Getting Student Financing Right in the US: Lessons from Australia and England[1]

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Abstract

The US student loan system is currently in crisis. US graduates owe $1.3 trillion in student loans; seven million borrowers are in default and even more are in arrears. The impact on borrowers is catastrophic. We argue that this is mainly due to the fact that the US operates mortgage-type student loans: these are repaid over a set period of time, which places high repayment burdens on low earning graduates. We draw on the experience of the income-contingent loan (ICL) systems operating in England and Australia, and use US Current Population Survey (CPS) data to show how such a loan system could be implemented in the US and assess the revenue and distributional implications. We also compare repayment burdens under the two systems. The current US income-based arrangements are not income contingent for the most important subset of borrowers – those with unstable employment and income and/or hours of work. We show that US mortgage style loans (such as Stafford loans) imply extremely difficult financial circumstances for a significant minority of US loan recipients, and that a well designed ICL can solve these problems in an efficient and cost-effective way with no risk of default.

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1. Background

The US student loan system is in crisis. As Dynarski (2016) points out, US graduates owe $1.3 trillion in student loans, seven million borrowers are in default and even more are in arrears. The impact on borrowers is catastrophic. Those of us with experience of the English or Australian approaches find aspects of the US college loan arrangements difficult to understand. In contrast, the systems in England and Australia are fundamentally sound because those countries have taken seriously the principles advocated by US economists such as Milton Friedman and James Tobin in designing a loan system *suitable for students*. The answer they propose is income-contingent (in US parlance, income-based) loans (ICLs), the system adopted successfully in Australia in 1989, New Zealand in 1992 and England in 1998.

Though the income-contingent systems in Australia, New Zealand and England are not perfect, design problems are largely the result of last-minute political interference and could be easily fixed. The problems with these systems, however, are small compared with those in the current US system (Dynarski 2016). This note draws on English and Australian experience over the last 25 years and offers an income-contingent solution to the most serious problems of the current US student loan system.

Section 2 explains why ICLs are the right model. Section 3 briefly describes the systems in Australia and England, and section 4 draws out the strengths of those arrangements. That discussion sets the scene for section 5 which considers the key design elements in an ICL loan and the considerations that underpin the choice of the parameters of the system. Readers prepared to take the arguments for income-contingent repayments on trust can proceed directly to section 5. Section 6 looks at the distributional implications of possible ICL systems and illustrates one of these systems for graduates at different points of the earnings distribution, and compares the repayment profiles of these graduates to what occurs under Stafford Loans.

2. Why income-contingent repayments for student loans?[2]

INCOME-CONTINGENT REPAYMENTS ARE VERY DIFFERENT.

We all understand how conventional mortgage style loans work: they involve a nominal repayment of $X per month for *n* years. With a mortgage style loan:

- An increase in the interest rates raises monthly nominal repayments.
- What is fixed is the duration of the loan; the variable component is the fraction of a person's income absorbed by repayments (referred to as the *repayment burden*).
- Because repayments stay the same (in the absence of interest rates changes), the repayment burden increases if income falls.

[2] For fuller discussion, see Barr (2012*a*, Ch. 12; 2012*b*).

In an income-contingent system, repayments instead are *x* per cent of the borrower's current income until he/she has repaid the loan. Further, in virtually all ICL systems payments are taken only after income reaches a threshold (to protect those facing financial stress). Hence, in an ICL system the variable component is the duration of the loan, which is longer for borrowers with lower incomes.

Income-contingency turns many standard understandings about student loans upside down:

- An increase in the interest rate has no effect on monthly repayments; what changes is the duration of the loan.
- What is fixed is the fraction of a person's income absorbed by loan repayments.
- If a person's income rises, their repayments increase but their repayment burden cannot exceed the repayment rate defined in the policy.

For the reasons set out below, an income-contingent design is a better fit than a conventional loan for borrowing to finance human capital.

WHY NOT CONVENTIONAL LOANS?

In a prescient and highly readable account, Friedman (1955) identified the fundamental reason why conventional mortgage-type loans work well for home loans but not for investment in skills. Friedman identifies two strategic problems in the market for student loans:

- There is a lack of collateral: in contrast with home loans, there is nothing for a bank to sell if a student defaults on his/her loan; and, again unlike home loans, students can emigrate, leaving no forwarding address. In addition,
- There is asymmetric information: students are better informed than lenders about whether they aspire to careers in say financial markets or the arts.

The first problem implies excessive risk for borrowers; both problems imply excessive risk for lenders. As a result, with conventional mortgage-type loans, investment in human capital is too low. The deterrent applies to all students, but particularly to those from poorer backgrounds who tend to be (*a*) less well informed and (*b*) less able to absorb financial risk.

These market failures imply that to achieve an efficient level of investment in human capital a loan system needs two elements:

- Consumption smoothing: the loan needs to be large enough to provide consumption smoothing over the course of the loan; *and*
- Insurance: if consumption smoothing is to be effective (that is, people borrow enough to finance the efficient amount of investment in human capital), the loan needs to provide an element of insurance against low earnings.

LOANS WITH INCOME-CONTINGENT REPAYMENTS

Having identified the capital market imperfections outlined above, Friedman goes on to point out that:

'The device adopted to meet the corresponding problem for other risky investments is

equity investment plus limited liability on the part of shareholders. The counterpart for education would be to "buy" a share in an individual's earning prospects: to advance him the funds needed to finance his training on condition that he agree to pay the lender a specified fraction of his future earnings' (1955, p. 138)

On that basis he advocates loans from government, in return for which:

'The individual would agree in return to pay to the government in each future year x per cent of his earnings in excess of y dollars for each $1,000 that he gets in this way. This payment could easily be combined with payment of income tax and so involve a minimum of additional administrative expense' (p. 140).

Based on similar thinking, Yale University introduced a system of ICLs in the 1970s. The main reason why that system failed was that a university lacks a sufficiently robust capacity to collect repayments, particularly of an income-contingent form.

The operation of student loans is analogous to social security and should operate on the same principles. Pensions redistribute from a person's younger to her older self; student loans redistribute from middle years to earlier years.[3]

DIFFERENT INCOME-CONTINGENT DESIGNS

An income-contingent mechanism has two generic forms:

- With a graduate tax (as in Friedman), borrowers repay a fraction of their earnings for life or (say) till retirement. This is equity finance: repayments are contingent on lifetime income; thus people with higher lifetime earnings repay more in present-value terms.
- With loans, repayment continues until the borrower has repaid some specified amount, for example, 100 per cent of the amount borrowed in present value terms. In this design, income contingency affects the time path of repayments but, except for the lifetime poor, not the total repayment.

In what follows we concentrate on loan finance since graduate taxes have problems and in effect impose an infinite interest rate on the loans of graduates while they work – they are student loans which you can never pay off.[4]

DIFFERENT WAYS OF IMPLEMENTING INCOME-CONTINGENT REPAYMENTS

Repayments can be organised in different ways.

- Based on current income, as in Australia, New Zealand and England. Since repayments adjust automatically to current earnings, this is the best method so long as a country has the institutional capacity to implement it effectively;
- Based on past income, as in Hungary; and

[3] For an early UK proposal in which student loan repayments are linked to social security contributions, see Barr (1989).

[4] See Barr (2009), https://www.iod.com/MainWebSite/Resources/Document/Graduate_Tax_0910.pdf

- Through a hybrid arrangement, as in the Netherlands. The Netherlands has a traditional mortgage-like system, but if a person's earnings are low, he/she can contact the student loans administration and request a lower repayment rate, losing the benefits of automaticity.

KEY ELEMENTS IN DESIGN

The core elements of an ICL are:

- The repayment rate(s), that is, repayments as a percent of a person's current income;
- The repayment threshold, that is, the level of income at which repayments start;
- The interest rate and/or loan surcharge/administrative charge;
- A cap on total and/or annual borrowing from the student loan system;
- The maximum number of years of repayment, that is, forgiveness after *n* years;
- Conditions for early repayment;
- A robust collection mechanism.

We discuss these elements both individually and in terms of their interactions in section 5.

3. How the English and Australian student loan systems work: Tuition[5]

Universities in England and Australia operate in the public sector with tuition charges set by government. Fee levels have changed considerably over the last 20 years and are currently:

(i) A maximum of GBP 9,000 (USD 11,000) per full-time student year in England, irrespective of subject, with over 95 per cent of institutions charging this amount; and

(ii) Between about AUD 6,000 (USD 5,500) and AUD 9,000 (USD 7,000) per full-time student year in Australia depending on the course studied, there being three tiers (for example, law and medicine are in the top and arts and humanities the bottom tiers).

Upon enrolment, domestic students choose between paying tuition up-front or deferring their obligation through an ICL system. The vast majority (85 per cent in Australia, 90 per cent in England) choose to defer, and a student's debt is recorded and linked to his/her unique social security/tax file number. When a borrower starts work, employers withhold loan repayments based on the borrower's current income in the same way that they withhold social security payments and income tax. Outstanding debt is recorded and reconciled within a government agency, which can be the tax authorities or a separate loans administration, such as the UK Student Loans Company.

[5] What follows considers the case for tuition debts only although the British arrangement also provides means-tested loans to cover living costs. The administrative arrangements are identical although policy concerns with respect to interest rate subsidies are more important in a system that covers living costs because the resulting debt is larger, hence the distortion caused by an interest subsidy greater.

In both Australia and England, borrowers have no repayment obligation unless their incomes exceed a certain amount, GBP 21,000 per year (USD 26,000) in Britain and AUD about 57,000 (USD 42,000) per year in Australia. Above these thresholds loan repayments are an increasing proportion of income, but cannot exceed 9 and 8 per cent of incomes, respectively in Britain and Australia. When the loans has been fully repaid, employers are informed and repayment collections cease; the median duration is about 8 years in Australia and about 27 years in Britain (where average debts are much larger), although the variance is considerable; in Britain all outstanding loans are forgiven after 30 years, but there is no maximum repayment period in Australia. Both systems charge interest, and both include an element of interest subsidies, an issue considered in more depth below.

4. Key conceptual features of the English and Australian ICL systems

Several critical features of the British and Australian loan arrangements contrast with those in the US. The most important are:

REPAYMENT BURDENS

A critical concept is that of the "repayment burden" (RB), the proportion of a borrower's income required for loan payments. The most important benefit of the English and Australian ICL systems is that by design there is a maximum RB of 8 or 9 per cent. This feature contrasts sharply with the typical situation in the US, where RBs for an individual borrower can fluctuate widely and also differ considerably between student debtors, as noted in Dynarski (2016).

RBs are a crucial aspect of student loan design because they reflect the difficulty or ease of meeting repayment obligations. With non-ICL systems, for example standard Stafford loans, a borrower is required to repay a fixed amount each month for 10 years, irrespective of their financial capacity to do so. Thus borrowers experiencing unemployment or low earnings through non-graduation (a particularly likely outcome for borrowers who did not complete their degree from the for-profit sector), face high RBs, causing hardship and in many cases leading to default. This cannot happen with an ICL loan system and this is the main benefit of such arrangements.

Chapman and Dearden (2016) present calculations of RBs for BA graduates in the US at different percentiles in the US earnings distribution. Though most graduates do not experience difficulties, those in the 10^{th} and 20^{th} centile face serious problems, particularly early in their careers. With hypothetical illustrations, Chapman and Dearden report RBs of over 100 per cent for young men and women in the 10^{th} centile of BA earnings at the age of 22; and even those in the 20^{th} centile face high RBs of over 30 per cent for men and 40 per cent for women early in their career.

These can seriously distort both labour market decisions (whether to work in the public or private sector, do volunteering, look after family members) and decisions about family formation (partnership and when to have children) in ways that are neither efficient nor equitable. Chapman and Dearden (2016) illustrate this with the example of a young female teacher who has a child.

A central characteristic of ICL loans in England and Australia is that such difficulties are ruled out by design, since both systems provide automatic insurance against low earnings. As a result, there are no adverse consequences in terms of damaged credit reputation – a major cost for debtors in the US system. Furthermore, an ICL system minimises (and for some designs eliminates) the perverse labour market and family formation incentives that face low earners in the US system.

ADMINISTRATIVE SIMPLICITY

As Dynarski (2016) stresses, while US borrowers can choose an income-based repayment stream from the plethora of loan options available, the system is complicated to navigate and administratively burdensome. For example, being part of the US income-based arrangement must be negotiated on an annual basis and requires a fairly sophisticated understanding of the present value of expected loan repayments of different repayment options. In the English and Australian systems, in contrast, repayments adjust automatically; borrowers are not required to navigate through the myriad rules, nor to make complex decisions about their loan strategies.

Stiglitz (2014) has labelled these advantages "transactional efficiencies" and promotes this aspect of the British and Australian policies as one of the most important positive features of ICL. The resulting benefits take two forms:

- The marginal cost of collection is small because the system builds on an existing administrative income-contingent collection apparatus[6].
- As noted, the benefit for the borrower is that repayments automatically adjust to financial circumstances.

ACCURACY IN ADJUSTING REPAYMENTS TO CURRENT FINANCIAL CIRCUMSTANCES

ICL repayments in England or Australia accurately reflect a borrower's *current* capacity to repay, since repayments are collected on the basis of the borrower's current weekly, fortnightly or monthly income. This aspect is important for the insurance element built into ICLs. This is not the case in the US variant of income-based repayment since repayments are based on the previous year's income rather than current income (Dynarski, 2016).

The distinction between past and current income would be immaterial with stable and predictable incomes, but that is not the way the world works for borrowers. The incomes of young people are least stable, and depend significantly on the state of the labour market when first seeking full-time employment. Thus the US income-based arrangements are not income contingent for the most important subset of borrowers – those with unstable employment and income and/or hours of work. Unemployment benefits and tax credits are rightly based on current circumstance; for the same reasons, the insurance element in ICLs requires repayments based on current earnings not past earnings.

[6] Administrative costs in the Australian and UK systems are about 3 or 4 per cent of the annual revenue collected (Chapman, 2014).

ICLs GUARANTEE THAT THE REPAYMENT PERIOD IS OPTIMUM FOR ALL GRADUATES

An implication of the English and Australian ICLs is that the repayment period for higher-earning income borrowers will generally be shorter and for low-earning graduates longer.

There is no good economic argument for having a fixed 10-year (or indeed 20- or 30-year) term for student loans. Indeed, the typical US term of 10 years is an outlier compared with student loans in other countries; for example, in the Thai and Canadian mortgage-style student loan systems the repayment periods are 15 and 18 years respectively. It is efficient if the lifetime of a loan is related to the lifetime of the asset, hence 3-year car loans and 25-year home loans. Since human capital has value throughout a person's working life, the option of a long repayment duration is efficient, as well as reducing the risk of default. Note that, as discussed below, a well-designed ICL allows early repayment if that is what the borrower wishes.

MINIMISING TAXPAYER SUBSIDIES WITH ICL

The extent of taxpayer subsidy associated with an ICL depends on its design, discussed in section 5.

It is always possible to design an ICL system that is cost neutral. Key variables include a combination of low loans, real interest rates above the government cost of borrowing, loan surcharges, lower thresholds, higher repayment rates, longer loan terms, and a healthy labour market with good earnings growth. Some of these variables can be controlled, others cannot. A good ICL system should be transparent, easy to understand, with high take up (essential for the insurance mechanism), easy to access, easy to administer, placing low burden on borrowers once they enter the labour market, and basing repayments on current earnings.

The English and Australian experience points to the following conclusions.

- ICLs deliver major benefits in terms of consumption smoothing and insurance, because they eliminate concerns with high repayment burdens and hence largely eliminate defaults;
- Repayments through employer withholding based on current income is the simplest and cheapest approach for both lender and borrowers;
- A system without the complications of reapplication has significant administrative and conceptual benefits both for government and borrowers; and
- The parameters of an ICL are critical design issues, to which we now turn.

5. Designing an ICL system

This section discusses in turn the elements in an income-contingent system noted earlier: the repayment function (that is, the repayment rate(s) and repayment threshold); the interest rate on the loan and/or the loan surcharge charge; the cap on borrowing from the system; forgiveness after *n* years; conditions for early repayment; and a robust collection mechanism.

Student loans have multiple objectives, including consumption smoothing and social mobility (hence avoiding high repayment burdens), and fiscal parsimony (thus allowing loans to be large enough to provide good consumption smoothing, and sufficiently widely available to bring about the efficient level of investment in skills). The choice of parameter values will depend on:

- The relative weights given to these different objectives;
- The choice of the other parameters, i.e. the parameters interact with each other;
- The size of the loan;
- The level, distribution and projected rate of change of graduate earnings;
- The tax and benefit regime operating in a country and the tax base;
- Political sensitivity connected with real interest rates and surcharges.

THE CHOICE OF REPAYMENT RATE.

- In England, the 9 percent repayment rate applies only to earnings above the threshold of GBP 21,000 per year; thus the repayment for someone earning GBP 22,000 per year is GBP 90, i.e. 9 per cent of GBP 1,000. In Australia, once a borrower's earnings cross the threshold of AUD 54,000, a 4 per cent repayment rate applies to *all* earnings; thus the repayment for someone earning AUD 55,000 is AUD 2,200, i.e. 4 per cent of AUD 55,000. Other things equal, the Australian system can have a lower starting repayment rate, but at the expense of a 'cliff edge' as earnings cross the threshold. Australian evidence suggests that this has behavioural tax reporting effects in the short run (a bunching of earnings just below the threshold) but this quickly disappears (after just one year).
- A higher repayment rate brings in more repayments faster, but creates a larger potential distortion to labour supply, as labour supply is affected by the marginal tax rate. In England, the repayment rate of 9 per cent means that the increase in the marginal tax rate above the threshold is 9 per cent for all graduates (until the loan is repaid). In the Australian system the increase in the marginal tax rate for a $1 increase in salary is extremely high, as much as several hundred thousand per cent under particular assumptions concerning eventual repayment. This 'cliff edge' can be reduced by having more thresholds with smaller changes in the repayment rates.

THE CHOICE OF REPAYMENT THRESHOLD.

- Other things equal, a lower repayment threshold increases repayments, making it possible, for example, to have a lower repayment rate.
- The case for a higher threshold is to avoid the high marginal tax rates faced by many low earning recipients of income-tested benefits, and to reduce financial stress on low earners. A higher threshold disentangles student loan repayments from the welfare system, with both efficiency and equity gains, but reduces revenue.
- The choice of threshold depends on the balance between repayment flows and social concerns, and will depend crucially on the median level of income in a country,

the extent of income inequality, its tax and benefit systems and the efficiency of the tax collection/employer withholding system.

THE CHOICE OF INTEREST RATE

- If a policy aim is to keep taxpayer subsidies small, one approach is an interest rate on the loan not below the government's cost of borrowing. An interest rate below the cost of finance means that *no* borrower repays in full in present value terms. The outcome can be expensive in fiscal terms (especially if the government cost of borrowing is high). However, a lower interest rate may be politically more palatable, reduce adverse selection[7] and is also more progressive in terms of the proportion of the loan paid by the cohort of borrowers in present value terms across the earnings distribution. We return to the issue in section 5.2.
- If the interest rate is set above the government's cost of borrowing, borrowers who repay their loan in full repay more than the cost of their loan in present value terms. However this is no longer necessarily progressive within the cohort of borrowers (since the richest graduates repay their loan faster and hence contribute less proportionately in present value terms from the interest surcharge).

THE CHOICE OF SURCHARGE

- An alternative to a positive real interest rate, or an option alongside a real interest rate, is a loan surcharge[8] A surcharge has the advantage of transparency (unlike compound real interest rates) and can help to maintain progressivity within the cohort of borrowers by allowing a real interest rates in a revenue neutral way (due to the increased revenue from the surcharge).
- A disadvantage is that the optics of a surcharge, particularly a large surcharge, may impact on the decision to take out a loan.

THE CHOICE OF CAP ON BORROWING.

Loans should be capped for two reasons.

- To prevent people borrowing more than they can realistically repay. Thus the choice of cap should be heavily influenced by the level and expected rate of growth of average earnings.
- To help to contain fee inflation – a relevant consideration if a country (like the US, in contrast with Australia and England) has no cap on tuition fees. In England in 2012, when fees were allowed to rise to GBP 9,000 and student loans were allowed to rise commensurately, virtually all fees went up to GBP 9,000[9]. This was repeated in 2016

[7] See Barr (2012b, pp 485-7). In Australia, the interest rate is 0 per cent real, in New Zealand is is 0 per cent nominal – so below the government cost of borrowing. Conversely in the UK the interest rate is 3 per cent real and above the government cost of borrowing.

[8] The US Stafford Loan system currently has a loan surcharge of 1.67 percent..

[9] See Haroon Chowdry *et al.* (2012b) and Lorraine Dearden *et al*. (2014).

when fees for 2017 were allowed to rise to GBP 9,250 and all but a handful of universities raised fees to the maximum level.[10]

MAXIMUM NUMBER OF YEARS OF REPAYMENT.

- In a system with a positive real interest rate, a lower maximum repayment duration is more progressive (since lower earners are increasingly protected), but at the expense of less revenue.
- England has a maximum repayment duration of 30 years, i.e. any outstanding loan balance after 30 years is forgiven. In Australia, by contrast, there is no maximum period of repayment but implicitly is set to be the death of a debtor.

CONDITIONS FOR EARLY REPAYMENT.

In a well-designed system, borrowers should be able to repay early, in part or fully, with no penalty, so that nobody is forced to take longer than they wish to repay. A well designed system should have no incentives to repay early and/or ensure that there is no loss of revenue if there is early repayment.

A ROBUST COLLECTION MECHANISM.

As discussed earlier, employer withholding on the basis of current earnings is (a) cheap, (b) robust in a country like the US, and (c) essential if the insurance element in the loan is to be effective. Retrospective collection of ICL repayments is not transactionally efficient and defeats the very essence of the insurance element of an ICL loan system. A system as suggested by Dynarski (2016) in which employer-withholding is done in the same way as is done with respect to social security contributions, would be ideal.

FUTURE PROOF

A well designed ICL should be transparent, future proof and not easily subjected to political manipulation.

In sum, a good loan scheme has the characteristics summarised in Box 1.

[10] See https://www.offa.org.uk/access-agreements/.

Box 1 Characteristics of a good loan design

INCOME-CONTINGENT REPAYMENTS based on current earnings.

A WRITE-OFF after *n* years, or at retirement or death.

REPAYMENT THRESHOLD AND REPAYMENT RATE chosen so that:

- A graduate with 'good' earnings repays (in PV terms) 100 per cent, or for high earners perhaps more than 100 per cent, in the latter case with a cap on maximum overpayment (in present value terms) by any individual.
- As far as possible seeks to avoid distortions, e.g. large cliff edges or wedges.

Such a loan is designed to make a loss on people with low lifetime earnings but should seek to keep the loss on other borrowers low.

Fiscal parsimony of loan design matters, not out of a sense of the purity of the loan, but because loans that make avoidable losses reduce their capacity to fulfil their core purpose of facilitating investment in human capital. Expensive loans restrict one or more of:

- The number of loans that are made available;
- The size of loans;
- Student numbers;
- The breadth of the loan system, e.g. not covering living costs, or excluding part-time students, postgraduate students and students in sub-degree tertiary education.
- Spending on more powerful pro-access policies, including earlier in the system.

FINANCING NON-REPAYMENT. The design question is where the loss on low-earning borrowers should fall: (a) on the taxpayer, or on the cohort of borrowers through (b) a cohort risk premium or (c) a surcharge.

- With a small loan any of these methods can work.
- The larger the loan the greater the marginal loss (the marginal loss on a $10 loan is zero, on a $1m loan close to 100 per cent). If loans are large, excessive reliance on any one method is generally suboptimal.
    - Taxpayer subsidy: a large fiscal cost (as in the English loan until 2012), as just discussed, creates downward pressure on the number and/or size of loans, and crowds out other beneficial activities;
    - Risk premium: a large loss requires a substantial risk premium, that is, an interest rate significantly above the government's cost of borrowing, risking adverse selection and creating potential political problems;
    - Surcharge: a large loss requires a substantial surcharge, again raising the prospect of adverse selection.

This line of argument suggests that the loss should be covered by a mix of the three mechanisms, the mix depending on the size of the loan and country specifics.

6. Empirical illustrations for the US

How might such a system work in the US? In order to assess this, we requires good earning simulations of future graduates throughout their (simulated) lifetimes. This is the only way to work out the full cost implications of different ICL designs and the full distributional implications for borrowers. In England, the Department for Education provides simulated earnings profiles for male and female graduates, which allow anyone to calculate the implications of different ICL systems for different types of graduates and on government finances[11] under different assumptions. It is very similar to models developed at the Institute for Fiscal Studies since 2002[12]. In the US, it would be easy for the government to replicate these simulated earnings since they have the best sources of longitudinal data (e.g. see Looney and Yanellis (2014)).

Instead, for this paper we take the latest data from the 2015 Current Population Survey. We focus on Bachelor of Arts (BA) graduates who do not pursue further postgraduate qualifications. We put these data in 2016 prices and assume real earnings growth of 1 per cent real per year for all these graduates.

We assume all BA graduates stay in the same earnings percentile throughout their life. This is simply for illustrative purposes and in no way reflects a typical earnings path for BA graduates and will exaggerate differences in earnings across the BA graduate distribution but should be reasonably accurate in comparing the likely broad taxpayer subsidies involved in different types of ICL systems.[13] We begin by looking at the implications of an example ICL scheme across the distribution of all BA graduates.

We start with (a) a system with a zero real interest rate, and consider its distributional impact within the cohort of borrowers and the overall taxpayer subsidy. We then show the distributional implications of reducing taxpayer subsidies via (b) a real interest rate only or (c) a real interest rate in combination with a loan surcharge.

We then illustrate the essential differences of our ICL system with a Stafford style mortgage loan using two examples of graduates: a female BA graduate who is assumed to earn around the 20th centile of the earnings distribution throughout her life, and a male graduate who is assumed to earn around the 90th centile of the male earnings distribution throughout his life. These very different experiences have been chosen to illustrate the range of likely earnings and ICL experiences.

[11] See https://www.gov.uk/government/publications/simplified-student-loan-repayment-model.

[12] See Haroon Chowdrey *et al.* (2012a).

[13] Note that using example individuals and or assuming that somebody stays in the same centile of the earnings distribution is not remotely realistic. Studies that have analysed the PSID and/or SIPP data in the US show that individuals experience transitory and permanent employment and earnings shocks throughout their lives, e.g. see Low *et al.* (2010). Moreover, the big differences between the two systems is for people with even poorer labour market outcomes. The aim of the example graduates we use in this section is to show that that a well designed ICL can make a significant difference in important ways even for a moderately successful graduate. We also show, that for a successful graduate, revenue streams can accrue faster than with a mortgage-type loan.

CASE 1: AN EXAMPLE ICL WITH ZERO REAL INTEREST RATE

How might an ICL system work in the US, and what would be the distributional and taxpayer subsidies involved? As an illustration only, we draw on Chapman *et al.* (2016) and start with the following possible ICL parameters for a US system:

(i) A first income repayment threshold of $25,000 per year, and a second threshold of $40,000 (in a policy reality these would both uprated annually with inflation);
(ii) A flat 3 percent repayment rate on total income above the first threshold and 6 percent for earnings above the second threshold;
(iii) A zero real interest rate (i.e., debt increases with inflation only);
(iv) A loan write-off after 25 years compared to no write-off.

In order to compare the full distributional implications of this ICL as well as the size of the taxpayer subsidy, we calculate the unconditional quantiles of earnings by age and gender using CPS income data for BA graduates. We then smooth these quantile estimates using polynomials in age (see Chapman and Dearden (2016)). We use these smoothed unconditional quantile earnings profiles by age and gender to estimate the impact across the entire income distribution of BA graduates. For calculating the taxpayer subsidy we pool the male and female results using current BA enrolment proportions taken from the Digest of Education Statistics for 2014.[14] We assume 1 per cent real earnings growth, 1 per cent; inflation and that the government cost of borrowing is the 10-year bond rate plus ¼ of a point.[15]

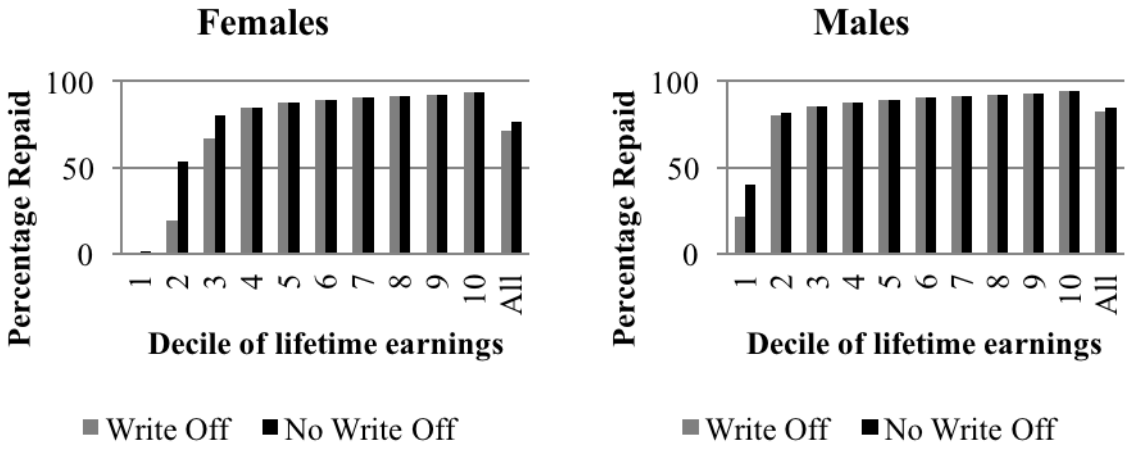
A zero real interest rate in an ICL system is always *progressive* within the cohort of debtors - it helps the lowest graduate earners the most. This is because those with lower incomes repay their loans for longer, and the longer a loan with a subsidized interest rate is not fully repaid, the bigger is the subsidy.

Figure 1 shows the distributional impact (by deciles of the male and female college earning distribution) of a zero interest rate for our baseline scenario for men and women. We show the differences when there is debt write-off (after 25 years) and no debt write-off.

[14] Currently 57 per cent of conferred BA students are female and 43 per cent male. See Table 322.20 http://nces.ed.gov/programs/digest/d15/tables/dt15_322.20.asp?current=yes

[15] The Stafford interest rate of 3.78 percent per annum nominal is the government cost of borrowing plus 2.05 per cent points and hence 1.78 per cent points higher than a real interest rate of one percent (assumed in our ICL example) with one percent inflation.

Figure 1: Proportion of ICL Loan Repaid by Decile of Lifetime Earnings: zero real interest rate



Overall, this baseline scheme involves a 24 per cent taxpayer subsidy with a write-off, and a 20 per cent subsidy with no write-off. All graduates receive a taxpayer subsidy because there is a zero (subsidised) real interest rate while at college and below the first threshold from which every graduate benefits. On average women repay between 72 per cent and 77 per cent in present value terms, and men between 82 per cent and 85 per cent. Having a write-off makes the scheme more progressive for the cohort of borrowers but only impacts on the bottom three deciles for women and bottom decile for men.

Having explained earlier the ill-effects of excessive taxpayer subsidies, we now consider two ways of reducing these subsidies and highlight the regressivity with respect to all taxpayers: increasing the real interest rate above the government cost of borrowing and applying it for the duration of the loan (including while at college and when earning below the first threshold); and introducing a loan surcharge.

CASE 2: RAISING THE REAL INTEREST RATE

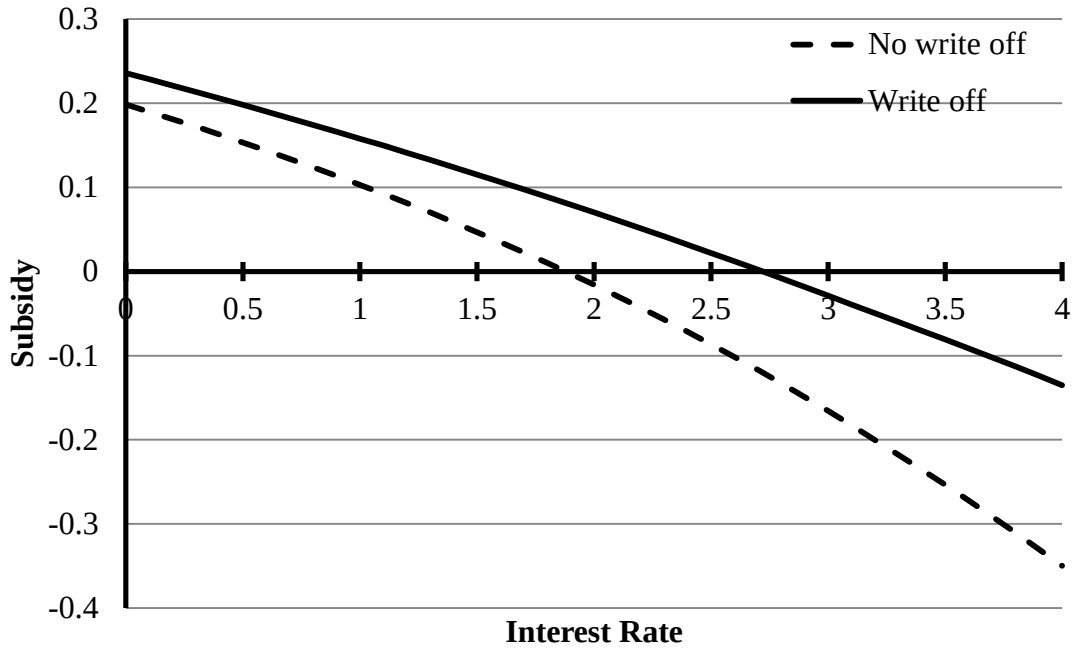
Figure 2 shows the relationship between the real interest rate and the extent of taxpayer subsidies for the ICL described above. In contrast with Case 1, the real interest rate applies from the moment the student takes out the loan, with no subsidy during college or below the first threshold[16]. The figure shows that the taxpayer subsidy falls as the real interest rate increases. From the graph we can see the level of real interest necessary to make this baseline ICL system cost neutral. For the loan with no write-off it would be 1.7 per cent real or 2.7 per cent nominal, and with a 25 year write-off.7 per cent real or 3.7 per cent nominal.[17] In what follows this is what we define as involving no overall taxpayer subsidy.[18]

[16] In Chapman *et al*. (2016) we also carry out this exercise with a zero real interest rate applying below the threshold and during college. This increases the 10 per cent taxpayer subsidy real interest rates to 1.5 per cent (no write-off) and 2.5 per cent (write-off) and the 0 per cent taxpayer subsidy real interest rates to 2.7 per cent (no write-off) and 3.8 per cent (write-off). This system is more progressive for the cohort of borrowers than the interest rate system illustrated in this paper.

[17] This is almost identical to the current Stafford Loan rate of 3.78 per cent nominal.

This is identified where the lines cross the *x* axis. It is also easy to see what interest rate would require an average taxpayer subsidy of 10 per cent (or indeed any other taxpayer subsidy): for this example the real interest rate could remain at the government cost of borrowing if there is no write-off, or 1.7 per cent real or 2.7 per cent nominal with write-off after 25 years.

Figure 2: Real Interest Rates and Taxpayer subsidies

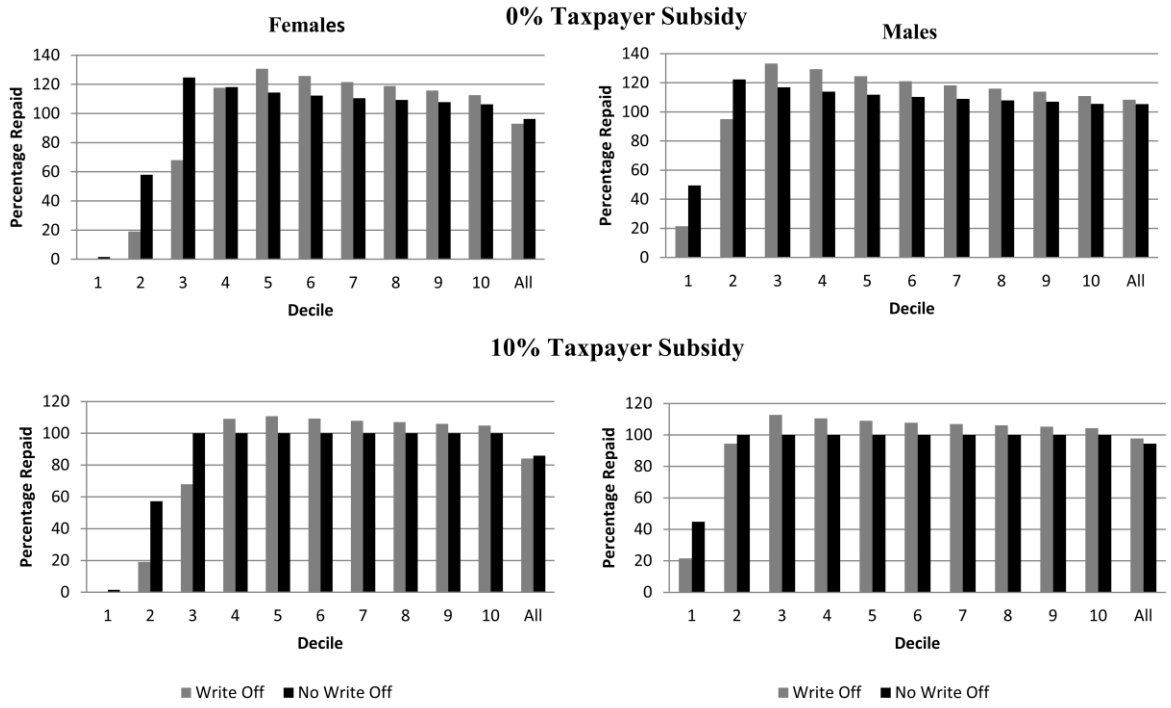


Note: The real interest rate is assumed to apply as soon as the loan is taken out.

What are the distributional implications of increasing the real interest rate compared to those shown in Figure 1? To illustrate this we look at the distributional implications of a 10 per cent taxpayer subsidy and 0 per cent taxpayer subsidy by increasing the interest rate under both write-off scenarios. This is shown in Figure 3.

[18] Of course, this ignores administrative and other costs of implementing an ICL system and ignores non-completers and two year college students. Hence no taxpayer subsidy for the BA group will necessarily involve a taxpayer subsidy for the student loan system as a whole. It also ignores direct government funding for teaching and grants.

Figure 3: Distributional Consequences of Imposing a Real Interest Rate



We see that for the 0 per cent taxpayer subsidy case, the biggest proportionate burden tends to be centred around the 3rd, 4th, 5th and 6th deciles (and 2nd decile for males with no write-off). Those in the top decile do well in proportionate terms and for men only those in the bottom decile (with no write-off) and bottom two deciles (with write-off) pay a lower proportion of their loan in net present value terms. In the 10 per cent taxpayer subsidy case, the outcome is progressive within the cohort of borrowers in the case of no write-off. [19] For the write-off case those in the 4th, 5th and 6th decile for women, and 3rd, 4th and 5th decile pay proportionately more than other deciles so once again this is not progressive within the cohort of borrowers.

CASE 3: IMPOSING A LOAN SURCHARGE

In what follows we again pool the male and female BA graduates using latest enrolment figures and use our earnings data to see what surcharge would be necessary to reduce taxpayer subsidies for the baseline scenario with a zero real interest rate. This is shown in Figure 4, which illustrates how the taxpayer subsidy falls as the surcharge increases. The figure also shows the surcharge necessary to make the baseline ICL loan cost neutral, or indeed any other taxpayer subsidy.

[19] As in the case the real intererst rate is equal to the government cost of borrowing so all those who pay off their loan, will do so in full in net present value terms.

Figure 4: Loan Surcharge and Taxpayer Subsidies: zero real interest rate

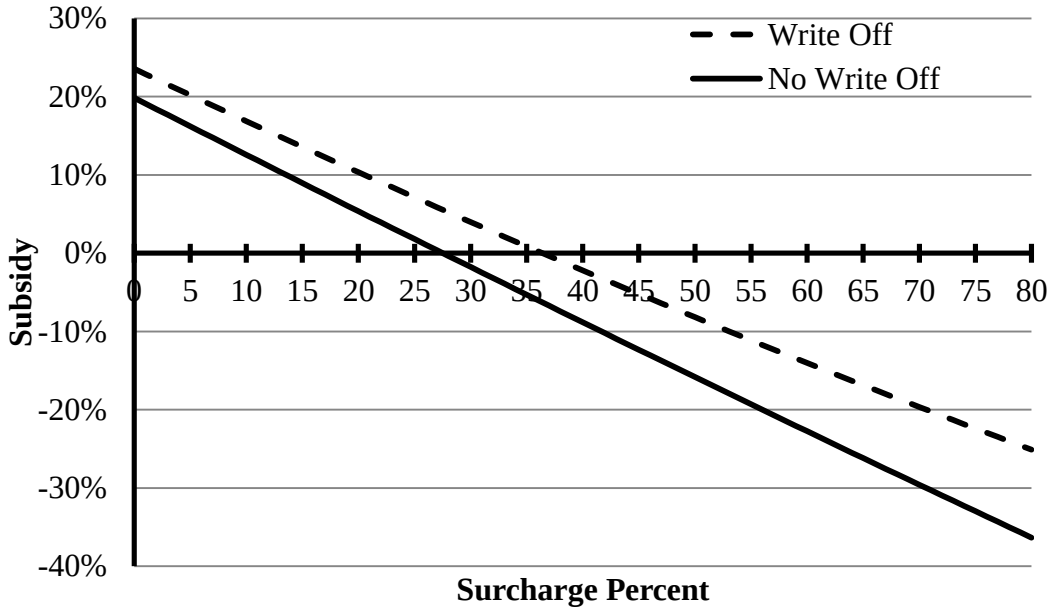


Figure 4 shows that a surcharge of around 27 per cent is necessary to avoid any taxpayer subsidy with no write-off, and around 35 per cent with a write-off. Alternatively, a surcharge of around 13 per cent with no write-off and 20 per cent with a write-off would require a 10 per cent taxpayer subsidy.

Figure 5: Distributional Consequences of Imposing a Surcharge

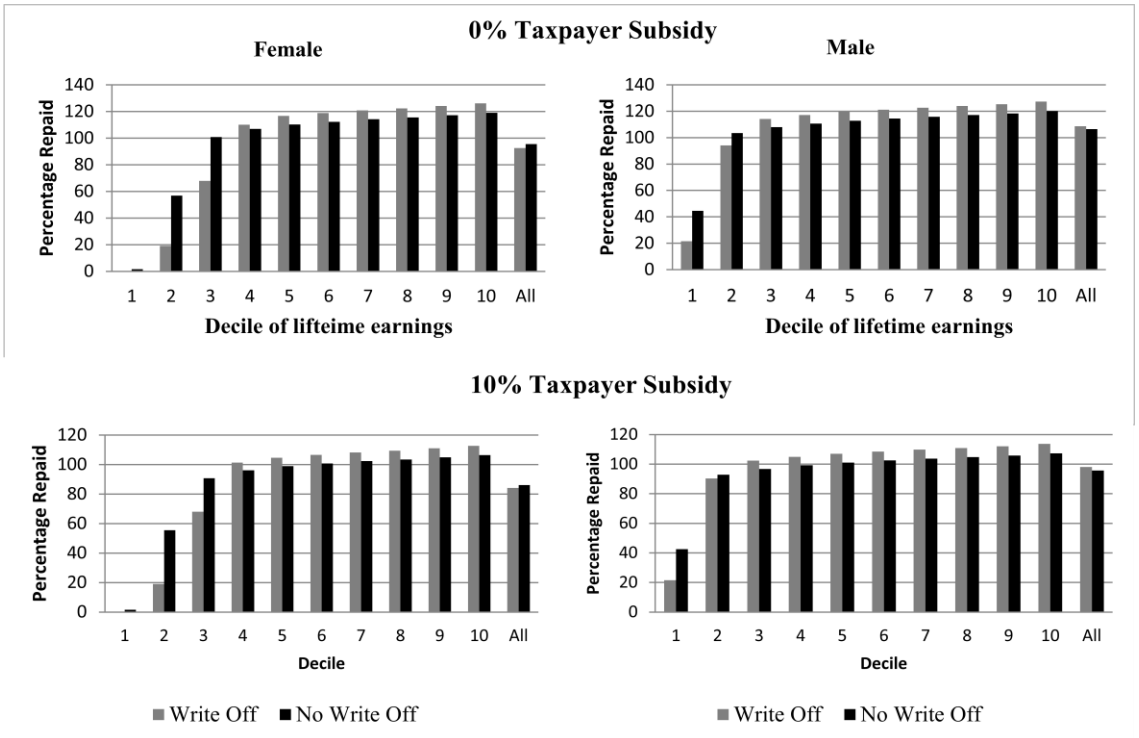


Figure 5 shows the distributional implications of these two surcharges and shows that they are both progressive within the cohort of borrowers i.e. as we move up the deciles of the income distribution, graduates pay proportionately more. For each taxpayer subsidy they are more progressive than the fiscally equivalent interest rate scenario illustrated above. With a surcharge, the richest graduates pay around 127 per cent of their loan in NPV terms in the case with no taxpayer subsidy and 113 per cent with a 10 per cent taxpayer subsidy. For a Stafford Loan for the same amount, the equivalent figure is 114 per cent but this applies to *all* graduates regardless of earnings and ignoring default.

Finally, in Figure 6, we show the implications of a hybrid scheme which charges a real interest rate of 1 per cent real above the threshold combined with a surcharge to make up the shortfall. For a 0 per cent taxpayer subsidy, the surcharge needs to be 16 per cent with no write-off and 25 per cent with a write-off. Alternatively, a surcharge of around 4 per cent with no write-off and 10 per cent with a write-off requires a taxpayer subsidy of 10 per cent.

In these examples, we have shown the implications only of changing real interest rates and surcharges. However, as highlighted earlier, these are not the only parameters that can be changed.[20] The implications of changing other parameters are shown in Chapman *et. al*. (2016). Importantly, the economic and political implications of charging a surcharge vs higher real interest rates are different and may impact differently on student's borrowing and decisions about university. It also depends on how they interact with other components of the ICL design, the tax and benefit system, the private loan market, and the moral hazard and adverse selection issues associated with the ICL design.

[20] Other parameters that can be changed are: the number and level of thresholds; repayment rates; write-off period; the maximum loan level. Also, the estimates are sensitives to economy wide variables such as earnings growth, the government cost of borrowing and inflation.

Figure 6: Distributional Consequences of Imposing a Surcharge: 1 per cent interest rate above threshold

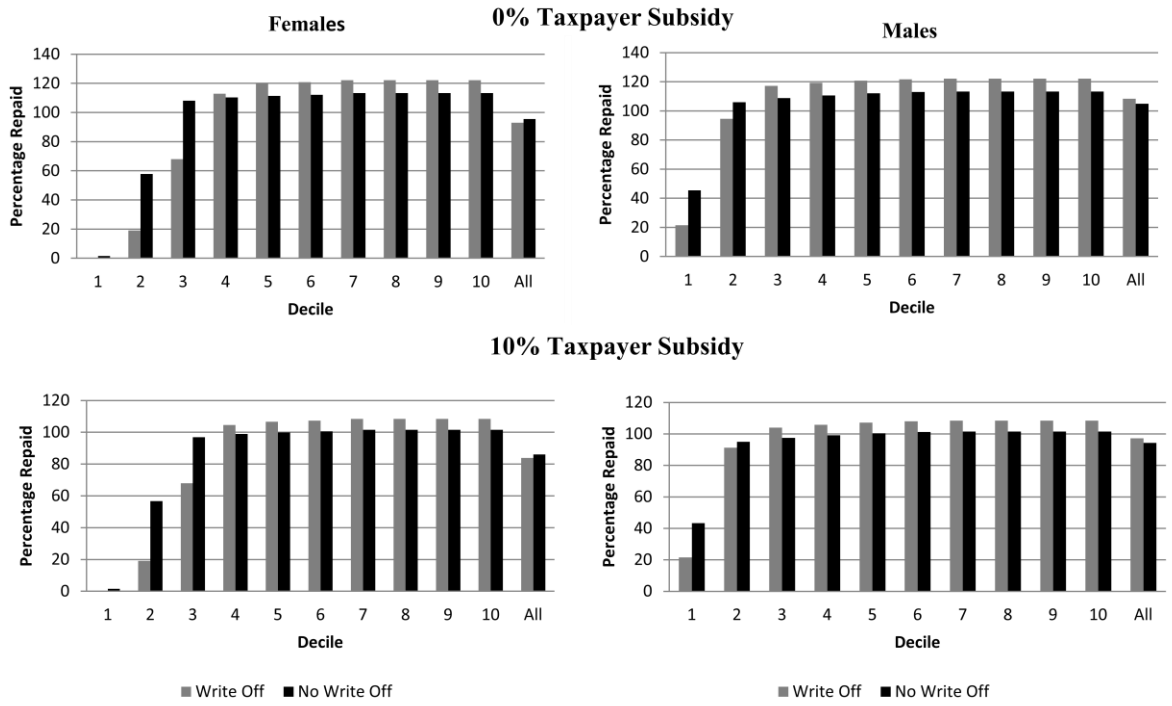


Figure 6 shows the distributional implications of these two surcharges and shows that they are both progressive within the cohort of borrowers i.e. as we move up the deciles of the income distribution, graduates pay proportionately more. With a surcharge, the richest graduates pay around 120 per cent of their loan in present value terms in the case with no taxpayer subsidy and 108 per cent with a 10 per cent taxpayer subsidy.

COMPARING ICL AND STAFFORD STUDENT LOANS REPAYMENT SCHEDULES AND BURDENS FOR EXAMPLE GRADUATES

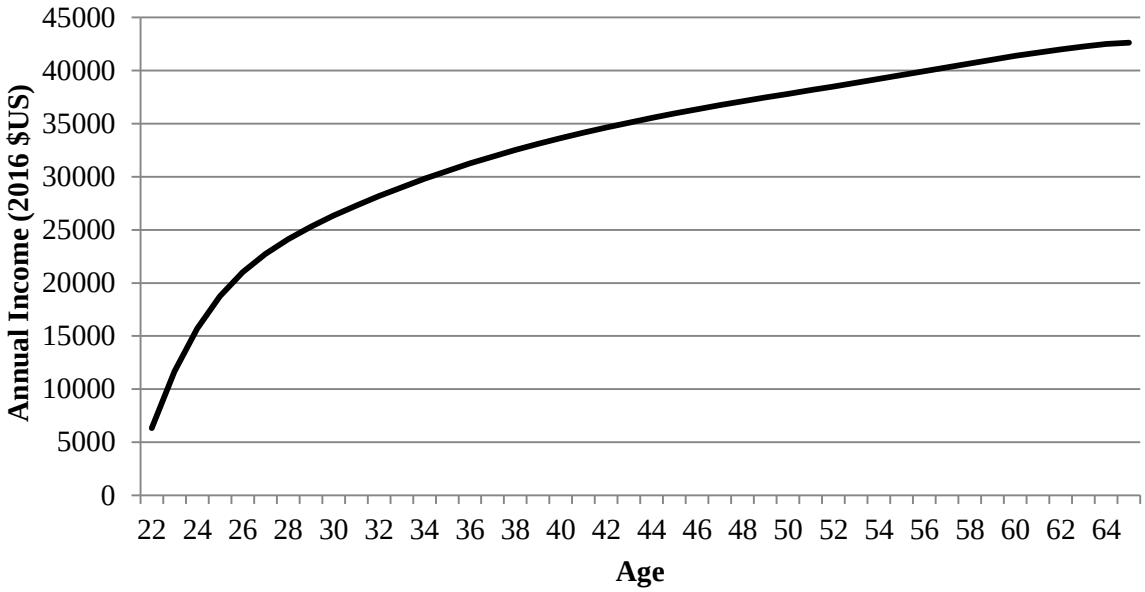
In this section we compare repayment burdens for different types of borrowers under the various ICL schemes discussed in the previous section and Stafford mortgage style loans (Stafford ML).

We do this by comparing the situation of a female BA graduate who remains in the 20th centile of female BA earnings all her working life with that of a 90th centile male BA graduate. As with our earlier examples, we assume a debt of $35,000 in 2016 prices and a 10 year Stafford ML with a nominal interest rate of 3.78 per cent, the rate applying for those taking out loans in 2016. We compare the yearly repayments and repayment burdens for a

Stafford Loan with the ICLs delivering a 10 per cent taxpayer subsidy that we discussed in our distributional analysis above. [21]

In Figure 7, we show our estimate of the earnings of this female BA graduate in $2016. We have assumed 1 per cent real earnings growth throughout her lifetime. Chapman and Dearden (2016) show that a BA graduate in the 20th centile of the earnings distribution receive about one half only of the median income of a female BA graduates.

Figure 7: Female BA Graduate 20th Centile of Earnings throughout Lifetime (Annual Earnings in 2016 $US)



For both of our example graduates, we will assume that they borrow $35,000 over 4 years, the same as was assumed in the previous section. We consider the following types of loans:

1. Stafford ML with a repayment term of 10 years and an interest rate of 3.78 per cent[22]
2. An ICL with 1 per cent real interest rate and no write-off
3. An ICL with a 1.7 per cent real interest rate and a write-off after 25 years
4. An ICL with a loan surcharge of 4 per cent, 1 per cent interest rate above the threshold and no write-off
5. An ICL with a loan surcharge of 10 per cent, 1 per cent interest rate above the threshold and a write-off after 25 years
6. An ICL with a loan surcharge of 13 per cent, 0 per cent real interest rate and no write-off
7. An ICL with a loan surcharge of 20 per cent, 0 per cent real interest rate and write-off after 25 years

[21] With the current Stafford MLs the government underwrites defaults on these loans and current estimates suggest that this subsidy is well in excess of 10 per cent of the total value of Stafford MLs (see Looney and Yannelis (2015)).

[22] The average student debt in 2015 was $30,100 but this included all debt including private debt. See http://ticas.org/sites/default/files/pub_files/classof2015.pdf.

From the previous section, we saw that all of these ICL schemes involve a taxpayer subsidy or around 10 per cent. Currently Stafford MLs are costing the government a much higher proportion of subsidy due to high default rates so this seems fair. For all scenarios we assume a 1 per cent rate of inflation and a government cost of borrowing of 1 per cent (as we did in the previous section).

Figure 8 shows us the annual repayment schedule in $2016 for these schemes. For poor women, the repayment schedule is identical for all schemes involving write-off as they do not repay their loan within 25 years.

Figure 8: Female BA Graduate 20th Centile of Earnings: Repayment Schedule ($ per year in 2016 prices) for $35,000 loan

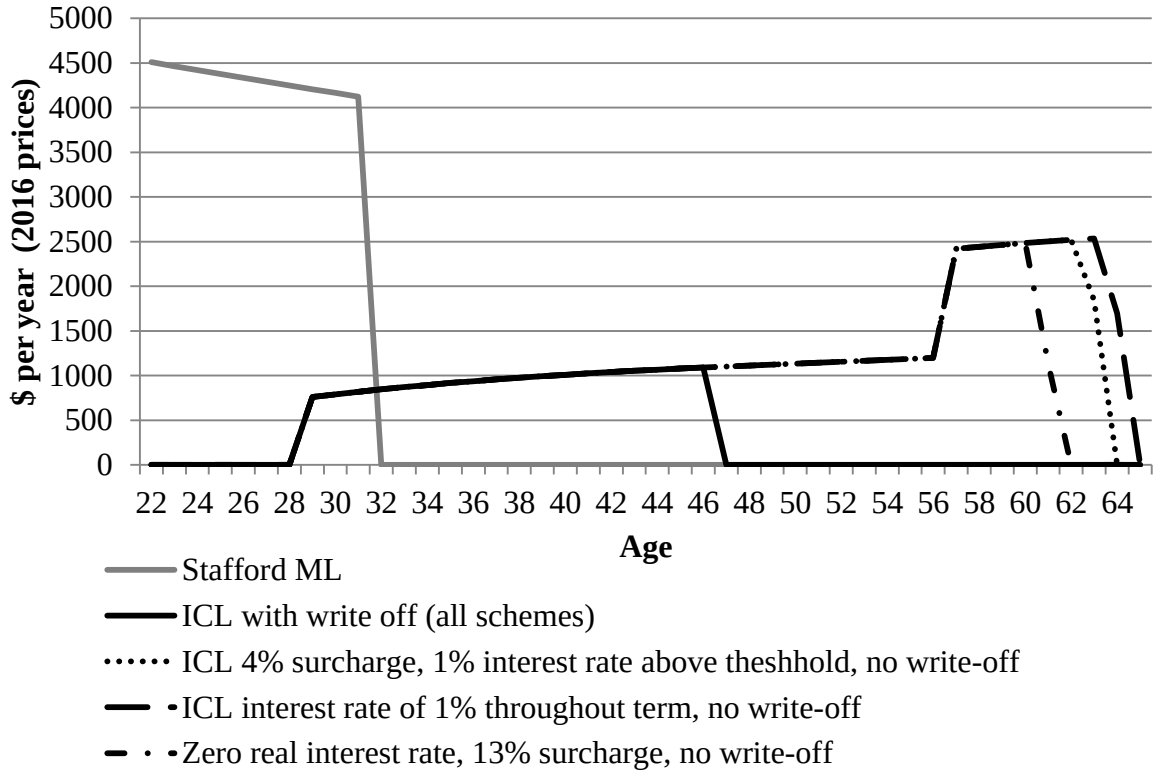


Figure 8 shows that, with the Stafford loan, around $4,100 to $4,500 per year (in 2016 $US) must be repaid for the 10-year period from when the graduate is age 22 to 31, after which there are no further repayments. With the ICL, the repayment streams and levels are quite different. Up until the age of 28, no repayments are made at all as income is below $25,000. Repayments then slowly rise as income rises and in a scheme with a write-off repayments stop after 25 years with the loan not fully repaid. In the schemes with no write-off, there is a jump in repayments at the age of 57 when her income goes above the second threshold of $40,000.

In the schemes with the surcharge our hypothetical woman finally repays her loan when she is 62/64 and in the schemes with a real interest rate at the age of 65, so after just over 40 years. Annual repayment amounts never exceed $2,500 per year and never come close to

approaching Stafford levels, even when this graduate's earnings are relatively healthy. Combining the data from Figures 7 and Figure 8 allows the calculation of the RBs for each of the loan systems. The results are shown in Figure 9.

Figure 9: Female BA Graduate 20th Centile of Earnings: Average Burden (Repayment/Income) for $35,000 loan

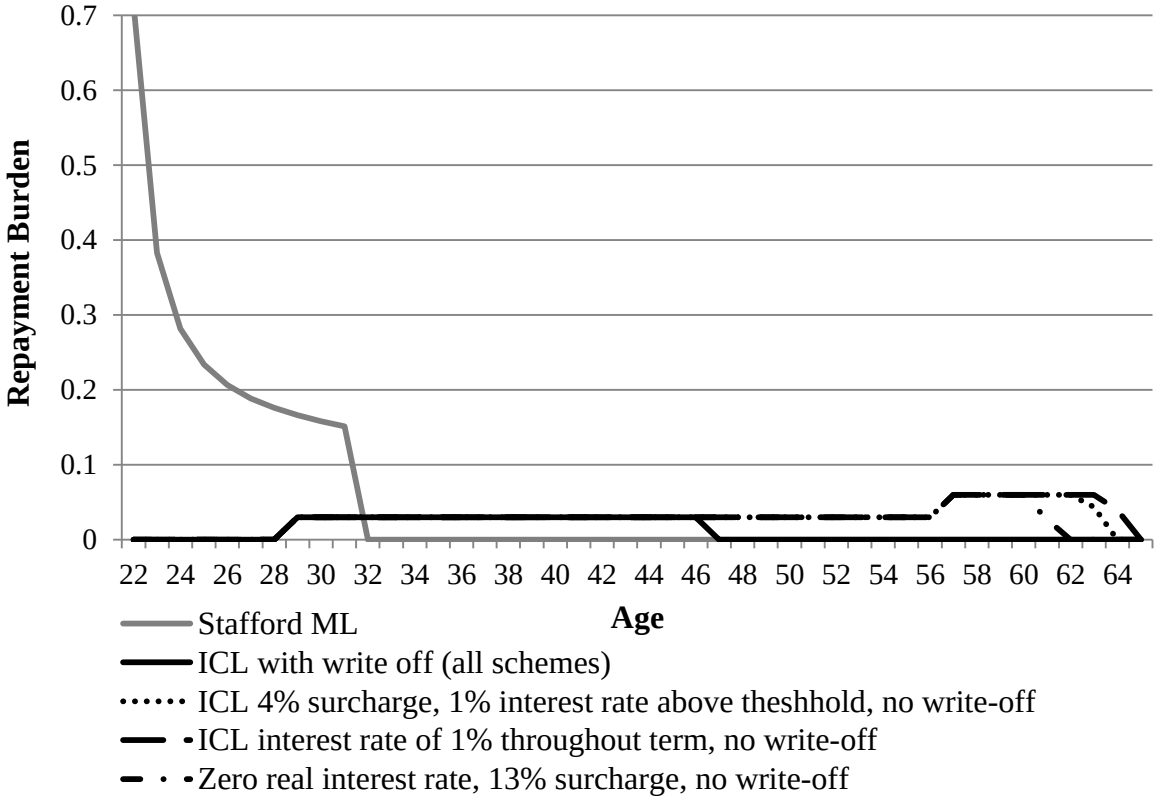


Figure 9 reveals very different repayment experiences under the Stafford ML and the ICLs for our low-income female graduate. Because the Stafford loan system constrains repayment to be concluded within 10 years, the RBs begin at a daunting 71 per cent of income, fall then to around 15 by the end of the 10-year period (still a relatively high proportion of income). The RB averages around 27 per cent of income for the 10 years. In contrast, with the ICL, RBs do not exceed 6 per cent per annum, and up until the age of 29 are zero and up until the age of 46 (with write-off) and 57 (no write-off) only 3 per cent. The graduate only pays around 40 per cent of her loan with the write-off and 95 per cent maximum without the write-off (in net present value terms) which is less than the 114 per cent she would pay with the Stafford loan (presuming she doesn't default).

However, with such high RBs this graduate considered above is very likely to default or experience financial distress. This has implications for calculating taxpayer subsidies as the ICL schemes offer insurance to taxpayers, since debtors are more likely to remain solvent and able to repay their debt in full.

In our final example we consider the implications of the different schemes for a high earning male graduate in the 90th centile of the earnings distribution. Figure 10 shows the earnings

of this graduate from the age of 22 to 40. A male graduate in the 90th centile is earning around 50 per cent more than median earnings by the age of 40.

Figure 10: Male BA Graduate 90th Centile of Earnings during Lifetime (Annual Earnings in 2016 $US)

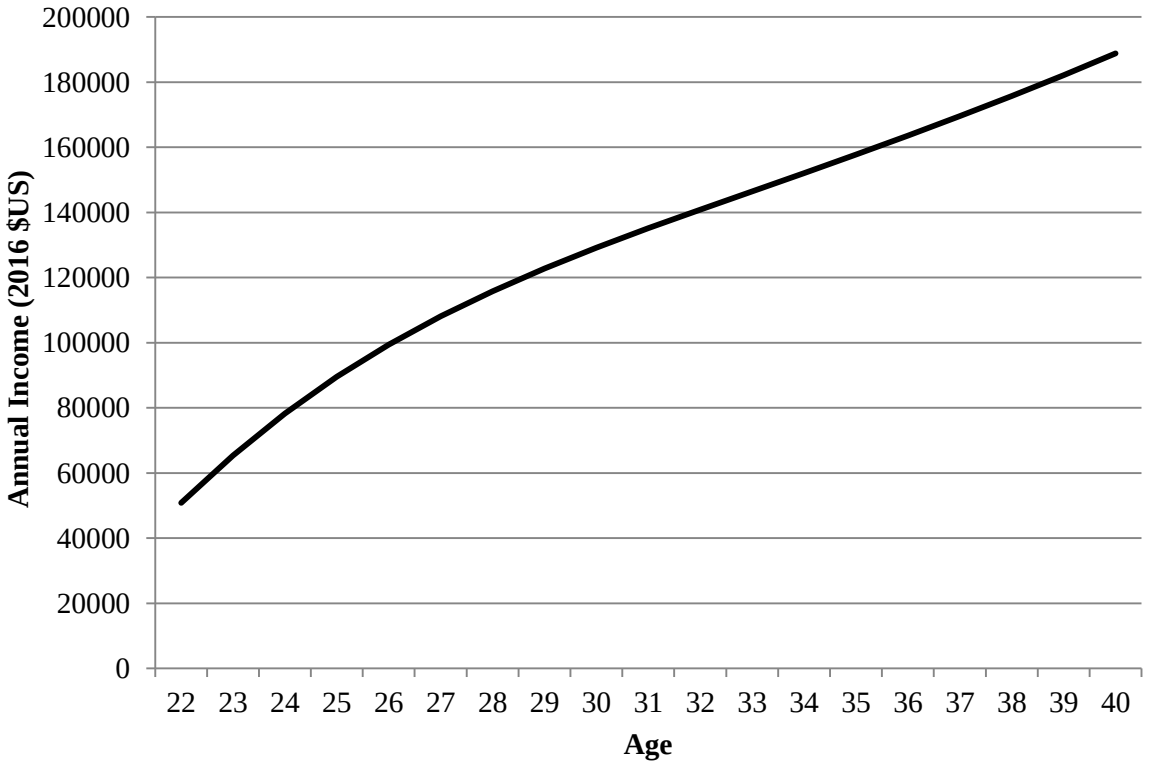
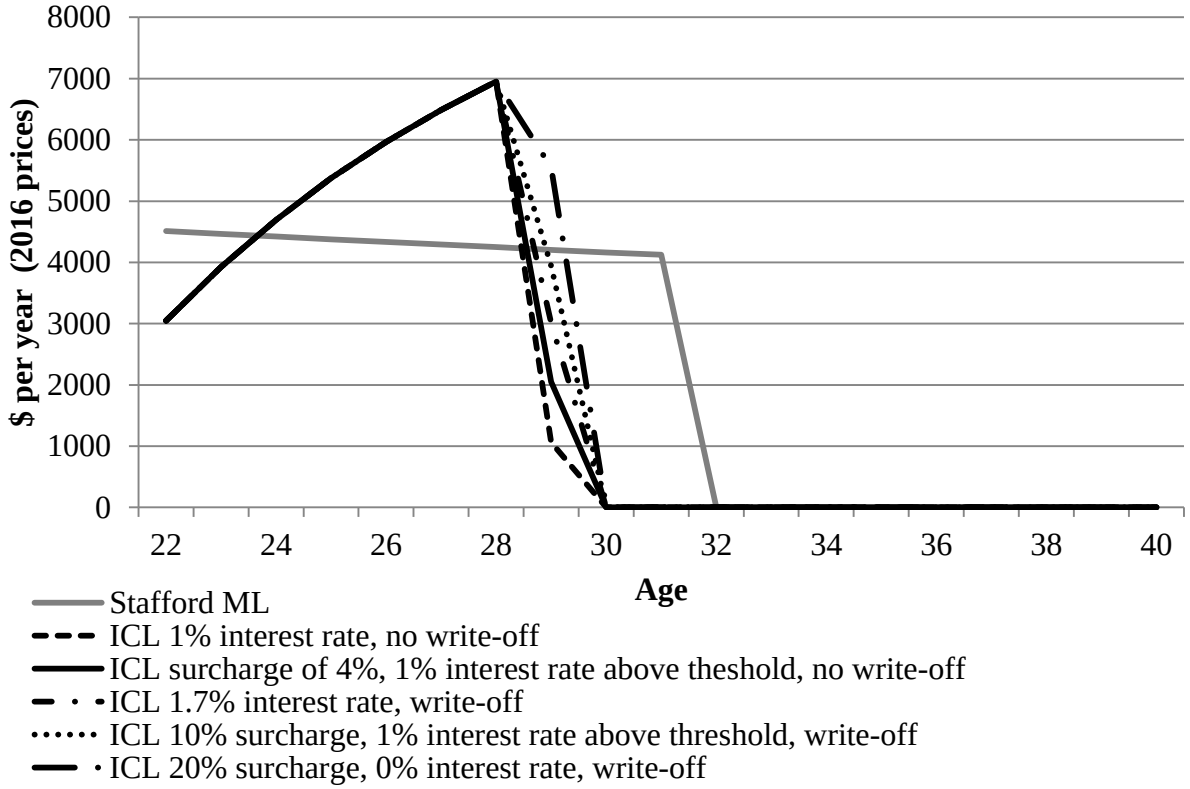


Figure 11 shows annual repayments under the various loan schemes. As was the case for our female BA graduate (and indeed all graduates), under the Stafford loan, our male graduate must pay around $4,100 to $4,500 per year (in 2016 $US) over the 10-year period after which there are no further repayments. With the ICL schemes, the repayment streams and levels are quite different and from two years after graduation are larger than the Stafford repayments which means the loan gets paid between two to three years faster. The high earning graduate pays most with the 20 per cent surcharge scheme and zero real interest rate (around 112 per cent of the loan value which is similar to the 114 per cent under the Stafford ML).

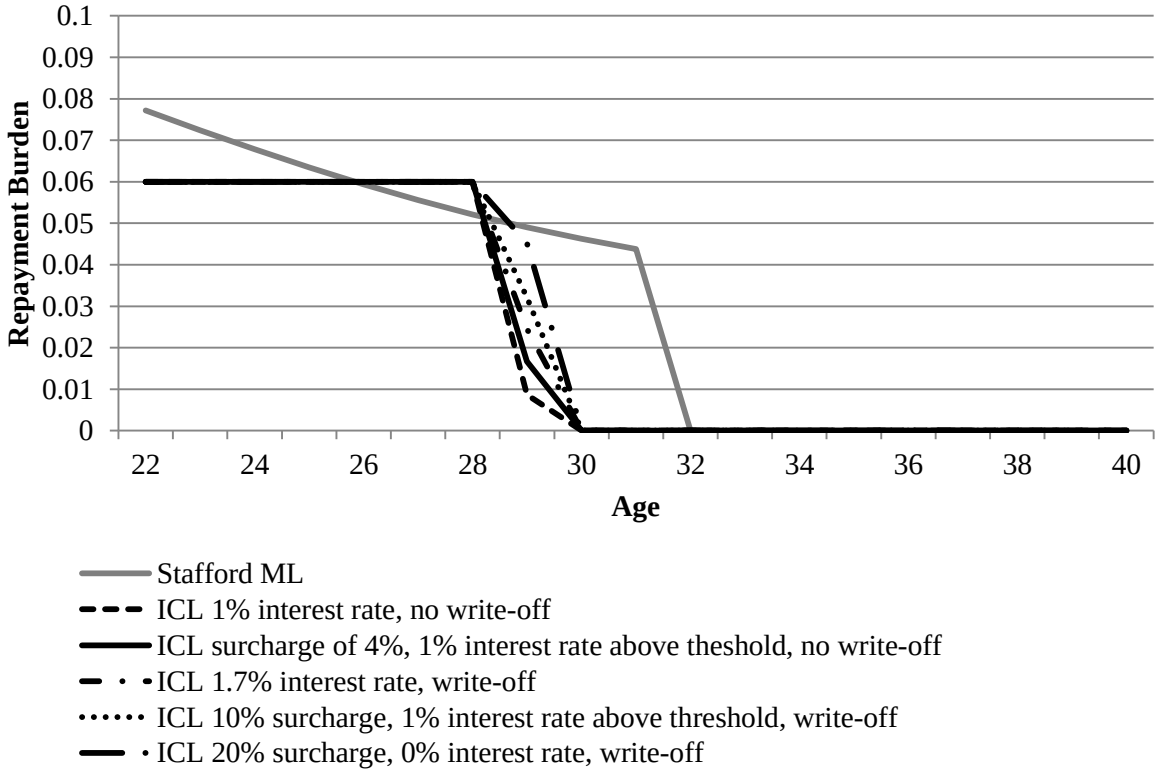
The loan takes slightly longer than the scheme under which this graduate pays the least (the 1 per cent real interest ICL with no write-off where he pays off 100 per cent of the loan value) which results in the quickest repayment of the debt. The ICL with a 13 per cent surcharge, 1 per cent real interest rate above the threshold and no write-off is almost identical to the 1.7 per cent real interest rate scheme with write-off for 90th centile men so is not shown. Once again, combining the data from Figures 10 and Figure 11 allows the calculation of the RBs for each of the loan systems. The results are shown in Figure 12.

Figure 11: Male BA Graduate 90th Centile of Earnings: Repayment Schedule ($ per year in 2016 prices)



From Figure 12, we see that even this high earning male graduate is protected from having a RB above 6 per cent under an ICL compared to a Stafford ML (where the RB is around 8 per cent in the first year after graduation). This high earning graduate pays 6 per cent of earnings every year until the loan is paid back. He pays back two to almost three years faster than under a Stafford ML depending on which ICL loan scheme is adopted.

Figure 12: Male BA Graduate 90th Centile of Earnings: Average Burden (Repayment/Income)



7. Conclusions

There are serious problems associated with the current design of US student loans, due largely to the difficulties many students face in repaying. After all, there are considerable risks associated with the process of acquiring a college degree, and substantial uncertainty related to the individual financial returns to higher education. Loan arrangements which don't take these uncertainties into account, such as the system in place in the US, have great potential for creating adversity for borrowers.

This paper draws lessons from Australia and England to suggest how this problem can be solved. The problem arises because with a conventional loan, with fixed monthly repayments, the duration of the loan and monthly repayments do not respond to changes in income, so that the ability to pay depends crucially on having sufficient income to make these loans affordable.

In this paper we have explained the conceptual issues underpinning an ICL and shown empirically how a well-designed loan can protect low-earning graduates from defaulting or experiencing financial distress, while simultaneously ensuring that taxpayer subsidies are kept low. This contrasts with the current situation in the US where the default rates on government backed student loans are at an all time high, mainly because of the very large

Repayment Burdens (RBs) of Stafford type loans for low income and even moderately low-earning BA graduates, particularly early in their career. Concerns about RB do not arise in countries with ICLs because the inherent design of these systems imposes an upper bound on RBs and hence avoids repayment problems. ICLs ensure consumption smoothing and provide insurance against the adverse exigencies that can lead to default.

Using current data, we show that a well-designed ICL system with the characteristics summarised in Box 1 can overcome virtually all these problems in a simple, efficient, equitable and cost effective way.

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