Student Loan Design for Higher Education Financing: Conceptual Issues and Empirical Evidence

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Abstract

Over the last several decades there has been, and there is on-going, a quiet transformation internationally in the form and structure of higher education student loans. The movement has been away from the traditional system of government intervention of guaranteed bank loans and towards income contingent student loans. With the latter approach students' debts are repaid if and only when their income exceeds a certain threshold, there is a maximum percentage of income that can be recovered in a given time period, and repayments are typically collected through the income tax system (internal revenue service). The first country to adopt a national scheme of this type was Australia, in 1989, but since then about 8 other countries have done the same. The paper examines the conceptual bases for these on-going higher education policy reforms and reports theory and data related to the main disadvantage of non-income contingent loan systems, that of excessive repayment burdens for debtors which lead to repayment hardships and/or default.

Key words: Income contingent loans; government-guaranteed bank loans; consumption smoothing; default insurance; repayment burdens.

JEL Classification: J22, J24, J28.

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1 Introduction and Background

In 1989 a higher education policy initiative took place in Australia which can be seen to be a first step to international reform in the nature of higher education student loans. The scheme, then known as the Higher Education Contribution Scheme (HECS), involved domestic students being charged tuition but with the obligation to pay being deferred until debtors earned above a given income threshold, which is (now) set at a maximum of between 4 and 8 per cent of annual personal income. A critical aspect of this reform was that the debt would be collected by employers and remitted to the Australian Tax Office (internal revenue service (IRS)) in much the same way that personal income taxes are.

Twenty-six years later HECS (now known as HECS-HELP), which can be accurately categorised as an income contingent loan (ICL), now exists in different forms in more than a handful of countries, although scheme design, eligibility, interest rates, and debt forgiveness regimes differ widely between systems, and have changed over time in most jurisdictions. Critically, however, the essential characteristics of the loans, income contingency and collection through auspices of the equivalent of each country’s IRS, are shared.

ICLs typically take forms that are similar to the scheme initiated in Australia. Debts to cover tuition costs (and in some cases income support) are recorded while a person is studying, and the relevant income tax authority is informed of the individuals’ future repayment obligation. When the debtor, most often as a graduate, is employed and receiving an income which is above a given threshold, that person’s employer takes a percentage of income and remits it to the tax authority. For example, the first threshold of repayment in Australia is currently about $(A) 54,000 per annum and at that point the debtor repays four per cent of income or around $(A) 2,200. A typical tuition debt in Australia is about 45-50 per cent of the recurrent cost of higher education, although in other countries the obligation can be quite different (for example, in England it is close to 100 per cent of recurrent costs).

Countries other than Australia that have adopted (or soon will) adopt ICL, and the year in which the arrangement first began, are as follows: New Zealand (1991), South Africa (1991), England and Wales (1998), Hungary (2001), Thailand (for 2006 only), South Korea (2009), the Netherlands (revised for 2016) and Malaysia (apparently planned for 2016). A Bill was put to the US Congress in 2013 which could have meant the adoption in that country of an ICL as default option in an array of student loan choices. While the Bill did not pass it is widely regarded in the US that the reform impetus towards ICL remains.

It is argued in this paper that the economic, administrative and equity case for ICL are very strong, although there are caveats with respect to both design and administration. The paper considers: the need for government intervention in higher education financing in the form of loans (Section 2); the limitations of what has been the most common form of intervention, government guaranteed bank loans (GGBL), in terms of what are known as repayment burdens (Section 3); an explanation and reporting of an approach to economic theory that formalises the main issues related to concerns with the use of GGBLs (Section 4),
specifically with respect to the decision for borrowers to default; and an analysis of the advantages and difficulties associated with ICL (Section 5).

2 Higher Education Financing: Why do we need student loans?

A significant financing issue for higher education is that there is generally seen to be a case for both a contribution from students and a taxpayer subsidy (Barr, 2001; Chapman, 2006). The agreement on the appropriateness of so-called cost sharing comes from two related features of higher education, the high private rates of return and the existence of externalities; in combination these justify part-payments from both parties (Chapman and Lounkaew, 2015). An important question is: is there a role for government beyond the provision of the subsidy?

An understanding of the issue is facilitated through consideration of what would happen if there were no higher education financing assistance involving the public sector. That is, a government, convinced that there should be a subsidy, could simply provide the appropriate level of taxpayer support to higher education institutions, and then leave market mechanisms to take their course. Presumably this would result in institutions charging students up-front on enrolment for the service.

However, there are major problems with this arrangement, traceable in most instances to the potent presence of risk and uncertainty. The essential point is that educational investments are risky, with the main areas of uncertainty being as follows (Barr, 2001; Palacios, 2004; Chapman, Higgins and Stiglitz, 2014):

(i) Enrolling students do not know fully their capacities for (and perhaps even true interest in) the higher education discipline of their choice. This means in an extreme they cannot be sure that they will graduate with, in Australia for example, around 25 per cent of students ending up without a qualification;

(ii) Even given that university completion is expected, students will not be aware of their likely relative success in the area of study. This will depend not just on their own abilities, but also on the skills of others competing for jobs in the area;

(iii) There is uncertainty concerning the future value of the investment. For example, the labor market - including the labor market for graduates in specific skill areas - is undergoing constant change. What looked like a good investment at the time it began might turn out to be a poor choice when the process is finished; and

(iv) Many prospective students, particularly those from disadvantaged backgrounds, may not have much information concerning graduate incomes, due in part to a lack of contact with graduates.
These uncertainties are associated with important risks for both borrowers and lenders. The important point is that if the future incomes of students turn out to be lower than expected, the individual is unable to sell part of the investment to re-finance a different educational path. For a prospective lender, a bank, the risk is compounded by the reality that in the event of a student borrower defaulting on the loan obligation, there is no available collateral to be sold, a fact traceable in part to the illegality of slavery. And even if it was possible for a third party to own and sell human capital, the future value of this investment might turn out to be quite low taking into account the above-noted uncertainties.

It follows that, left to itself - and even with subsidies from the government to cover the presumed value of externalities - the market will not deliver propitious higher education outcomes. Prospective students judged to be relatively risky, and/or those without loan repayment guarantors, will not be able to access the financial resources required for both the payment of tuition and to cover income support.

These capital market failures were first recognised by Friedman (1955) who suggested as a possible solution the use of a graduate tax or, more generally, the adoption of approaches to the financing of higher education involving graduates using their human capital as equity. The notion of “human capital contracts” developed from there and is best explained and analysed in Palacios (2004). A critical point for policy is that, without some form of intervention, higher education financing will not deliver the most propitious outcomes in aggregate, nor can such markets left alone deliver equality of educational opportunity because those without collateral – the poor – will be unable to participate.

Consequently, in almost all countries governments intervene in the financing of higher education. There are currently two major forms that this intervention takes: GGBL (including financing directly from the government “bank”) and ICL. In concept there are several varieties of the latter (which are examined in detail in Chapman, 2006), with the only type currently in existence being what is known as a “risk-sharing ICL”, in which governments in effect pay the debts for former students whose lifetime incomes turn out to be insufficient to repay in full. What now follows examines some critical empirical findings with respect to both forms of assistance.

3 Higher Education Financing: Government Guaranteed Bank Loans

3 (i) Background

A possible solution to the capital market problem described above is used in many countries, such as the US, Canada and Japan. It involves higher education institutions charging up-front fees but with government-assisted bank loans for both tuition and income support being made available to students on the basis of means testing of family incomes. Public sector support usually (for example, in Canada) takes two forms: the payment of interest on the debt before a student graduates; and the guarantee of repayment of the debt to the bank in the event of default. Arrangements such as these are designed to facilitate the involvement of commercial
lenders, and the fact that they are internationally a common form of government financial assistance would seem to validate their use.

3 (ii) **GGBL: Solving market failure for lenders**

This form of assistance seems to address the capital market failure problem for lenders, since with this approach banks do not need borrowers to have collateral because the public sector assumes the risks and costs of default. That is, GGBL address the higher education financing problem for lenders, essentially because the guarantee removes the bank’s needs for collateral in the event of default. However, solving the problem of the provision of finance from the perspective of the banks is not the end of the story.

GGBL raise two problems for borrowers, the students. They are that loans requiring repayment on the basis of time, rather than capacity to pay, are associated with both default-risk and the prospect of future financial hardships related to repayment difficulties. These critical issues are now examined.

3 (iii) **GGBL: Default risks for governments and students**

All forms of bank loans have repayment obligations which are fixed with respect to time and are thus not sensitive to an individual’s future financial circumstances. This raises the prospect of default for some prospective borrowers, a prospect which means damage to a borrower’s credit reputation and can thus restrict eligibility for other loans, such as for a home mortgage (Barr 2001; Chapman 1997). Thus, in anticipation of potential credit reputation loss, some prospective students may prefer not to take the default risk of borrowing because of the high potential costs. The possible importance of this form of ‘loss aversion’ is given theoretical context in Vossensteyn and de Jong (2004).

There is a distributional issue here, related to the evidence concerning which students actually default. Dynarski (1994) used the National Post-secondary Student Aid Study for the US and found strong evidence that experiencing low earnings after leaving formal education is a strong determinant of default. Importantly, borrowers from low-income households, and minorities, were more likely to default, as were those who did not complete their studies. An important issue from these findings is that some poor prospective students might be averse to borrowing from banks because of the risk of default.

Even so, it would be an exaggeration to suggest that students with bank loans have no alternative other than default in unanticipated circumstances in which they are unable to meet their repayment obligations. In the US, for example, borrowers have the potential to defer loan repayments if they are able to demonstrate that their financial situation is unduly difficult, and in some rare cases this might lead to loan forgiveness. But there would generally be no expectation that a bank loan repayment takes into account capacity to repay.
To illustrate the point, the remaining part of this subsection offers empirical evidence of default rates in the U.S., Canada, Thailand and Malaysia. It should be noted that there are several ways of measuring loan defaults, and for reasons of comparability we are focussing on just one, the cohort default rate, which is given by the percentage of loan borrowers who enter the loan payment during a fiscal year (October 1 to September 30 of the following year in the US) and default before the end of the subsequent fiscal year.

Table 1 reports GGBL default rates from the U.S., Canadian, Thai and Malaysia student loan systems. It should be noted that the U.S. and Canadian data are based on three-year cohort default rates, 2010 for the U.S. and 2011 for Canada. Student loans agencies in Thailand and Malaysia do not explain fully the methodology used in their calculations of default rate. Based on the analysis of official documents of these two institutions, the numbers reported in the table are either the cohort default rate or percentage of borrower who default on the loans compared to total number of borrowers.

<table>
<thead>
<tr>
<th>Country</th>
<th>Cohort Default rate (per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>14.7</td>
</tr>
<tr>
<td>Canada</td>
<td>13.0</td>
</tr>
<tr>
<td>Thailand</td>
<td>53.0</td>
</tr>
<tr>
<td>Malaysia</td>
<td>49.0</td>
</tr>
</tbody>
</table>


These data suggest that default rates are around 15 per cent for the US and Canada to about 50 per cent in Thailand and Malaysia. There is little doubt that defaults are the major costs to governments in countries with relatively low graduate incomes and less than fully functioning administrative systems. And it is these costs to governments that explains why GGBLs are rationed and typically are available to only around half of the prospective student population.

3 (iv) **GGBL: Repayment hardships for debtors**

A related, and arguably the biggest, problem for students with GGBL concerns possible consumption difficulties associated with fixed repayments. If the expected path of future incomes is variable, a fixed level of a debt payment increases the variance of disposable (after debt repayment) incomes. The essential issue comes down to what are known as “repayment

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1 Rationing has the additional consequence for access of prospective students who are ineligible for loan assistance because their family incomes are too high but who are unable to secure financial assistance from within their household.
burdens” (RB), the proportions of graduate incomes per period that need to be allocated to repay mortgage-type student loans. Formally:

\[
\text{Repayment burden in period } t = \frac{\text{Loan repayment in period } t}{\text{Income in period } t}
\]  

(1)

RBs are the critical issue associated with mortgage-type student loans because for a given level of income the higher is the proportion of a graduate’s income that needs to be allocated to the repayment of a loan the lower will be disposable income. And lower student debtor disposable incomes have the two mortgage-type loan problems: higher default probabilities and repayment hardship. The point is critical in the policy choice context, because the essential difference between GGBL and ICL is that the latter have RBs set at a maximum by law (in Australia, England and New Zealand, for example, these maxima are 8, 10 and 9 per cent); by contrast, RBs for GGBL are unique for each individual borrower and can in theory be close to zero for high income debtors and well over 100 per cent for very low income debtors.

There is by now considerable empirical analysis of RBs associated with GGBL in many different countries including with respect to Vietnam, Thailand, Indonesia, Germany and the US. An important and innovative aspect of this empirical work is that in all cases the calculation or simulation of RBs for graduates is done at different parts of the graduate earnings distribution using an unconditional quantile regression approach (UQR).

The unconditional quantile approach allows the impact of student loan repayment obligations to be revealed for the whole of the graduate income distribution by age and sex, a major improvement over previous analysis which focussed on RBs at the means of the graduate income distributions. The results, summarised in Chapman (2016), reveal that in all countries examined, RBs for the lowest parts (the bottom 25 per cent) of the income distribution for graduates by age are extremely high (typically around 70 per cent or more) and without doubt would be accompanied by considerable repayment hardships and/or high default probabilities for all relatively low income graduates.

These issues can be illustrated more formally with the presentation of a basic theoretical model which is examined in Section 4.

4 Towards a Formal Model of the Consequences of GGBL

This section develops a formal model to illustrate how a GGBL can induce a borrower to rationally default on a loan; such a decision is based on the fact that repayment obligations are similar in concept to a mortgage loan offered by a commercial bank. The basic issue for the borrower is that defaulting on the loan is a rational choice when the financial costs of repayment outweigh the costs of default. While there has been important theoretical work comparing GGBL with ICL, the contribution here is the extension of modelling to
incorporate the default decision and to explain why this analysis is able to highlight the main insurance benefits of an ICL.

The model developed in this section focuses on the post-university default decision. Several recent studies utilise a two-period model to analyse several characteristics of alternative student loan design (García-Peñalosa and Wälde, 2000; Quiggin, 2003; Del Rey and Racionero, 2010) and this approach involves the following set-up.

A graduate is assumed to live for two periods after graduation. The decision whether to repay the loan is made in the first period after the first period’s income is known. With a known income in the first period, the expected operator preceding the first period utility function can be removed. Let $W(.)$ denotes life-time welfare of a borrower which depends on three variables: consumption in the first period ($c_1$); consumption in the second period ($c_2$); and subjective discount rate ($\beta$). Thus the life-time welfare of a borrower can be expressed as follows:

$$W(c_1, c_2, \beta) = U(c_1) + \beta E[U(c_2)],$$

(2)

Empirical studies have found that it is common for a student loan scheme to have built-in subsidies (Ziderman, 2003; Shen and Ziderman, 2009; Chapman and Lounkaew, 2010). This takes the form of differences between loan interest rates for student borrowers being lower than is the government costs of borrowing.\footnote{By adding administrative cost and default the total unrecoverable part of the loan is called the hidden grant (Ziderman, 2003; Shen and Ziderman, 2009); it is also known as implicit subsidies (Chapman and Lounkaew, 2010; Chapman \textit{et al.}, 2010). Shen and Ziderman (2009) report the hidden grant to range between -8 to 88 per cent for 44 loan schemes operated in 39 countries.} For a GGBL this interest rate subsidy can be formalized as follows:

$$s(\gamma, r, t) = 1 - \frac{\sum_{l=1}^{L} \left( \frac{1}{1 + \gamma} \right)^{l} R_l(r, l, L)}{l},$$

(3)

where $s(\gamma, r, t)$ is the amount of subsidy inherent in the design of student loan repayment scheme which depends on several variables: $l$ is the total loan disbursed which covers tuition fee as well as living expenses; the government cost of borrowing is $\gamma \in [0, 1]$; $r$ is the real rate of interest charged on the loan; $L$ is the length of loan repayment; $R_l$ is the repayment required to service the loan at time $t$ which is a function of the real rate of interest, the total amount borrowed and the time required to repay the loan. In the two-period environment, with a fixed cost of borrowing to the government, the interest rate subsidy can be expressed only as a function of the real interest rate charged. Thus, by simplifying equation (3) to be
consistent with the two-period model employed in this section, the total amount of loan repaid can be expressed as follows:

\[
[1 - s(r)]l = \left(\frac{1 + r}{1 + \gamma}\right)l.
\]  

(4)

Equation (4) means that if the interest rate charged on the loan is less than the government cost of borrowing, then the actual amount of repayment is lower by the proportion \( s(r) \).

In order to model the default decision, let \( \eta \) denote the subsistence level of income. For graduates whose incomes are very low such that \( y_i < \eta \), they will default on student loans with a probability of 1. This condition also means that the trade-off between interest rate subsidies and repayment burdens comes from the behavioral response of graduates whose incomes are above the subsistence level; that is the income level such that \( y_i - \eta > 0 \). In other words, graduates will be able to repay the loan only if their incomes in the first period are enough to cover their subsistence level of consumption. The same argument applies to the second period.

It is possible for a graduate to borrow an amount of \( X = \phi y_i \) to finance period 1 consumption. This loan has to be repaid in period 2. The interest rate charged on the loan depends on whether the borrower has defaulted on the student loan. Let \( i \in [0,1] \) be the interest rate charged on the loan and \( \lambda \geq 0 \) be the additional cost charged on the loan if the borrower has defaulted on the student loan. The amount of repayment in period 2, \( X' \), is as follows:

\[
X' = \begin{cases} 
[1 + i]X, & \text{no default} \\
[1 + i + \lambda]X, & \text{with default}
\end{cases}
\]  

(5)

This set-up allows us to understand the impact of the default decision. There are several consequences following the default decision: loss of eligibility for forgiveness plans; lowered credit rating, legal actions and wage garnishment. Let \( \lambda \) represent the additional cost associated with default. If \( \lambda = 0 \), default does not carry any penalty. When \( \lambda = \infty \), default is strictly prohibited; this is called the natural-borrowing limit (Lawrence, 1995; Ljungqvist and Sargent, 2004; Arthreya, 2008)). Taking into account this loan repayment rule, the budget constraints for these two periods can be stated as follows:
**Period 1:** \( c_1 = y_1 - d^s \cdot [1 - s(r)]l + X - \eta = y_1 - d^s \cdot [1 - s(r)]l + \phi y_1 - \eta \), where \( d^s = 0 \) if the borrower chooses to default and 1 otherwise. That is the borrower can enjoy higher consumption in the first period by not repaying the loan.

**Period 2:** \( c_2 = y_2 - X' - \eta = y_2 - [1 + i + d^d \cdot \lambda] \phi y_1 - \eta \), where \( d^d = 0 \) if the borrower chooses to repay the loan and 1 otherwise. Thus, the amount that the borrower can consume in the second period depends on whether default takes place in the first period. With default in the first period, the borrower will be able to consume less than he would otherwise can had the loan repayment been made in the first period.

In the case of no default, putting these budget constraints into equation (2) yields the following:

\[
W^R(\tilde{y}_1, E(y_2), \beta, r, \phi) = u_1 \left[ y_1 - [1 - s(r)]l + \phi y_1 - \eta \right] + \beta E u_2 \left[ y_2 - (1 + i)\phi y_1 - \eta \right] .
\]  

Equation (6) expresses the maximization problem in relation to incomes, the amount borrowed to finance higher education and the level of interest rate subsidies (which follows from the interest rate charged on the loan). Applying a second-order Taylor approximation around the mean for the expected utility function in the second period, the life-time utility function can be approximated by:

\[
Eu_2(y_2 - (1 + i)\phi y_1 - \eta) = u \left[ E(y_2) - (1 + i)\phi y_1 - \eta \right] + \frac{1}{2} u^* \left[ E(y_2) - (1 + i)\phi y_1 - \eta \right] \sigma^2
\]

The above equation means that expected utility in the second period depends on second period income, the amount of loan repaid, subsistence level of income and variation of income in the second period. The income variation component have negative influence on expected utility. Holding other factors constant, the higher is the variation, the lower is the expected utility in the second period.

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3 The same technique has been employed by Padula and Pistaferri (2001), Hartrog and Serrano (2003), and Migali (2006).
Thus the welfare function if the borrower chooses to repay the loan can be approximated by:

\[ W^R(.) = u[y_1 - (1 - s(r))l + \phi y_1 - \eta] \]

\[ + \beta \left\{ u[E(y_2) - (1 + i)\phi y_1 - \eta] + \frac{1}{2} u^*[E(y_2) - (1 + i)\phi y_1 - \eta] \sigma^2 \right\} \]

(8)

If the borrower decides to default, total welfare is as follows:

\[ W^D(y_1, E(y_2), \beta, r, \lambda, \phi) = u[y_1 + \phi y_1 - \eta] + \beta E u_2[y_2 - (1 + i + \lambda)\phi y_1 - \eta] \]

(9)

With similar application of the second-order Taylor approximation, the total welfare in the case of default is approximated by:

\[ W^D(.) = u[y_1 + \phi y_1 - \eta] \]

\[ + \beta \left\{ u[E(y_2) - (1 + i + \lambda)\phi y_1 - \eta] + \frac{1}{2} u^*[E(y_2) - (1 + i + \lambda)\phi y_1 - \eta] \sigma^2 \right\} \]

(10)

Equations (8) and (10) derived above form the foundations of the conceptual analysis in the rest of this section. What constitutes the differences in the two equations are loss of consumption in the first period as shown in equation and the cost of default in the second period as shown in the equation.

There are two important points that can be derived from these equations. First, a borrower will default if \( W^D(.) > W^R(.) \); that is default will occur when the loss of welfare resulting from default penalty is less than the loss of welfare due to having low income after repaying the loan. In addition, the welfare functions developed above can be used to illustrate the conditions under which a borrower will default on a GGBL. While defaults can depend on the interactions of some or all variables in the utility function, empirical research has consistently confirmed that the most crucial aspect associated with default is income (Dynarski, 1994; Harrast, 2004; Baum and Schwartz, 2006; Gross et al., 2009). A direct consequence of having low income is that borrowers will have to devote higher proportion of their incomes to
service the loan. This will lower disposable incomes and thus affect borrowers in two ways: less consumption and changes in consumption patterns as borrowers adjust their consumption baskets to maintain the same level of welfare. If we assume that the decision to default is made rationally by weighing marginal costs against marginal benefits, then an individual with a concave utility function will be more likely to default as the amount of money required to service the loan relative to income increases. Holding the loan size constant, therefore, the poor are more likely to default on the loan.4

The relationship between income in period 1 and the life-time welfare, holding other factors constant, is shown in Figure 1. This curve intersects with the vertical axis at the point where income is at the subsistence level, that is $y_1 = \eta$. The intercept represents minimum welfare resulting from the borrower consuming at the subsistence level. The welfare curve $W(y_1, \cdot)$ is concave since the utility function is concave in income. The remaining arguments in the welfare function will alter either intercept or slope or both configurations of the welfare curve.

![Figure 1: The Welfare Curve](image)

While higher income increases welfare, it does so in declining fashion. An additional dollar received when income is low increases welfare more than a dollar added when income is already high. That is why the welfare curve is increasing at a declining manner. The welfare curve illustrated above can be adapted to illustrate the case of repayment and default. Such

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4 One may consider extending maximum repayment period as another viable option to deal with default caused by excessive repayment burdens. This option, however, does not solve the fundamental problem caused by the lack of insurance protection against periods of low incomes. It is possible for an unlucky borrower who experiences protracted period of unemployment and still have to repay some part the loan under the “extended” mortgage-type repayment; in this scenario repayment burden can greatly exceed 8 per cent. In addition, this arrangement requires additional administrative and documentation efforts, thereby increasing the operating cost of the scheme.
attempt can be facilitated by the information obtained from their respective first order conditions which simply is the slope of welfare curve. These are reported below.

Repay:  
\[
\frac{\partial W^R(.)}{\partial y_1} \approx u'_i \left[ y_i - (1 - s(r))l + \phi y_i - \eta \right] (1 + \phi) \\
- \beta u'_2 \left[ E(y_2) - (1 + i)\phi y_1 - \eta \right] (1 + \phi) > 0; \quad (11)
\]

Default:  
\[
\frac{\partial W^D(.)}{\partial y_1} \approx u'_i \left[ y_i + \phi y_i - \eta \right] (1 + \phi) \\
- \beta u'_2 \left[ E(y_2) - (1 + i + \lambda)\phi y_1 - \eta \right] (1 + \phi) > 0; \quad (12)
\]

In summary:

(i) While it is possible that the intercept of \( W^R(.) \) is higher than the intercept of \( W^D(.) \), we will focus only on a case where the intercept of \( W^R(.) \) is lower than \( W^D(.) \). In other words, we are illustrating the case where incomes after repaying the loan is insufficient to cover subsistence level of consumption.

(ii) Welfare increases with the first period income in both cases. The fact that net income from repaying the loan is lower than the net income after default during the loan repayment period implies that marginal utility in the first period of the former is higher than the latter; the same line of reasoning applied to the second period; that is, marginal disutility associated with commercial debt repayment in the case of student loan repayment being lower than marginal disutility associated with defaulting on the student loan. This implies the slope of \( W^R(.) \) is steeper than the slope of \( W^D(.) \). Put simply, if the borrower decides to repay, his/her income in the first period will be lower than if he/she decides to default; with lower income, an additional dollar gained will increase welfare faster. That is why the welfare curve for the case of repayment is steeper than the default welfare curve.

(iii) The information on their slopes, together with information on intercepts, entails that \( W^R(.) \) intersects with \( W^D(.) \) from below.

These relationships can be used to construct the shapes of the welfare functions for both default and repayment; they are portrayed in Figure 2.
Holding other factors constant, the borrower is indifferent between repaying and defaulting on the loan at the point where these two curves intersect. The level of income associated with this point is $y_1^*$. To the left of this income, defaulting on the loan yields higher utility than repaying it. This is because the amount of commercial loan obtainable is proportional to the first period income; low income means lower size of commercial loan borrowed, and therefore lower utility gained from it.

The opposite claim applies to the case in income level beyond $y_1^*$, of which loan repayment offers higher welfare than defaulting on it. This occurs to a borrower with sufficiently high first period income who also enjoyed a higher commercial loan size. If they chose to default, the utility cost resulting from having to pay a higher effective interest rate would have been high enough to make such a decision unattractive.

The model is able to formalise the default decision with respect to a GGBL, the situation in which repayments per period are fixed and thus repayment burdens fluctuate with incomes. It has been shown that a rational borrower will default on such a loan as long as the welfare cost of default is less than the welfare cost of repaying.

The result has a critical implication with respect to the design of student loans: to avoid default (and repayment hardship) repayment burdens have to be capped at a level manageable to the borrower. Conceptually, the benchmark for manageability is at the point where the level of the repayment burden is such as to make the borrower indifferent between default or repaying the loan, that is where $WR(.)$ crosses with $WD(.)$. This leads to a discussion of an alternative loan scheme in which design limits the repayment amount to a fixed proportion of income, which is the essence of ICL. This is now taken up.
5 Higher Education Financing: Income Contingent Loans

5 (i) Background

The essential benefit of ICL explained below is that, if properly designed, the arrangement avoids the problems outlined above with respect to government guaranteed bank loans. The critical point there can be no concerns with RBs with an ICL. Further, for many countries, the administrative costs of collection of ICL are very small. Some of the empirical consequences of the HECS system are summarised, and commentary is offered on key points related to administration and design.

5 (ii) ICL: Consumption smoothing

The essential difference between the two types of loans is that the income contingent variety serves to protect former students who earn only low incomes; capacity to pay is an explicit feature of the approach. That is, unlike bank loans, ICL schemes offer a form of ‘default insurance’, since with ICL debtors does not have to pay any charge unless their income exceeds the pre-determined level. And after the first income threshold of repayment is exceeded, ICL repayments are typically capped at a fixed and low proportion of the debtor's annual income. For example, in Australia, New Zealand and England/Wales, the maximum repayment proportion of annual income for their ICLs are 8, 9 and 10 per cent. Effectively this means that ICLs offer a form of consumption smoothing since there are no repayment obligations of the loan when incomes are low, and a greater proportion of income is remitted to repay the debt when incomes are high.

As noted above, these features of an ICL are very different to a mortgage-style loan, in which the costs of defaulting on the loan may be very high in terms of being denied access to other capital markets (most notably housing) through the damage to a borrower’s credit reputation. The removal of repayment hardships and the related advantage of default protection via income contingent repayment thus resolves the fundamental problems for prospective borrowers inherent in mortgage-style loans.

A significant further point is that the protections of an ICL could particularly matter for both default probabilities of borrowers and loan revenues for governments in times of recession. That is, if there are poor short-term employment prospects at the time of graduation, such as was the case for many countries in 2008-2013, can mean both high defaults and low loan repayments for systems with government guaranteed bank loans. The issue is avoided with an ICL.
5 (iii) **ICL: Transactional Efficiencies**

As emphasised by Stiglitz (2014), a key point is that ICL can be collected very inexpensively, a feature he has labelled "transactional efficiency". Some of the evidence is as follows. The Australian Tax Office estimates put the collection costs for the government at around $45 million (2015 dollars) annually, or less than 3 per cent of yearly receipts. To this figure Chapman (2006) adds an estimate of the compliance costs for universities and comes up with a total administration cost of less than 5 per cent of yearly receipts. In collection terms the system seems to have worked well and there are apparently significant transactional efficiencies in the use of the income tax system for the collection of debt. Estimates of the costs of collection of the England and Wales ICLs are very similar (Hackett, 2014).

The reason is that the collection mechanism simply builds on an existing and comprehensive personal income tax system, and is essentially a legal public sector monopoly. There is no reason that if legal jurisdiction was granted to the private sector to be able to know citizen's incomes this could be changed in the future, although it is difficult to imagine that a commercial entity could do this as cheaply as happens through the taxation authorities.

It should be acknowledged that, as with all loan schemes subsidised by governments, a system is required that minimises the potential for non-repayment from debtors going overseas. One (likely very ineffective) approach to this issue would be to involve the cooperation of other governments in the collection of the debt. However, as suggested by Chapman and Higgins (2013) and now instituted in New Zealand, a system could be designed that puts a legal obligation on a debtor going overseas to repay a minimum amount of their obligation each year in which they are away.

5 (iv) **ICL: Some Empirical Consequences Related to Access**

At the time of the implementation of HECS important areas of concern were raised with respect to the potential for the new tuition arrangement to exclude prospective students from disadvantaged backgrounds. The main area of investigation into the effects of HECS has been with respect to the consequences of the scheme for the access of relatively disadvantaged prospective students. There is by now considerable evidence on this issue with the main conclusions from the Australian research with respect to socio-economic mix and access being:

(i) The relatively disadvantaged in Australia were less likely to attend university even when there were no student fees. This provides further support for the view that a no-charge public university system (that is, financed by all taxpayers) is regressive;

(ii) The introduction of HECS was associated with aggregate increases in higher education enrolments; and
HECS has been associated with increases in the participation of prospective students from relatively poor families (although the percentage point increases were higher for less disadvantaged students, especially in the middle of the wealth distribution);

It is apparent than that there have been few consequences for the accessibility to higher education for students from relatively disadvantaged backgrounds, at least as represented by enrolments. Broadly speaking, the socio-economic make-up of the higher education student body was about the same 25 years after the introduction of the policy as in the late 1980s. This might have also happened with other financing approaches, of course.

5 (v) ICL as Higher Education Policy: A Significant Caveat and the Role of Design

In Australia and other countries in which an ICL has been introduced, this has turned out to be a relatively simple matter from an administrative point of view. The reasons for this are that the public administration systems of these countries feature a strong legal framework, a universal and transparent regime of income taxation and/or social security collection, and an efficient repayment mechanism. The last involves computerised record keeping of residents’ vital financial particulars and, very importantly, a universal system of unique identifiers (often accompanied by an identity card).

Under these circumstances it is not complicated to identify and track individual citizens and their incomes over time and space. It is not expensive, moreover, to tack onto some existing tax collection mechanism an additional function: the collection of payments from ex-students, on the basis of a fixed proportion of income. In the developing world, however, the preconditions to allow ICL are often lacking. A related issue is that even if administrative mechanisms are apparently in place, it is important that the system provides up-to-date knowledge of incomes since lags could mean inappropriate deductions from current incomes.

The difficulty in the administration of an ICL compared to a GGBL is that with the former there needs to be an efficient way of determining with accuracy, over time, the actual incomes of former students. Further, it would seem to be clear that a basic requirement for the introduction of an ICL is a strong legal framework and functional judicial system. Indeed, it is hard, from a developed-world perspective, to imagine implementing a workable scheme outside this context.

A final set of points needs to be made with respect to design issues. This is that ICLs around the world differ importantly with respect to some key collection parameters and other policy features. This implies that there is no one ideal system, with the following examples of differences being as follows.

One, approaches to interest rates vary widely, with the Hungarian system having close to no interest rate subsidies with, in contradistinction, the New Zealand arrangement with a zero
nominal rate of interest, implying very high interest rate subsidies. Two, the first income levels after which repayment is required and repayment rates are quite different, with most countries having collection being based on a marginal rate involving additional income, compared to the Australian system which collects a percentage of total income. Further, Australia does not have a period after which all debts are forgiven, which is not the case elsewhere (it is 25 years in England and Wales). In sum these policy differences mean that the amount of unpaid debt in countries such as England/Wales is likely to be considerably higher than is the case for Australia.

A final design issue relates to the need to minimise the potential for non-repayment from debtors going overseas. One (likely very ineffective) approach to this issue would be to involve the co-operation of other governments in the collection of the debt. However, as suggested by Chapman and Higgins (2013) and now instituted in New Zealand, a system could be designed that puts a legal obligation on a debtor going overseas to repay a minimum amount of their obligation each year in which they are away. The Australian government recently legislated an obligation for ICL debtors to submit payments in line with their incomes outside Australia, but it is too early to judge the success or otherwise of this new arrangement.

These administration and design issues are very important to the success or otherwise of an ICL system. Public sector subsidies need to be minimised to allow ICL to be fiscally sustainable and this issue is critically about the choice of ICL scheme design parameters.

6 Conclusions

This paper is motivated by the need to explain, and compare and contrast, different public policy approaches to higher education financing. The importance of government intervention in this area of economic policy has been explained, and the different student loan policy instruments available, GGBL and ICL, have been described and assessed in both conceptual and empirical terms. The most important issue in a comparison of the student loan alternatives relates to "repayment burdens" (RB), the proportion of a debtor's income that is needed to repay a loan.

The major contribution of the exercise is the presentation of economic model related to RB. This model examines the costs and benefits of borrowers choosing to default on their GGBL repayments and thus incurring the costs, which are essentially related to the loss of credit reputation and what this means for both access to and the costs of acquiring other future loans.

The model, and associated data and discussion related to RB, have a strong policy prescription. This is that, so long as an ICL can be designed to be administratively efficient, this is the most equitable and likely least cost policy approach for higher education financing. ICL are a superior student loan system to the more conventional mortgage-type loans policies.
essentially because the former offer insurance against hardship and thus default. It should not be a surprise that the international transformation of higher education financing has taken the clear directions apparent over the last 25 years towards ICL.

References


