

The economics of Browne's tax on education: what went wrong and how to fix it

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Abstract: I analyse the economics of the Browne Review (2010) proposal and explain why it is flawed. I show how to fix the main problems with their suggestion, allowing a more flexible system to develop through time. The approach is based on charging universities insurance premiums to cover their students' borrowings rather than Browne's approach of taxing education. The resulting financial incentives some universities might have to admit more upfront payers or more men (due to gender inequality in average wages) are removed. The structure of this approach works whether there is a cap on tuition fees or not and whether that state wishes to provide a subsidy or not.

1. Analysis of Browne's method for funding universities

1.1 Browne's key objectives

The first key new driving idea in the Browne Review (2010) is to remove rationing of high education by making graduates pay for the cost if those graduates can afford it. This means the UK Treasury will have no financial reason to stop its natural expansion through time. The second key driver is to improve quality. This would be achieved by allowing tuition fees to vary and the state removing its caps and floors on student numbers at individual universities and the sector. This allows universities to compete for students. Strong institutions could expand, putting pressure on weaker ones to either up their game or close. A constraint which Browne imposes is one of fairness and access. English universities should charge fees but be free at the point of use, while graduates pay if their earnings extend beyond a reasonable threshold. Browne would like better-off upfront payers to pay the same in the long-run as poor students who take out loans who then go on to have high earnings as graduates. Further, on average women earn less than men, but it would be perverse if this led to universities receiving more income from teaching men than women.

This agenda empowers students to be, in effect, customers who universities compete for. The fairness and free at the point of use criteria means it is a "regulated market".

1.2 Graduate contributions

Browne recommends allowing universities to charge what they want for undergraduate education, but removing the state's support for all subjects except for STEM subjects where STEM scholarships will be paid to universities to support their costs of teaching. All university fees, or graduate contributions, would be accompanied by income contingent loans for students if they want them. They boosted the amount of maintenance grants for the poorest students and simplified maintenance loans, which are available to all, to a level which is more realistic.

Like now students have the option not to take out maintenance loans and/or pay upfront their tuition costs. At the moment around 15% of students do this².

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The state will offer to support the student during their education, providing the maintenance loan and pay upfront the tuition costs. Then the state will ask the graduate who has received support to repay the support through time at the rate of 9% of income above a threshold of £21k. If the graduate has not repaid in full after 30 years the amount remaining is forgiven. The interest rate used in the calculation is the government’s cost of borrowing (around 2.2% real). These changes make sense compared to now (£15k threshold, 25 year forgiveness and interest of 0% real). It provides stronger insurance for low earners by increasing the threshold, it removes the interest rate subsidy on better off graduates and is made more fiscally efficient by lengthening the payment period to up to 30 years (in Scotland this period is 35 years and that has advantages). Overall this is a progressive change. Real debt is stopped from escalating by a rule that forgives increases in real debt, just increasing by inflation in cases where earnings are too low³.

This system means those taking out loans will cover all the cost except those who are fully or partially forgiven after 30 years. This is the realised insurance cost. A key question is: who should pay the insurance cost? In the past this was the state, but then the Treasury may try to reduce this by rationing or price capping. This removes the Browne drivers. So we need an alternative.

1.3 How much is the average realised insurance cost as borrowing varies?

What is the expected realised insurance cost and how does it change with the amount borrowed? Table 1 provides an estimate of this using the methodology described in Shephard (2010), where references are given to the original research behind these methods. The Table expresses the borrowing in terms of per person per year assuming a three year course⁴ and is in £k.

Borrow	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Loss	0.0	0.1	0.1	0.2	0.3	0.5	0.7	0.9	1.1	1.4	1.7	2.1	2.5	2.9	3.4	3.9	4.5	5.1	5.7	6.3
Marginal rate %		4	6	9	12	14	18	21	25	28	32	36	40	44	48	52	55	59	62	66

Table 1. Estimated expected realised insurance cost for different levels of borrowing in £k per borrower per year. This table ignores the targeted interest rate subsidy.

The key feature of Table 1 is that as the amount borrowed increases the rate of losses increases faster and faster. These averages mask vast variation. For example, on average women have lower earnings and longer periods of no earnings, so the losses associated with them will be much higher. Groups of students at some prestigious universities will on average have higher earnings and so the losses associated with them may be much smaller than Table 1 indicates.

1.4 Variable fees

Browne recommended allowing universities to charge what they want for undergraduate education. He argued there is no rigorous way of calculating a good fitting cap for a diverse sector, hence there should be none. Browne argued the state should be willing to provide loans for such fees.

² This might reduce as the size of the fees increase, but increase as the interest rate becomes more realistic.

³ This is expensive as it means students who go on to post-graduate degrees (for example) and have high earnings get a life-time interest subsidy. Perhaps a better policy would be to cap the number of years where the real debt can increase to, say, 4 years during the 30 year period. Hence someone who has a career break to raise children for 15 years or becomes a low paying artist would be largely subsidised, but the banker with a Ph.D. in maths would not be. An alternative is a conditional payment extension for 1-3 years only on those who have received the interest subsidy, where the payment extension cap (the most they can pay during the payment extension) is the amount of interest subsidy they received. Hence high earners will payback their subsidy, low earners will not. Barr (2010) calls this a conditional interest rate subsidy, and can be thought of as a subsidy on those with low lifetime earnings. This conditional version is clearly not a tax.

⁴ The numbers would be higher for a four year course and lower for one over two years. The expected loss reflects the total amount of borrowing during their education.

Browne argues that by liberalising supply market forces will keep in check tuition costs, as they do for other forms of education provided by English universities. Universities with high fees will lose student numbers.

Given the withdrawal of the HEFCE-T grant for most subjects (around £2.7k) it is likely that universities will want to charge at least £6k in order to financially standstill. This delivers borrowing of around £10k and so insurance losses of £1.4k per borrower per year. It is the presence of both the maintenance and fee loans which make these losses so high.

As the fee level rises the average insurance loss per borrower accelerates. Table 2 gives the results for a person on a three year course who has a maintenance loan.

Fees	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Insurance losses on fees and maintenance	0.2	0.3	0.5	0.7	0.9	1.1	1.4	1.7	2.1	2.5	2.9	3.4	3.9	4.5	5.1	5.7	6.3
Insurance losses on fees only	0.0	0.0	0.1	0.1	0.2	0.3	0.5	0.7	0.9	1.1	1.4	1.7	2.1	2.5	2.9	3.4	3.9

Table 2. Average insurance costs of fees and maintenance as the level of fees increases. All in £k per borrower per year. Results are given also for fee only loans, which is standard for other-EU students.

Of course the sector wide insurance cost is only around 85% of this number, as around 15% of students pay upfront⁵.

1.5 Browne's tax on education

To make the system self-funding we need some combination of students, graduates and the universities to pay for the insurance premium. Browne suggested funding it by taxing universities based upon their fee income above £6k. At £7k the marginal rate of tax on education is 40%, then it goes up by 5% each extra £1k until it hits £10k, then it increases at 10% for each extra £1k afterwards until the tax hits 100%. It becomes 100% above £14k. He called his tax on education a levy. His tax schedule is given in Table 3.

Fees	6	7	8	9	10	11	12	13	14	15	16
Tax	0	0.40	0.85	1.35	1.9	2.55	3.3	4.15	5.1	6.1	7.1
Marginal rate of tax %	0	40	45	50	55	65	75	85	95	100	100

Table 3. Browne's tax on education. The Browne table only goes up to £12k, so the rest is extrapolated.

The main argument for taxing fees is that this meets the fairness criteria given above.

Economically the most interesting feature of the tax is that it does not match the insurance costs. The marginal tax rate, the amount the taxes increase as fees increase, is very high at the higher level of fees (higher than the marginal insurance costs) and is missing entirely at the low level. It crosses over at £14k⁶.

⁵ The insurance costs for other-EU students may be lower as they do not receive maintenance awards. However, it may be necessary to inflate them due to the extra cost in collecting the fee revenue from graduates and perhaps the higher level of graduates who go missing to the SLC. This is an empirical question.

⁶ This is high. One reason for this is the Browne's tax revenue is not sufficient to pay for the insurance costs unless fees are very high. E.g. suppose 1/7th of universities set fees at £6k, £7k, £8k, £9k, £10k, £11k and £12k, respectively. Then the tax revenue on borrowers is £1.5k, while the actual insurance costs on the state of the borrowers averages £2.6k. Of course upfront payers will be profitable for the Treasury as they will be simply taxed, so on average the state loses 0.85*£2.6k - £1.5k= £0.7k. If there were no universities with fees of £6k, then the loss from the state would still be £0.4k. Much higher fees are need for this to be self-funding.

Browne argued that this choice had the virtue of potentially damping the desire of universities to increase their fees beyond £6k. This is unclear economically. What it certainly does is to provide a cross subsidy from high to low fee paying universities. This cross subsidy makes the system intellectually confusing and is open to discussions about which universities are more deserving. Further, by opening the door to taxing universities, the government could in the future just spend the tax on something else.

Browne's choice not to charge someone for its costs but instead to tax fees causes a number of problems which are not remarked upon in the report. The most obvious are that

- (i) Philanthropists, universities and employers who pay a part of the maintenance and fees of a student are heavily taxed by the Treasury. This would kill the possibility that universities will massively fundraise to forgive student fees and support maintenance. This is the main form of fundraising at US universities.
- (ii) Universities running two year intense degrees with the same total fee cost as a three year degree (e.g. £12k a year for two years against £8k a year for three years) pay more tax; ones running four year courses pay less (e.g. £6k a year).
- (iii) A university with a different (perhaps more generous) loan system for its students than the government's system will pay the Browne tax and their own insurance costs.

2. Fixing the problem

2.1 Proper insurance premiums

The most obvious alternative is to ask universities to pay the insurance premiums: in effect paying the cost of providing fair funding to their "customers" who will mostly have no capital so need a financial package. How much to charge?

The actuarially fair estimate of the insurance costs of each additional £1k a student borrows during their academic career. So for each £1k of borrowing the student's university is sent a bill by the state, the size of which depends upon how much the student has already borrowed. As they borrow more the charge rises, faster and faster, reflecting the increased chance more of the borrowing will be forgiven.

Averaged over a three year course Table 2 illustrates this and so the universities charge would be roughly these numbers times the number of students who borrow each amount.

A main problem with this approach is that universities will receive more income from students who borrow less and most from those who pay upfront --- which could incentivise universities to behave poorly. There is no problem with them gaining more from teaching students funded by philanthropists, rewarding fundraising to forgive student fees. But what about those upfront payers? The Browne approach is blunderbuss (killing philanthropy on the way to the target) by taxing education generally.

We need a mechanism to neutralise the income from upfront payers. In practice nearly all borrowers from the SLC borrow the full amount for fees and maintenance available, as they have little capital. So we can do the following at the university level

- (i) Collect all the insurance premiums that would have gone to the state if all upfront payers had borrowed the whole lot and form the university's scholarship fund.
- (ii) Use the scholarship fund at the university to forgive some fees of appropriately selected worthy students at that university.

This "neutralisation" was suggested by Shephard (2010).

By reducing student debt the insurance premiums going to the state fall, but the state should not mind as those were correctly priced and benefits as the overall student loan book shrinks. Of course poorer students benefit as their student loans are significantly reduced. Universities benefit as they will be able to use the scholarship programme to trumpet their openness to poorer students, counter balancing their better-off upfront payers. By construction universities with a large number of upfront payers will also have a large number of scholarship students.

There is a good argument that this form of neutralisation is too strong. Nationally around 15% pay upfront, so one could argue universities should keep back the full payments from say 10% of students and then form the scholarship programme for the number of students above 10%. Economics teaches us that incentives on the margin are the key, so this is probably sufficient and allows universities to keep a little more income.

The Table below illustrates this from a university with 30% upfront payers, 10% philanthropic payers of fees (but not maintenance) and fees of £12k. Assume the course lasts three years, all borrowers get maintenance loans so borrowing is £16k, while the insurance premium paid to the state is £3.9k. Then net university revenue should be £8.1k from a full borrower. The student with no fees but maintenance has an insurance premium of £0.2k.

We now generate a scholarship program which we assume is of the form of forgiving half the fees of some students. This costs £6k - (£3.9 - £1.4) = £3.5k per student as the insurance premium for those students fall from £3.9k to £1.4k. Hence the scholarship program can be spread over $0.2 * 3.9 / 3.5 = 0.22$, or 22% of the students. The result is given in Table 4. This setup is entirely self-funding.

	Loans	Net Univ revenue	Insurance premiums to state
Better-off upfront (20%) recycled	0	8.1	0
Better-off upfront (10%) kept	0	12.0	0
Philanthropic supported (10%)	0	11.8	0.2
Scholarship students (22%)	6	8.1	1.4
Others (38%)	12	8.1	3.9

Table 4. Example of a fully insured system with no financial incentive for the university to increase its number of upfront payers. Face value of the fees is £12k.

Table 5 compares this to a university with 10% of upfront payers and no philanthropic support, where fees are £12k. At that university the average loan size is much larger, but except for the philanthropic support, the income to the university is the same.

	Loans	Net Univ revenue	Insurance premiums to state
Better-off upfront (10%) kept	0	12.0	0
Others (90%)	12	8.1	3.9

Table 5. Example of a fully insured system with no financial incentive for the university to increase its number of upfront payers. Face value of the fees is £12k.

Table 6 applies the same approach to a university with fees of £9k. The fall in net income is correctly cushioned by the fall in the insurance premium. Hence the face value in fees falls by £3k, but the net revenue only falls by around £1.5k. This roughly reproduces the current income a university receives for teaching a social science or humanities student.

	Loans	Net Univ revenue	Insurance premiums to state
Better-off upfront (10%) kept	0	9.0	0
Others (90%)	12	6.5	2.5

Table 6. Example of a fully insured system with no financial incentive for the university to increase its number of upfront payers. Face value of the fees is £9k.

2.2 Structures

2.2.1 Capping fees

The above system is self-funding whatever the level of fees at each institution. Hence it also works with a cap on the level of fees. Ignoring STEM premiums, to produce a net income for universities of at least the current minimum of around £6.0k (£3.2k plus £2.8k HEFCE-T grant) with a maintenance grant of £3.75k, we need fees of around £9k. This high level will shock many readers and students. There are three effects going on: (i) removing the HEFCE-T grant, (ii) the government not paying the insurance premium, (iii) an increase in the maintenance loan driving up the premium.

The advantage of the above system is that it puts in place a system which would work if the cap was to rise in the future or was uncapped.

2.2.2 Rigorous standards

The state has a financial incentive to raise the insurance premiums, universities to minimise them. However, the above approach has the virtue that the level of the premiums should be defined to be self-funding. This is a technically well defined task. Hence it would make sense to have a group of experts overseeing the setting of the premiums, with input from the state, universities and students. This should make their setting less contentious and removes the state's ability to extract surplus from universities which it can spend upon other projects such as defence or welfare.

2.2.3 Pupil premium

This structure allows the state to quite cheaply incentivise universities to admit students from difficult backgrounds. It can act as a philanthropist, paying part of the university's insurance costs for particularly worthy students (rather than their fees). This will push up the university's marginal net revenue from these students above the net level received from upfront payers.

2.2.3 Abandoning self-funding

Insurance premiums are expensive and so the level of fees needs to be quite high to produce an appropriate level of net revenue to universities. One approach to reducing them is to use conditional interest rate subsidies, rather than unconditional ones. Another is to extend the 30 year payment period to 35 years to match that used in Scotland, taking into account the raising of the threshold to £21k makes the system much more progressive.

The state might also wish to pick up some of the bill. This goes against one of the Browne report's drivers of avoiding rationing. A simple approach would be for the taxpayer to pick up the insurance costs for low amounts of borrowing, e.g. below £8k a year per student. This would cost around £0.9k per student per year. This is simple to administer for then the SLC sends the insurance bill to the state rather than to the student's university. The advantage of this kind of subsidy is that the marginal incentives for universities and students are not changed by this subsidy. For every extra £1k borrowed above this level both face the true marginal insurance premium. The results are given in Table 7. At first sight this looks like the reintroduction of the HEFCE-T grant, but it is not, due to the impact of upfront payers and philanthropists. Table 4 is transformed into Table 8 for a university with fees of £12k, while Table 9 deals with the £7k fee case. As a percentage the lower fees universities are helped much more by this subsidy. Table 9 roughly reproduces the current income a university receives for teaching a social science or humanities student. This compares to Table 6, where £9k fees were required when there was no subsidy.

Fees	4	5	6	7	8	9	10	11	12	13	14	15	16
Net insurance losses on fees and maintenance	0	0.2	0.5	0.8	1.2	1.6	2.0	2.5	3.0	3.6	4.2	4.8	5.4

Table 7. Insurance costs after the state picking up the insurance costs on the first £8k of borrowing.

	Loans	Net Univ revenue	Insurance premiums to state
Better-off upfront (20%) recycled	0	9.0	0
Better-off upfront (10%) kept	0	12.0	0
Philanthropic supported (10%)	0	12.0	0
Scholarship students (17%)	6	9.0	0.5
Others (43%)	12	9.0	3.0

Table 8. Replaces Table 4 when the state absorbs the insurance losses from the first £8k. Face value of the fees is £12k. Number on scholarships falls to $0.2 * 3.0 / 3.5 = .17$, or 17%.

	Loans	Net Univ revenue	Insurance premiums to state
Better-off upfront (10%) kept	0	7.0	0
Others (90%)	12	6.2	0.8

Table 9. State absorbs the insurance losses from the first £8k. Face value of the fees is £7k.

2.3 A monopoly supplier of loans: why?

A different interpretation of Browne's tax is that the state is making a compulsory purchase of the future fee income from graduates paid to universities at the rate given in Table 2.

As universities are independent charities it is not a priori clear that they should be treated in this way. This monopoly purchase fails to enhance their autonomy, which many studies have suggested is important for their academic performance. An alternative to this is for the schedule in Table 2 to be an offer rather than a compulsory purchase. This is exactly the approach advocated in Shephard (2010). Indeed the offer could be more sophisticated than he argued.

Whatever levels of fees set by the university, $\text{£}x_k$, the university sets another number $0 \leq y \leq x$. Then it could sell the income flow up to $\text{£}y_k$ to the state, using the schedule in Table 2, and receive the face value of the fee minus the premium as discussed above as if its fees were $\text{£}y_k$. Then any revenue from the fees above $\text{£}y_k$, what Shephard (2010) called a deferred fee, would arrive slowly to the university through time, as well as a bunch upfront (which would be neutralised as above using scholarships). It would then be up to the university how to manage this extra flow.

An example of this is if fees were $\text{£}12k$, but a university sells the first $\text{£}10k$ to the state for $\text{£}10k - \text{£}2.9k = \text{£}8.1k$. It then waits on the remaining revenue to come in from its high earnings graduates. It would pay the state no insurance premium to the state on the $\text{£}2k$, but is exposed to the risk it will be forgiven as its graduates do not earn enough to pay it.

2.3.1 Adverse selection

The argument against this is adverse selection. Universities with strongly earning graduates could opt out of the state's offer and potentially gain if they can manage the cash flow. But this would diminish the strength of the national pool, increasing the insurance premiums the state will charge. Some will argue this is bad, as they like thinking about the university sector as a whole, broadly all universities should stand together and be "equal". Others will argue that this is how it should be as universities are independent charities and creating cross-subsidies between universities create poor incentives for universities to free load on others. Both arguments have virtue.

2.3.2 Two caps

A compromise, which is also very practical, is to ask all universities to pool their resources at comparatively low levels of fees (e.g. $\text{£}9k$) or below (e.g. $\text{£}7k$) if there was a state subsidy on insurance costs. This would be a "lower cap." If universities wish to go beyond this then they are on their own, but their income would arise through the income contingent mechanism given above so this is fair to students and allows access irrespective of the level of capital the student has. Upfront payer bias would have to be neutralised via scholarships. These additional fees might themselves be capped, delivering an "upper cap".

2.3.3 Private universities

In some ways the system of a lower cap is what we have now, but the current system is worse for access and the state. At Buckingham University students can get state loans for maintenance and the first $\text{£}3.3k$ of fees through the SLC. Fees above $\text{£}3.3k$ have to be paid upfront --- which excludes most students from being able to go there as they have no capital. Under the above Buckingham would only the able use the above SLC system at all if they agree all maintenance and fees would be collected through income contingent methods and Buckingham recycled money for scholarships from upfront payers. Further they would pay the state about $\text{£}0.7k$ per borrowing student per year as an insurance premium for the above facility (currently it is free, so they are subsidised by the state). The premium would rise if their levels of fees were above $\text{£}3.3k$ using the schedule in Table 2 depending upon the borrowing of their students.

2.3.4 Gender

On average women earn less than men, even controlling for subject choice, presumably largely due to childcare choices. The above system allows universities to benefit if their graduates are high earners, but this could incentivise them to discriminate against women on admissions. Of course this would be illegal. However, this incentive could be removed entirely in the following way.

Each university would only be allowed to hold at least as many womens' as mens' deferred fees, i.e. fees above £yk. The deferred fees of any excess men in the university's student population would have to be sold to the state in full at the usual price given in Table 2. This entirely neutralises the financial impact of gender. An example is a university with 60% men and 40% women and fees of £12k and we take $\gamma=10$. Then the university must sell the deferred fees of the excess 20% of men to the state using the schedule in Table 2. It may keep, if it wishes to, the deferred fees of the 40% men and 40% women on its books. A university with 51% women and 49% men are allowed to keep all of its deferred fees on its books.

3. Conclusion

In this note I have analysed the Browne Review's funding proposal. I believe it is strangely flawed. I argue for a much simpler insurance premium approach, where the premiums for borrowing are paid by the student's university in an actuarially fair manner. I use a scholarship programme to neutralise the impact of incentivising universities to admit more upfront payers. This method can work with or without a cap and allows a subsidy from the taxpayer if this is desired.

I argue that universities should be allowed to decline the offer from the state to buy the fee income from better-off graduates. This could be carried out in chunks, with a basic national scheme for fees up to some level such as £9k which applies to all universities. Then universities who want to charge more can opt out for the extra fees. This protects the national system of universities, while allowing universities to have more autonomy if they wish to have it. This "outside option" should increase the sector's self-confidence even if almost all choose to sell all of their fee income to the state, as is likely. I showed how to neutralise any gender incentives this might create. This second fee can also be capped if this is desirable.

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