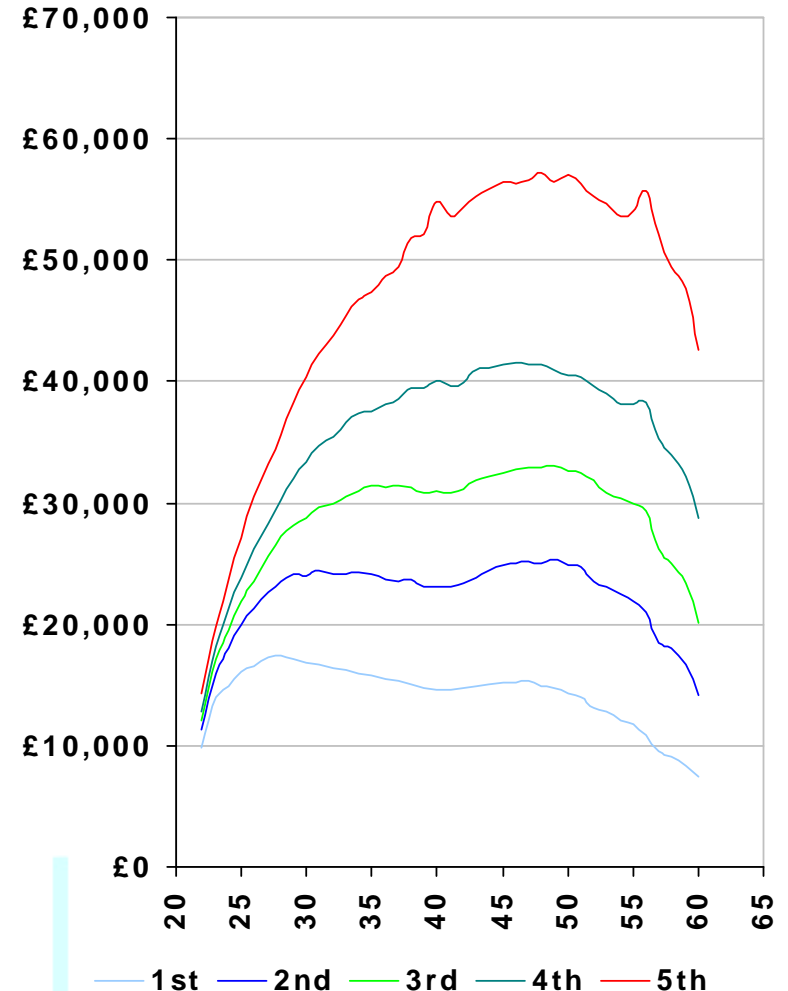
The chart opposite shows the mean earnings by age and quintile of the graduate lifetime earnings distribution. The figures are in 2006/07 prices and based on zero real earnings growth. The cebr projections are based on data supplied by the Institute for Fiscal Studies for male and female graduates separately.

There is a great deal of variation in the projected earnings of graduates. For example, an average graduate in the bottom fifth of earners would never reach an income above £20,000 per year and a graduate in the top quintile would see their earnings peak at just over £57,000 and then decrease rapidly.

Using these graduate earnings projections, we can estimate the monthly individual contributions expected from graduates in a particular income category for a given set of assumptions.

In order to calculate the expected lifetime contributions of graduates using these earnings profiles, we use the prescribed formula for the alternative payment mechanism, which is set out on the following page.

Expected annual real income profiles for graduates by quintile, 2006/07 prices



Source: cebr extrapolation from Dearden, L., Fitzsimons, E., Goodman, A. and Kaplan, G (2008) "Higher Education Funding Policy", Economic Journal February, vol. 118, F100–F125.

3. The payment mechanism

This section describes the key characteristics of the proposed payment mechanism for the individual contribution. It also sets out how the proposed payment changes with the different inputs of the payment formula.

The formula for determining the amount of contribution that an individual would pay in a given month is set out below.

$$P = (I - (T/12))CW \quad \text{where:} \quad W = R / (YN(H - T))$$

The table opposite summarises the direction of the change in the input variables, which would lead to an increase in monthly payments. The payment to be made each month increases with a person's income, the number of credits they achieved, the 'specified number' and the total revenue sought from a person whose income precisely matched the threshold for higher rate income tax.

On the other hand, the monthly payment required from an individual will decrease for increases in the number of years in the payment period, the number of credits in the standard award and the threshold for payment of higher rate income tax.

The effect on the amount of individual contributions is ambiguous for increases in the payment threshold set by the government. For monthly incomes less than the threshold for higher rate income tax ($I < H$), an increase in the payment threshold will decrease the monthly payment, P . However, for anyone earning more than the threshold for higher rate income tax, currently £3,353 per month, increases in T will increase their monthly payments. This is explained in greater detail in section seven.

Factors influencing the level of individual contribution

Variable	Key	For an increase in P
P	Payment to be made that month	-
I	Person's gross income that month	↑
T	Payment threshold set by the government	?
C	Number of HE credits the person has acquired	↑
W	The 'specified number'	↑
R	Total revenue over the payment period sought from the reference person	↑
Y	Number of years in the payment period	↓
N	Number of credits in the standard award	↓
H	Threshold for payment of the higher rate of income tax	↓

4. The formulae in practice

This section describes how the formula presented on the previous page would work in practice for a given set of assumptions.

The graduate earnings profiles on the previous slide give us our values for I in the payment formula. We use the assumptions from the worked example in the National Union of Students' policy paper, for the values of our other inputs, T, C, W, R, Y, N and H. Using these assumptions we can calculate the expected individual lifetime contributions for any income quintile.

The values for our other inputs provided in the worked example are displayed in the table opposite.

We make two further assumptions about timing:

- We assume that the scheme is introduced for all undergraduate students leaving university in 2014.
- We assume that the first year of work for all graduates is when they are 22 years old.

Therefore, the first year for which the exchequer receives payment contributions from individuals is 2015, by which time our first graduate cohort will be 22 years old.

Assumptions for estimating the level of individual contribution

Variable	Key	For an increase in P
T	Payment threshold set by the government	£15,000
C	Number of HE credits the person has acquired	360
R	Total revenue over the payment period sought from the reference person	£35,000
Y	Number of years in the payment period	20
N	Number of credits in the standard award	360
H	Threshold for payment of the higher rate of income tax	£43,875

5. Estimating individual contributions

The results for the cumulative lifetime contributions given our set of assumptions is set out in the chart opposite.

Contributions from graduates rise with income and then stop once the payment period has expired, after 20 years in our example.

Given the set of assumptions in the worked example and the earnings profiles on the previous pages an individual in the top quintile would be expected to contribute just over £30,000 during the course of the payment period. The median income earners would be expected to contribute £14,782 during the course of the payment period, or 1.96 per cent of the income that they earned over that period.

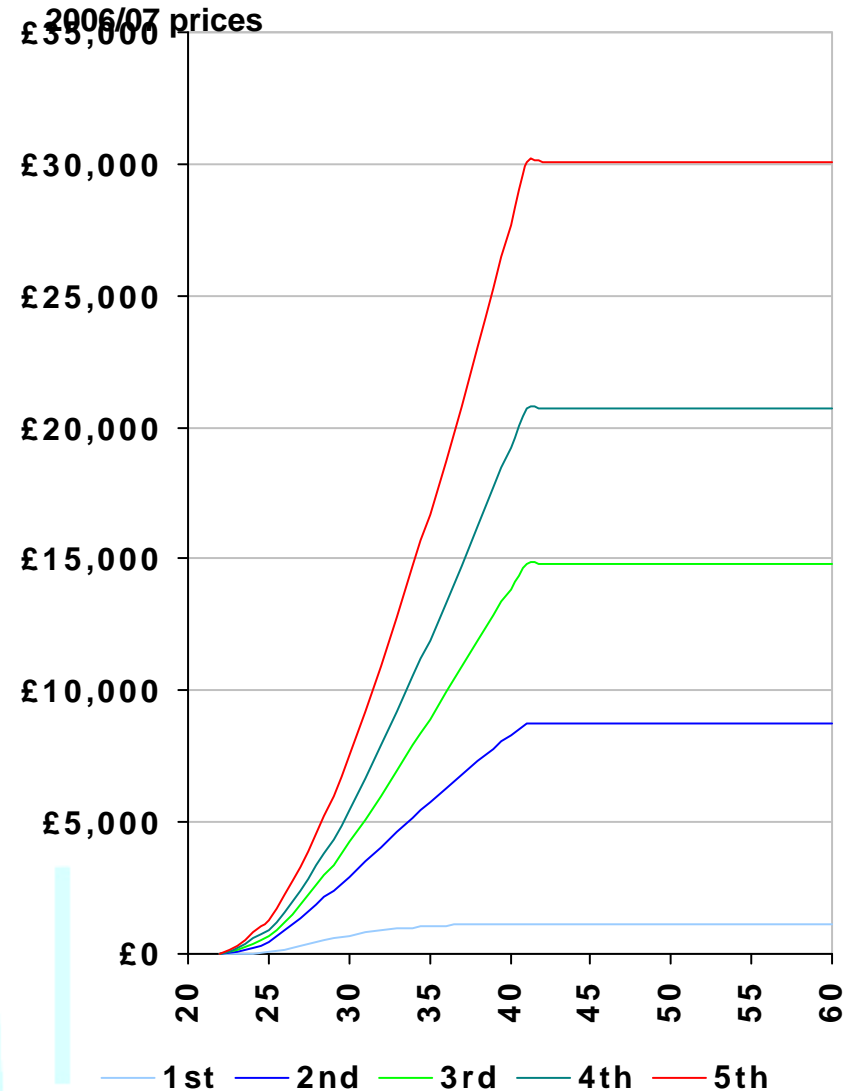
Conversely, the lowest quintile of earners would only be expected to pay £1,110 over the 20 year payment period.

If the payment threshold were raised to £20,000 then the lowest earners would not be expected to contribute any payments since their gross annual earnings never exceed £20,000.

Summary of contributions for graduates by earnings quintile 2006/07 prices

Quintile	1 st	2 nd	3 rd	4 th	5 th
Lifetime contribution	£1,110	£8,775	£14,782	£20,742	£30,028
Percentage of gross earnings	0.28	1.48	1.96	2.26	2.52

Expected lifetime contributions for graduates by earnings quintile



Case studies

The chart opposite shows the projected monthly contributions for three example occupations.

- Primary school teacher
- Middle manager
- Banker

The chart shows that using the alternative payment mechanism, a typical banker can expect to pay up to £380 per month. Their contributions rise steeply with earnings and also increase as a proportion of their earnings.

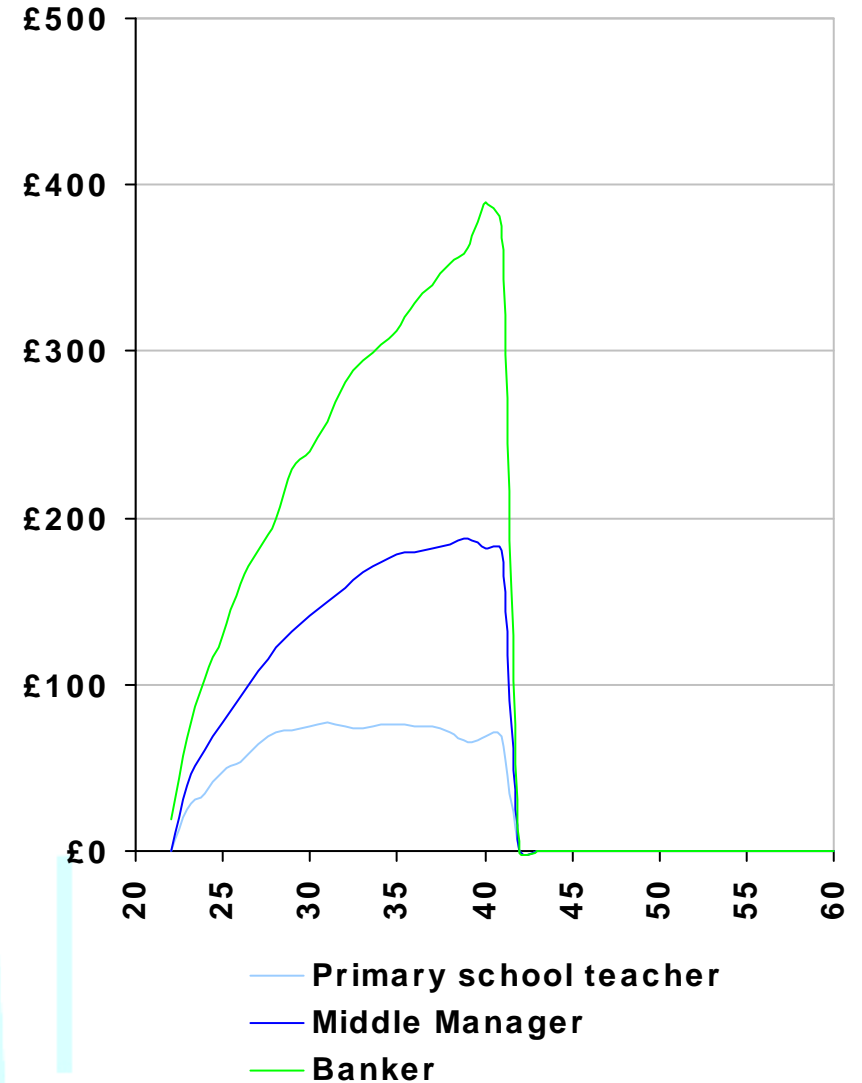
Whilst a primary school teacher, who might have a flatter earnings profile, would see a roughly constant level of monthly contributions over the payment period.

Summary of contributions for occupations, 2006/07 prices

Occupation	Primary School teacher	Middle manager	Banker
Median earnings ²	£30,586	£44,267	£59,348
Lifetime contribution	£14,665	£31,876	£58,082
Percentage of gross earnings	1.97	2.71	3.06

²Annual Survey of Hours and Earnings 2008, ONS

Expected monthly contributions for occupations, 2006/07 prices



6. Estimating total contributions

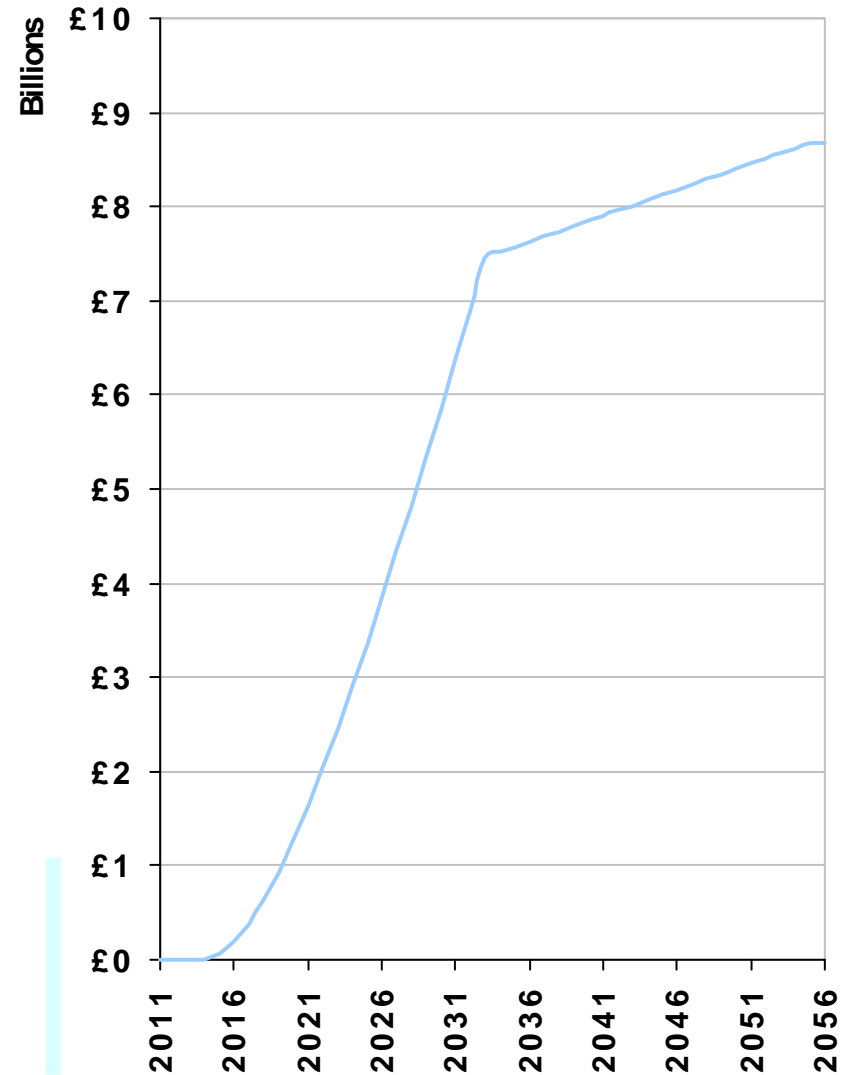
In order to calculate the total expected contributions from all graduates we need to introduce a further dimension to the analysis – the number of graduates.

Data from the Higher Education Statistics Agency³ show that in 2008, there were 441,590 individuals for which this scheme would be applicable. Namely, qualifying undergraduate students from the United Kingdom and European Union domiciled students at an Higher Education institution in England.

We use an assumption that this level will increase by 16.5 per cent between 2008 and 2029. This is the mid-point of an estimate by Bahram Bekhradnia and Nick Bailey⁴ for the expected growth in student numbers, given various demographic and changes in social mobility.

The chart opposite shows the path of total contributions to the exchequer each year from the proposed payment system. Contributions increase steeply each year until the date at which the system is in full operation and the payment period has expired for the first annual cohort of students. Given our assumptions of a 2011 start date, this occurs in 2033. After this time, the size of the contributions in real terms increases with the growth in student numbers.

Expected total contributions for all graduates, 2006/07 prices



³<http://www.hesa.ac.uk/>

⁴Demand for Higher Education to 2029, December 2008

Comparison with the present funding system

Given the assumptions for the different input variables outlined on the previous pages, we expect that contributions to the exchequer will rise to £7.5 billion in 2006/07 prices by the time that the first annual cohort's payment period has expired, i.e. when the system is at full operating capacity. This is significantly higher than current revenues of £4.5 billion from tuition fees & education grants & contracts for HEIs in England. Although the higher projected revenues are derived on the basis of increased future graduate numbers.

If the first year for which the exchequer receives payment contributions from individuals is 2015, then total contributions remain lower than current revenues of £4.5 billion until around 2027, after which time they continue to increase in real terms. In the intervening years the exchequer faces a shortfall of funding from contributions under the proposed system. However, higher projected future contributions will more than offset the temporary losses.

7. Areas for further review

Treatment of payment threshold

As it currently stands the payment mechanism formula calculates ambiguous values for monthly payments for an increase in the threshold at which payment becomes due (T). For all values where a person's annual income (I) is below the threshold for payment of the higher rate of income tax (H), an increase in the level T will necessarily decrease P, where the threshold for higher rate income tax, H, is more than the payment threshold, T.

However, where a person's income (I) is above the higher tax rate threshold, an increase in the threshold at which payment becomes due (T) will currently increase their monthly contributions (P).

Given the earnings profiles and the set of assumptions used throughout the report, total contributions increase when the payment threshold decreases. This is understood to be the desired effect. This is also the intuitive effect, since by decreasing the income level below which contributions become necessary, more people on lower incomes begin to pay contributions.

However, the formula will need to be reviewed in light of the findings for values of T, if the present assumptions are to be relaxed.

Mathematical approach

given the formula;

$$P = (I - (T/12))CW$$

Where:

$$W = R / (YN(H - T))$$

the first derivative with respect to T is:

$$P' = (1 / (H - T))^2 C(I - H)$$

Where $H > T$:

$$I < H \quad P' < 0$$

$$I > H \quad P' > 0$$



making business sense

centre for economics and business research ltd

Unit 1, 4 Bath Street, London EC1V 9DX

t: 020 7324 2850 f: 020 7324 2855 e: advice@cebr.com w: www.cebr.com