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Income Contingent Loan with Personal Insurance Policy:

An empirical assessment using Spanish data[1]

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Abstract

We propose an Income Contingent Loan that defers the payment of university fees and charges a fixed proportion of gross income for 30 years or until the debt is written off. Under these conditions, some participants in the scheme will have insufficient income to fully repay their loan balances. The deficit will be covered by the taxpayer, who ultimately bears the risk of investing in higher education. We then propose to transfer this risk to the student by adding a mandatory personal insurance policy to the individual loan. We calculate the premium required for the system to break even in Spain when everybody pays the insurance cost. Alternatively, the payment of the premium can be deferred, adding it to total debt. Then, some participants in the scheme will have insufficient income to even pay the insurance cost, and the premium needs to be increased to maintain the sustainability of the program. Although these mechanisms imply redistribution towards borrowers who end up being low earners, we show that middle-income individuals contribute a higher proportion of their incomes to covering for those unable to repay. To provide the system with more internal progressivity, we propose to impose a minimum period of repayment.

Keywords: Student loans, Insurance, Repayment burdens, Higher education financing, Returns to Education, Government Policy

JEL classification: I22, I26, I28

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1. Introduction

Individuals with a higher education degree earn more and have lower unemployment rates, on average, than individuals without a higher education degree. Across OECD countries, the employment rate of tertiary-educated adults is around 85% in 2017, compared to 75.2% for adults with upper secondary education as their highest level of attainment. Concerning earnings, across OECD countries, individuals with a tertiary degree earn on average 55% more than those with upper secondary education in 2016.

Given these prospects, it seems natural to defend that graduates should contribute to financing the costs of providing higher education. But there are two sticking points. First, there is concern that fees may harm access to universities, excluding those individuals who are poor and unable to pay upfront. A solution is to defer the payment of university fees to after graduation when the returns to the investment start to pay. Student loans have been increasingly introduced around the world from 1990 (Chapman and Lounkaew, 2010) and they are currently used in Australia, Canada, New Zealand, the United Kingdom, Hungary, Japan, South Korea, the Netherlands, and the USA, among other countries (Chapman, 2014).

Second, although returns to higher education are substantial on average, they also present a considerable dispersion, as has been increasingly acknowledged (e.g., Figueiredo et al. 2013; Green and Zhu, 2010; Lindley and McIntosh, 2015; Lochner and Shin, 2014). In this sense, borrowers experiencing unemployment or low earnings face high proportion of income required for loan repayments, causing hardship and in many cases leading to default (Barr et al. 2017).

As a matter of fact, two procedures can easily reduce borrower risk: establishing a repayment threshold, and a repayment burden limit. The former implies no repayment obligation unless borrower income exceeds a certain amount. The latter introduces a maximum proportion of borrower income required for loan repayment. Income contingent loan schemes, like the ones currently in use in England, New Zealand or Australia incorporate these mechanisms, which act as insurance, especially for those students from poorer backgrounds who tend to be (a) less well-informed and (b) less able to absorb financial risk (Barr et al., 2017).[2] At the same time, the amounts unpaid by low earners need to be covered, implying higher costs for the government (or, ultimately, the taxpayer), which covers the losses to lenders. Indeed, the loan scheme will involve a tax cost when either the borrowers earn below the minimum income for repayment, or the proportion of income required to repay the loan exceeds the repayment burden limit. In other words, the risk of some graduates being low earners is borne by the taxpayer.[3]

Barr and Johnston (2010) and Dearden, Goodman, Kaplan and Wyness (2010) have explored different ways to reduce the tax cost of student loans in England. Increasing the repayment rate, lowering the repayment threshold and/or increasing the debt write-off period are shown to be more regressive ways of raising revenue. In contrast, increasing the interest rate while lowering the loan repayment rate, and/or making graduates pay for a further period of time after they have paid off the full balance of their loans are more progressive ways to attain sustainability.

[2] This contrasts with mortgage type loans that impose predetermined fixed monthly payments.

[3] Like other insurance mechanisms, income contingent loans can lead to adverse selection. The reason is that they can be more attractive to those who expect to be low earners, who will not pay back in full. To avoid this, in all the universal schemes (Australia, England, New Zealand), participation in the scheme is compulsory.

In this paper we explore an alternative mechanism to minimise the costs of the loan system for taxpayers. We propose to transfer the risk of being unable to pay back the loan to the student. We will then complement each student loan with a personal insurance policy against the contingency of being unable to repay the debt. Then, the objective of this paper is to propose a new instrument to finance higher education on these grounds: the scheme will combine the income contingent nature of traditional public loan systems with a personal insurance policy that eliminates the cost to taxpayers.

To do this, we construct income predictions for individuals holding a University degree for Spanish data. We use the 2011 Survey of Household Finances (Bank of Spain) and, following Dearden (2018), do conditional quantile regression analysis to estimate incomes at different percentiles of the income distribution. We define a basic scheme that includes the total amount borrowed, the repayments as a percentage of a person's current income (repayment rate), the level of income at which repayments start (repayment threshold), the interest rate, and the maximum number of years of repayment. We calculate the deficit implied by this basic scheme and propose to include a compulsory personal insurance policy that allows the recovery of the full amount lent. This is based on the risk-pooling Income Contingent Loan scheme in Del Rey and Racionero (2010).[4]

We compute the insurance premium to be paid by each student. Provided the payment of this premium is made compulsory for all individuals (it can be charged upfront or in monthly instalments for a predetermined number of years) this scheme will no longer yield additional costs to taxpayers. Alternatively, the insurance premium can be added to the amount borrowed. In this case, because the size of the debt is larger, the

[4] The literature also refers to this kind of schemes as graduate taxes (e.g. García-Peñalosa and Wälde, 2000).

percentage of repayment falls at the lower end of the distribution. Consequently, we adjust the premium to guarantee that the system is self-sustaining, i.e. it yields no losses.

Both insurance policies clearly imply redistribution towards low earners and avoid taxpayers' extra costs. However, we show that middle-income individuals contribute proportionally the most to covering for defaulters. Increasing the repayment rate changes nothing in this respect, only speeding up the time required for total repayment at the higher end of the distribution. Accordingly, to increase the internal progressivity of the scheme, we propose to impose a minimum period of repayment beyond that required to pay the debt at the highest percentiles.[5]

Our work is also related to Chapman and Liu (2013), Chapman and Lounkaew (2010, 2015) and Chapman and Sinning (2012) who have studied repayment burdens and proposed student loan reforms for Vietnam, USA, Thailand, and Germany, respectively. Also, Callado-Muñoz, Del Rey, and Utrero-González (2017) that evaluated the program *Préstamos Renta Universidad* that provided loans to Master's students in Spain between 2007 and 2010, and Cabrales et al. (2018) that analysed the introduction of a public loan system for Bachelor students in Spain. To our knowledge, this is, however, the first paper to propose the cross-subsidization of participants in higher education by means of a mandatory personal insurance policy.[6]

The rest of the paper is organized as follows. Section 2 presents de data and estimated income profiles. Section 3 introduces a basic uninsured scheme. Section 4 presents an insurance policy and shows that the system continues to yield a deficit because some individuals at the lowest tail of the distribution do not even pay the premium. Then, in

[5] Note that early repayment cannot be allowed in this case.
[6] Other papers, like Azmat and Simion (2017), focus on the effects of financing reforms on educational attainment and labour market outcomes.

Section 5 we calculate the increased premium required for the system to break even. Section 6 presents an alternative scheme that achieves progressivity by introducing a minimum period of forced repayment. Section 7 concludes.

2. Data and estimated income profiles

We use the Survey of Household Finances (SHF), conducted every three years since 2002 by the Bank of Spain. We use the 2011 data. The survey collects data on wealth, income, debt, consumption and demographic characteristics from a representative sample of Spanish households. More information about the SHF2011 can be found in Bover, Coronado, and Velilla (2014).

The total number of households interviewed was 6,106. The survey allows having information on the level of education attained, the field of study and labour market experience of each member of the household. Therefore, we consider that SHF is an adequate database for the purpose of the paper since it allows identifying graduates and their field of study. There were 3,202 people with a university degree in SHF2011. We exclude people who were either in education or retired. After exclusion, we have a sample of 2,335 university bachelor degree holders: 55.67% employees, 21.65% were self-employed, 10.74% unemployed and 10.90% inactive. Table 1 shows some descriptive statistics.

[Insert Table 1]

To estimate the age-income profile of workers holding a University degree, we follow Dearden (2018). To compute the annual income, we use the self-reported monthly gross income times 12. Labour market experience is defined as the number of years after graduation, which typically takes place at age 22. Hence, labour market experience equals age minus 22. We estimate the following earnings equation:

$$y = \alpha + \beta_1 \, exp + \beta_2 \, exp^2 + \beta_3 \, exp^3 + \beta_4 \, exp^4 + \beta_5 \, exp^5 + \varepsilon \qquad (1)$$

where *y* is annual gross income, and a quintic polynomial in *exp*, where *exp* stands for labour market experience in years. As inactive and zero earnings and income are included in the estimation, a high order polynomial is necessary to capture earnings and income at the bottom of the ditribution (Dearden (2018)).

To estimate this equation we use conditional quantile regression. In this we also follow Dearden (2018), who argues that, when analysing the repayment of student loans, we need to account for how earnings change conditional on experience.[7]

[Insert Table 2]

Figure 1 displays predicted income paths along the 30 years following graduation at percentiles 15, 30, 45, 60, 75, 90 and 95 of the income distribution. It is important to note that these are not indidual income predictions, as individuals who are on, say, percentile 30 two years after graduation need not, and generally will not, be the individuals on percentile 30 ten years after graduation. The fact that individuals move across the earnings distribution all the time can have significant consequences for estimates of individual lifetime repayment. Global repayment, however, is unafected by these movements as long as the distribution of income remains constant over time. We therefore assume that the income distribution remains constant, while allowing mobility of individuals across percentiles.[8]

[Insert Figure 1]

[7] Chapman and Lounkaew (2015) argue in contrast that unconditional quantile regression analysis is more adequate in this case. We have used both methodologies and results do not change much. They are available upon request.

[8] It is common to assume that the distribution of income is constant (e.g. Chapman and Lounkaew (2015)). Our interpretation of this assumption is less stringent than assuming zero earnings mobility across percentiles.

3. The basic scheme

When introducing an income contingent loan system, there are critical features that can lead to very different results for both the borrowers and the taxpayers; actually, there is remarkable diversity in student loan systems throughout the world (NASFAA, 2014). Although there is a wide range of variation in University fees in Spain, according to field of study and also across regions, for simplicity we set an annual tuition rate to be financed. According to European Commission, the average fee in Spain is 1,110 Euros per academic year in 2014-15.[9] To simplify, we assume that each student is provided with 1,500 euros per year to pay fees, i.e., 6,000 Euros to cover the fees of the degree (5,860 in present value). The loan bears an interest rate equal to the cost of funds to the government.[10] The baseline repayment burden is fixed at a flat 4% of gross income for annual incomes above 12,000 (0% otherwise). The debt is written off after 30 years and participation is assumed to be compulsory.

Table 3 displays the number of years till repayment of the principal plus interests (Basic scheme) on each percentile of the income distribution. To provide a better picture of the whole distribution, we estimated equation (1) for each 5% and calculated the corresponding predicted earnings. Applying the repayment rate of 4% to gross incomes above 12,000 Euros does not allow to recover the full amount even in 30 years at the lowest percentiles. This implies a deficit of 20.98 % of the amount lent. We refer to this deficit as the tax cost of the scheme. Incomes in the 95th percentile only require eight years to repay the full amount.

In the next section we show that introducing a personal insurance policy against the

[9] European Commission, EACEA, Eurydice (2014). National Student Fee and Support Systems in European Higher Education: 2014/15: Eurydice: Facts and Figures

[10] Calculations are made for the average 10-year interest rate on government funds for the last three years: 1.6%.

prospect of being unable to repay the loan can make the system self-sustaining.

[Insert Table 3]

4. Income contingent loan plus personal insurance policy

Although the investment in higher education is profitable on average, we have seen that some earnings are very low. An income contingent student loan that does not account for this fact necessarily yields losses. In the basic scheme proposed in the previous section, those losses are ultimately borne by the taxpayer. It is possible to transfer the risk borne by the taxpayer to the student by forcing the subscription of an insurance policy. Because non-repayment does not impose the non-payer with the costs usually attached to default, borrowers will not be interested in subscribing this policy on a voluntary basis. Participation in the insurance scheme should then be *compulsory*. This is not rare. To avoid the adverse selection implied by the protection of low earners, in all universal ICL systems, participation is compulsory (see footnote 3).

We then propose to complement the income contingent loan with a risk pooling insurance policy to all students. If the insurance cost is paid for sure by all students, the tax cost of the student loan can be brought to zero.

We start by detailing the formulas that will allow the calculation of the insurance premium in general. Let L_i stand for the loss attached to individual i due to non-repayment:

$$L_i = \Pr incipal - \sum_{t=1}^{30} \frac{Payment_{it}}{(1+r)^t}$$

where *Principal* is the total amount student loan debt and $Payment = 0.04*(y_{it})$ if y_{it} >12,000 and zero otherwise. We divide the income distribution in 5% brackets so that

i=1,...,20; t is the time period *t=1,2,..,30*. A risk pooling insurance premium can be calculated as

$$\pi = \sum_i pL_i$$

where *p=0.05* is the proportion of individuals to whom that loss can be attributed. In our example, the resulting amount is 1,229 Euros. This amount can be collected upfront at the beginning of each academic year. Then, students would pay 314,66 Euro each year upon enrolment instead of the 1,500 Euro enrolment fee.

However, we may want to eliminate upfront payments altogether. One way to do this is to postpone the compulsory payments of the insurance premium to after graduation (in our example, the 1,229 Euros insurance premium amounted to 4.58 Euros a month when apportioned along the 30 years following graduation). Alternatively, the insurance premium can be added to the debt. In this case, the tax cost will not be brought to zero with the aforementioned premium.

Table 4, Insured scheme, shows the number of years till repayment of the principal and interest plus the insurance premium at different points of the income distribution. At the top percentiles, because the total amount due is now larger, total repayment involves more years of payment. As gross incomes below 12,000 do not contribute anything, not even the premium, this insured scheme continues to yield losses, albeit lower. In particular the tax cost amounted in this case to 5.94% (see Table 4).

[Insert Table 4]

5. Income contingent loan with increased personal insurance policy

The insurance premium required for the scheme to be self-sustaining when it is added to the debt should satisfy

$$\sum_{i=1}^{i=20} \text{Principal} + \pi^{*} - \sum_{t=1}^{30} \frac{Payment_{it}}{(1+r)^{t}} = 0$$

In our example, accounting for the fact that no payment is due for incomes below 12,000 Euros increases insurance premium to 1,734 Euro. Table 5, Over-Insured Scheme, displays the number of years till repayment of the principal and interest plus the augmented insurance premium at different points of the income distribution. Note that, in this case, the first incomes that are able to repay the amount in full are at percentile 35.

[Insert Table 5]

Since each individual is due to repay a student loan and an insurance policy that covers her non-repayment in case of insufficient income, we cannot speak of income redistribution ex-ante. However, as with any other type of insurance, those who never incur the loss end up subsidizing those who do. Given that the distribution of earnings differs across fields of study, we next study the aggregate ex-post redistribution across fields of study resulting from the proposed self-sustaining scheme. Since the distribution of earnings also differs acorss genders, we then do the same exercise for men and women.

[Insert Table 6]

Table 6 first presents the tax cost of the basic scheme, the insured scheme and the over-insured scheme resulting in the following fields of study: *Engineering and Technology, Health, Experimental Sciences, Social Sciences and Law* and *Humanities*. The label *Other fields of study* included graduates from 2-3 year degrees and those who do not answer or do not know. Negative amounts indicate a net contribution to the scheme. For that, we estimated earnings equation (1) and predicted income profiles by field of study. We then applied each scheme and obtained the

corresponding tax cost. To ease the interpretation and comparison with total tax cost we adjusted them by population. All fields of study yielded a tax cost under the Basic Scheme. The cost is reduced when the insurance policy is added to the loan and two fields of study, *Health* and *Experimental Sciences,* become net contributors. The Over-insured scheme reduces the tax cost to zero and changes the distribution of the burden of non-repayment. The field *Health*, is the highest contributor to the system both with the Insured and the Self-sustaining (Over-insured) scheme.

To see the reason why the distribution of the burden of default changes when we change the scheme, observe that two things happen when we add the insurance policy to the loan size. First, less people are able to pay the full debt. Second, those who can effectively pay, repay a greater proportion of the total debt. In fact, all fields end up contributing more under both the insured and the over-insured scheme. But the number of additional individuals who become non-repayers within each field varies as we increase the debt, and this changes the net contribution of each field to the program.

Table 6 also presents the tax cost of the basic scheme, the insured scheme and the over-insured scheme for men and women separately. Both men and women impose a tax cost under the basic scheme, although this is lower for men. Since men's earnings are higher on average, they contribute relatively more when we increase the size of the loan. With the insured scheme, the tax cost attributable to women decreases, and men become net contributors. Finally, with the income contingent loan with increased pesonal insurance policy, the deficit attributable to women is compensated by the superavit on men's payments. Table A1 in the Appendix shows some descriptive statistics of the distribution of total repayment capacity by field of study and gender that illustrate these differences.

6. Adding further progressivity

The over-insured loan scheme proposed implies a limited level of redistribution: lowest incomes do not even pay the insurance premium, and higher repayments by graduates with higher earnings recover this loss. However, all those who repay the amount in full repay an equal total amount: the principal plus interest plus the over-insured premium. The burden of over-insurance, measured in proportion to gross income, is, therefore, more significant on middle incomes. The program could be designed to imply more ex-post redistribution across earnings, i.e., to be internally more progressive.[11]

It is important to note, however, that increasing the repayment rate does not increase the progressivity of the scheme when the repayment obligation ends upon repayment of the debt. Under these conditions, increasing the repayment rate changes only the length of the repayment period (reducing it), not the total amount to be repaid, that is always the same for sufficiently high earners (the student loan plus the insurance policy). Imposing, instead, that graduates repay the stipulated percentage of gross income for a minimum number of years increases the total amount repaid at the highest percentiles, and allows to redistribute the burden of repayment.[12]

Table 7 displays the percentage of repayment of the principal plus the interest plus the increased insurance policy, and the number of years required for repayment by income quintile, when we impose a minimum number of years of compulsory repayment of a

[11] The term progressivity is usually understood to be with respect to the whole population. Here we refer to progressivity within the subset of graduates in the population.
[12] It is important in this case that early repayment is not allowed.

given percentage of gross income. Individuals continue paying after the minimum period required only if their individual debt is not cancelled by that time. Remaining debt by year 30 continues to be written off. The repayment rate has been calculated in each case to yield no losses.

[Insert Table 7]

Clearly, the rate to be applied to all incomes decreases as we increase the number of minimum years of compulsory repayment. This reduction benefits lower income earners, those who do not repay their full debt by year 30. In contrast, individuals in the higher quintiles are harmed by the extension of the minimum number of years of repayment. In the middle of the income distribution (Q35 to Q65) individuals end up repaying their loans plus insurance premium irrespective of the minimum period of repayment and corresponding rate applied. They are not subsidised nor subsidise others.

7. Concluding comments

Lower earners are rarely able to repay the full amount borrowed from student loan programmes. For this reason, they usually incur losses and need to be sustained by public funds. We propose to transfer the risk of being a low earner to the student, by complementing each student loan with a personal insurance policy against the contingency of being unable to repay. This way, the proposed scheme can be self-sustaining. We empirically analyse our proposal using conditional quantile regression analysis and data from the 2011 Survey of Household Finances of the Bank of Spain. We estimate the evolution of income for university graduates at different points of the income distribution. Then we simulate the rate of loan repayment by quintile when graduates pay 4% of their gross earnings if these are larger than 12,000 Euros every

year till their debt is written off or for a maximum period of 30 years. This allows us to test the performance of our proposal.

Insurance implies redistribution from those who do not incur the loss to those who do. Relative to gross income, the burden of this redistribution is more onerous on middle-earners. It can be legitimate to explore repayment schemes that move this burden upwards the income distribution. By imposing a minimum period of compulsory repayment, we could reduce the repayment rate, which benefits low earners, and raise the contribution of highest earners, while in the middle of the income distribution individuals would merely repay their own debt in full. The rationale behind the income contingent loan with personal insurance policy allows adapting the system to the characteristics of the aimed population and adjust relevant student loan parameters to pursue public policy goals.

Our work contributes to the debate over how to balance taxes and expenditures to improve distributional and efficiency objectives (IMF, 2014). This is especially relevant in the case of countries where there is evidence that welfare transfers contribute less to income distribution, such as USA or Spain: the US system of cash transfers is among the least inequality-reducing in the OECD (Denk et al. 2013) and Spanish social transfers impact on inequality has decreased over time, being below the OECD average (OECD, 2011) and not reaching a large part of low earners and unemployed (NorSpaR Team, 2015). Related to higher education, US undergraduate students received 76% ($181.1 billion) of total student aid in 2016-2017, two thirds of which was provided by the federal government (Collegeboard, 2017). However, some grant programs were non-need-based grants, that is financial circumstances had no influence on eligibility. Therefore, apart from students with limited financial resources, there were students for whom grant aid made it possible to attend a

particular institution, or type of institution, and other students for whom assistance reduced the price of the educational paths they would take even without financial support.

The case of Spain is slightly different, 72% of undergraduate students paid fees, and the rest were exempt based on need criteria in 2014-15 (European Commission, 2014) but only 25% of students from low income households attain higher education (Ruiz Rosillo, Sancho-Gargallo and Esteban-Villar, 2017). Deferring the payment of fees allows changing the focus of student aid and subsidize, instead, the students for whom the investment in education does not pay off. In this paper, we have shown one way to do this without relying on taxpayer subsidies.

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Appendix

Table A1: Descriptive statistics of the distribution of total repayment capacity by field of study

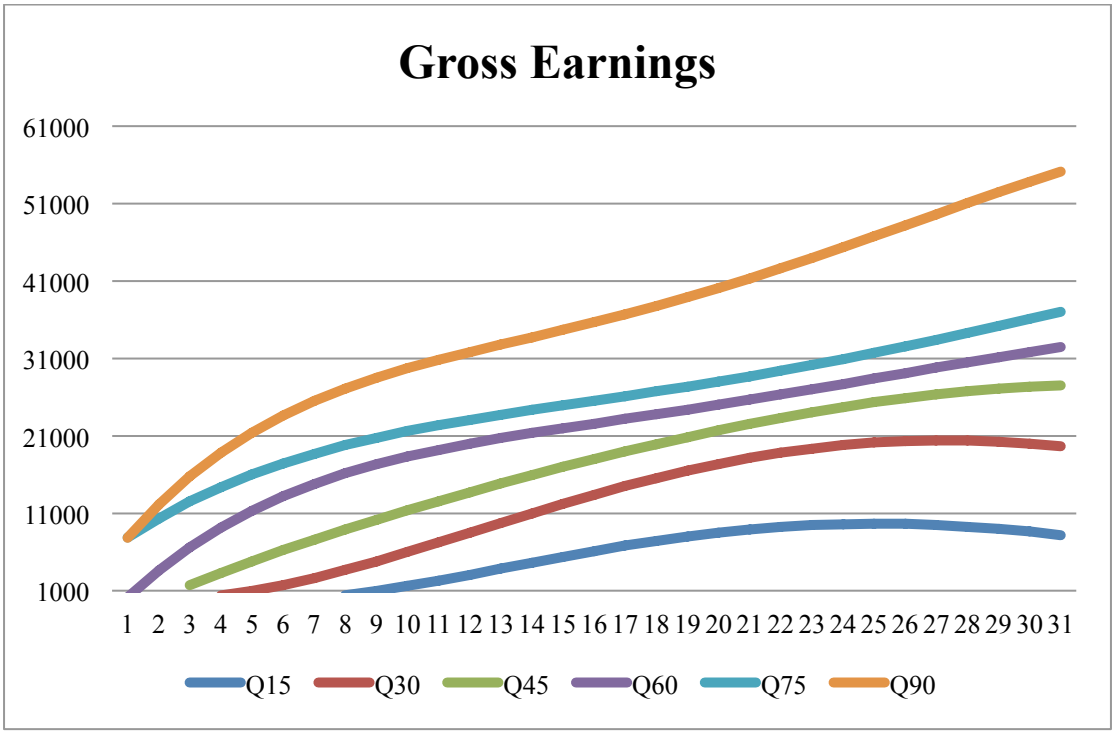
Field of Study	Mean	Std. Dev	Min	Max	Observations
Engineering and Technology	28,610	29,927	0	641,451	432
Health	25,566	16,535	4,611	71,169	318
Experimental Sciences	30,730	29,602	0	534,038	93
Social Sciences and Law	24,136	39,010	0	1,583,161	661
Humanities	21,271	21,772	0	300,000	404
Other fields of study	20,436	18,850	0	600,012	427
Gender					
Male	30,256	37,562	0	1,583,161	1181
Female	19,221	16,979	0	534,038	1154

Data Sources

The Survey of Household Finances (EFF), 2011 wave. Bank of Spain

Figures

Figure 1



Tables

Table 1: Total earnings: full sample and by quartile.

Degree Holders	Full Sample	1st quartile	2nd quartile	3rd quartile	4th quartile
Mean	24031.21	2415.22	15681.82	25397.57	53348.17
Std. Dev.	28416.69	3337.08	3051.67	2955.35	42486.85
Observations	2,335	583	583	583	584

Source: Own calculations

Table 2: Unconditional quantile regression of Annual Earnings

	Q25	Q50	Q75
Experience	-1458.70	2038.07*	2655.08**
	(1184.89)	(1053.72)	(1115.44)
Experience^2/100	29129.08**	-9626.65	-17891.72
	(11681.11)	(10398.29)	(11018.20)
Experience^3/100	-1277.13**	438.85	687.88
	(492.81)	(439.46)	(465.48)
Experience^4/100	20.67**	-10.15	-10.96
	(9.23)	(8.23)	(8.71)
Experience^5/100	-0.11*	0.08	0.06
	(0.06)	(0.06)	(0.06)
Constant	1851.14	0.00	7868.04**
	(4007.81)	(3570.44)	(3774.77)
Observations	2335	2335	2335
R^2	0.08	0.08	0.10

*, **, *** Statistically significant at 10%, 5% and 1% respectively

Table 3: Basic Scheme: percentage of repayment and total repayment year by quintile

	% Repayment	Year
Q5	0	0
Q10	0	0
Q15	0	0
Q20	80.45	0
Q25	100	29
Q30	100	27
Q35	100	25
Q40	100	24
Q45	100	22
Q50	100	20
Q55	100	18
Q60	100	16
Q65	100	15
Q70	100	12
Q75	100	11
Q80	100	10
Q85	100	9
Q90	100	8
Q95	100	8
Tax cost	20.98	

Legend: Qi represent the corresponding population quintile. *% Repayment* and *Year* stand for the percentage of loan repayment and the year when the loan is paid back respectively. *Tax cost* accounts for the tax cost of the scheme.

Table 4: Basic and Insured Schemes: percentage of repayment and total repayment year by quintile

	Basic Scheme		Insured Scheme	
	% Repayment	Year	% Repayment	Year
Q5	0	0	0	0
Q10	0	0	0	0
Q15	0.00	0	0.00	0
Q20	80.45	0	66.50	0
Q25	100	29	88.47	0
Q30	100	27	100	30
Q35	100	25	100	27
Q40	100	24	100	26
Q45	100	22	100	24
Q50	100	20	100	22
Q55	100	18	100	20
Q60	100	16	100	17
Q65	100	15	100	17
Q70	100	12	100	14
Q75	100	11	100	13
Q80	100	10	100	11
Q85	100	9	100	11
Q90	100	8	100	10
Q95	100	8	100	10
Tax cost	20.98		5.94	

Legend: Qi represent the corresponding population quintile. *% Repayment* and *Year* stand for the percentage of loan repayment and the year when the loan is paid back respectively. *Tax cost* accounts for the tax cost of the scheme.

Table 5: Basic, Insured and Self-sustaining Schemes: percentage of repayment and total repayment year by quintile

	Basic Scheme		Insured Scheme		Over-Insured Scheme	
	% Repayment	Year	% Repayment	Year	% Repayment	Year
Q5	0	0	0	0	0	0
Q10	0	0	0	0	0	0
Q15	0.00	0	0.00	0	0.00	0
Q20	80.45	0	66.50	0	62.08	0
Q25	100	29	88.47	0	82.59	0
Q30	100	27	100	30	99	0
Q35	100	25	100	27	100	28
Q40	100	24	100	26	100	27
Q45	100	22	100	24	100	25
Q50	100	20	100	22	100	23
Q55	100	18	100	20	100	21
Q60	100	16	100	17	100	18
Q65	100	15	100	17	100	18
Q70	100	12	100	14	100	15
Q75	100	11	100	13	100	14
Q80	100	10	100	11	100	12
Q85	100	9	100	11	100	11
Q90	100	8	100	10	100	10
Q95	100	8	100	10	100	10
Tax cost	20.98		5.94		0.00	

Legend: Qi represent the corresponding population quintile. *% Repayment* and *Year* stand for the percentage of loan repayment and the year when the loan is paid back respectively. *Tax cost* accounts for the tax cost of the scheme.

Table 6: Tax cost by field of study and gender

	Basic Scheme	Insured Scheme	Self-Sustaining insured Scheme
Total Tax Cost	20.98	5.94	0.00
Tax Cost by field of study			
Engineering and Technology	3.09	-0.17	-0.98
Health	2.06	-0.13	-0.71
Experimental Sciences	0.62	-0.12	-0.29
Social Sciences and Law	7.76	3.52	1.26
Humanities	3.19	0.94	0.03
Other fields of study	4.26	1.91	0.69
Tax cost by gender			
Male	7.71	-0.69	-4.09
Female	13.27	6.64	4.09

Legend: population adjusted tax cost by field of study.

Table 7. Further progressivity

Minimum Period of Repayment	**10 years**		**12 years**		**14 years**		**16 years**		**18 years**	
Repayment Rate	3.92%		3.51%		3.15%		2.87%		2.63%	
	% Rep	Year	% Rep	Year	% Rep	Year	% Rep	Year	% Rep	Year
Q5	0	0	0	0	0	0	0	0	0	0
Q10	0	0	0	0	0	0	0	0	0	0
Q15	0	0	0	0	0	0	0	0	0	0
Q20	60.91	0	54.32	0	48.89	0	44.54	0	40.82	0
Q25	81.04	0	72.27	0	65.04	0	59.26	0	54.30	0
Q30	96.70	0	86	0	77.60	0	70.71	0	64.79	0
Q35	100	29	100	30	90.61	0	82.55	0	75.65	0
Q40	100	27	100	28	100	30	93.63	0	85.80	0
Q45	100	25	100	26	100	28	100	29	98.64	0
Q50	100	23	100	24	100	26	100	27	100	28
Q55	100	21	100	22	100	24	100	25	100	27
Q60	100	18	100	20	100	21	100	23	100	24
Q65	100	18	100	20	100	21	100	22	100	24
Q70	100	15	100	16	100	18	100	19	100	20
Q75	100	14	100	15	100	17	100	18	100	19
Q80	100	12	100	14	100	15	104.13	16	109.54	17
Q85	100	11	100.06	12	108.13	14	115.46	15	121.77	16
Q90	100.94	10	112.58	11	122.23	12	130.89	13	138.28	14
Q95	103.62	10	117.66	11	130.29	12	142.36	13	153.40	14

Legend: Qi represent the corresponding population quintile. *% Rep* and *Year* stand for the percentage of loan repayment and the year when the loan is paid back respectively.