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Income-Contingent Loans: Some General Theoretical Considerations, with Applications

Joseph E. Stiglitz¹

6.1 Introduction

Income-contingent loan programs run by governments represent an important social innovation, an improvement over previous mechanisms for funding investment such as education and now showing its merits in a host of other arenas. This paper, and the other papers presented in this session, lay out the theory of income-contingent loans and describe experiences with this type of program in education and other areas.

Income-contingent loans are a response to long-standing imperfections in risk and capital markets, themselves a consequence of information imperfections, which lead to problems of moral hazard and adverse selection, as well as costly contract enforcement.

Current arrangements for student loans illustrate the deficiencies of the prevailing financial mechanisms: individuals can only borrow limited amounts. The obligations are fixed, irrespective of individuals' ability to repay. The result is that many individuals face undue hardship: there are a large number of unforeseen and unforeseeable events. An individual may receive training for a job for which he is not well suited. He may receive training for an occupation that is dying. Or with the episodic downturns that have afflicted capitalism from the beginning, he may find himself unemployed for an extended period of time; typically, unemployment insurance replaces only a small fraction of the income that he normally would have received.

Moreover, transactions costs are significant. Some of the transactions costs are simply those associated with screening loan applicants and collecting what is owed. But even here, markets *unnecessarily* increase costs. Each lender looks for individuals who are "overpriced," that is, who are willing to borrow at an interest rate that exceeds that which would compensate it for the risk of default and other costs of the loan; and attempts to foist onto other individuals who are underpriced. Imperfections of competition, typical of markets in which information

is imperfect and asymmetric, lead to high margins, and thus to large expenditures on marketing. Finally, for for-profit lenders, transactions costs – the spread between the costs of funds and what they receive on loans – are a good thing; they are the source of profits. They strive to make this kind of transactions costs as large as possible, including through discriminatory lending practices and loan complexity.

We know what the economy would look like with perfect information and costless enforcement. There would be perfect interstate and intertemporal smoothing. Individuals would be essentially indifferent between whether a bad state (say, unemployment) occurred or a good state.² The marginal utility of consumption of individuals at each date and state would be essentially the same, too.

But with moral hazard, there will be imperfect interstate smoothing. But imperfect smoothing of future risks leads to imperfect intertemporal smoothing: Lenders worry that the borrower won't have resources to repay. So too, the borrower worries that with a conventional loan, there will be large variability in future consumption, resulting in hardship. This will limit the amount of debt that individuals are willing to undertake.

This, in turn, has important consequences. There can be significant underinvestment in education (relative to what would have occurred in a perfect market). There will be lower levels of job search, since individuals would have to borrow excessively to continue looking for a job that better matched their skills. That is, they accept early job offers rather than continue to search for a better match.

Moreover, there will be a high level of consumption volatility (both across states and periods), at least relative to the first-best level.

Income-contingent loans represent a compromise. The standard income-contingent loan entails limiting repayments to a maximum percentage of the individual's income, with the repayment spread over a longer period of time. Typically, there is also a limit to the number of years of repayment.

Thus, when future income is moderately low, the burden of payment is spread out over more years – there is better intertemporal smoothing. If capital markets were perfect – if there were no credit rationing – this might not matter much. Individuals could simply borrow. But there is credit rationing, and so this intertemporal smoothing can matter a great deal.

Note that in this case, there is no attenuation of incentives. Since the individual pays back in full what is owed – payments are simply stretched out over a longer period of time – there is no incentive for individuals to shirk. Indeed, the fact that consumption risk has been lowered increases welfare, and, as we noted earlier, because the risk of borrowing has in effect been reduced, efficiency of investment (in education and job search) has increased.³

When there is a risk of a large reduction in future income, then there is some chance that individuals will not repay what is owed. Then, the

income-contingent loan achieves some degree of interstate smoothing. As in the case with any insurance, there can be adverse incentive effects – individuals may not take as much action to protect against insured events and to make sure that the events do not occur as they could/should. But there can, as before, be positive incentive effects: the risks of investments in education or job search are reduced, and this leads to more efficient investment – a level of investment that is closer to that which would have occurred had there been perfect markets.

Even with potential future disincentive effects, *some* level of interstate smoothing is desirable, that is, it is desirable to have an income-contingent loan program with *some* limits on the repayment period, so that if the individual faces a really bad state of nature (a long period of unemployment), he does not bear the entire brunt of the bad luck. The access to funds with *some* risk sharing increases both efficiency and equity.

But this is not the only reason for income-contingent loans. There are several reasons, in particular, for *government-provided* income-contingent loans. (Interestingly, the private sector has not on its own developed these superior financial instruments, partly for reasons that the following discussion will make clear.)

First, government-provided income-contingent loans allow taking advantage of economies of scope in the government's collection of taxes, which reduces the cost of enforcement, and increases the effectiveness of enforcement. (Moreover, in the case of loan programs, like mortgages, where an essential piece of information in determining an individual's creditworthiness is previous income, the government has, by definition, the best access to the relevant information. Typically, private borrowers simply take a printout of the individual's past returns, and then reenter the data into their loan evaluation programs.)

Secondly, as we have already noted, whenever there are information asymmetries (and there almost always are such asymmetries), private firms attempt to engage in "cherry picking," lending to good or overpriced risks, with great costs to society – and large transaction costs. In general, the utilitarian optimum cannot be attained,⁴ and, in general, the equilibrium (if it exists) is not even Pareto efficient (Greenwald and Stiglitz, 1986).

Thirdly, as Greenwald and Stiglitz (1986) noted, whenever there are information asymmetries, there are (pecuniary) externalities that matter which can take on a variety of forms: there are cross-market and cross-instrument externalities; that is, actions in one market have effects on others, and the use of one instrument has effects on others. For instance, governments raise money through the tax system; but the amount of money raised depends on the investments in education, and the terms at which student loans are available affects those investments, and thus tax revenues. But private markets, in deciding the terms of student loans, do not take into account the impacts on government tax revenues. A government-run student loan program could and should do so. As we note below, loans to help individuals manage a period of unemployment affect

job search (then and possibly in later periods), and thus expenditures under the unemployment insurance program.

Finally, as the recent crisis has shown, the financial sector has developed considerable expertise in exploiting especially those who are financially unsophisticated. While there has long been the hope that regulation could circumscribe at least the most blatant forms of such exploitation, the evidence is that the regulations have not sufficed (partly because of the influence of the financial sector in watering down the regulation, and partly because of their success in getting regulators appointed who do not believe in regulation). While public lending may suffer from other problems, it does not seem to suffer from this. The incentives for abuse of income-contingent loans simply do not exist within the public sector as compared to the private sector.

As noted earlier, student loans have been the main area where income-contingent loans have been used. While Australia has experienced remarkable success with its income-contingent loan program,⁵ conventional loans in the US and some other countries have been a disaster. They have imposed enormous hardship on the poor, discouraged them (and increasingly even the children of middle income Americans) from investing in education, leading to more inequality and less socioeconomic mobility. The huge buildup of debt (now, in the aggregate, greater than credit card debt and exceeding \$1 trillion) is having macroeconomic consequences. Of course, matters have been made worse by the provisions of the bankruptcy law, making it almost impossible for students to discharge this debt, even in bankruptcy.⁶

But in the second part of this paper, I want to focus on the use of income-contingent loans for managing the risks of unemployment.

6.2 Unemployment and income-contingent loans⁷

Unemployment seems to impose real hardship on individuals. There is limited unemployment insurance – limited in both duration and the fraction of the income lost that is replaced. The standard explanation is the worry about moral hazard. Making matters worse is the fact that individuals can't borrow to smooth consumption.

Most bouts of unemployment are small. If individuals could borrow against future income (for example, out of their retirement account), the costs of a short spell of unemployment would be low; individuals could easily smooth consumption over time. The advantage of allowing for full smoothing in this way is that there would be no adverse incentive (moral hazard): individuals' decisions, for example, about job search, would be totally unaffected.

But what happens if the individual faces repeated spells of unemployment? Then there can be lifetime shocks, that is, depending on the number of episodes of unemployment, individuals' lifetime income may be lowered significantly.

There then needs to be *some* insurance. But even then, insurance should be complemented by loans; and this is true despite the possibility of a loan default and the corresponding disincentive effects. (That is, if the individual borrows when he is young to smooth out his income – assuming that he will be unemployed only for a limited time – and then faces a run of bad luck, he may not be able to repay the loan. The knowledge that he *can* default on his loan might attenuate his incentives for search.)

In a sense, any loan program which allows an individual to (partially or totally) default if he has a run of bad luck can be thought of as a form of income-contingent loan. One can design systems with more or less income contingency. A non-income-contingent loan would force the individual to repay the loan, say out of his retirement income, even if the result was to force him into poverty in retirement. A more income-contingent loan would provide a high threshold of protection in retirement, no matter how bad his fortune.

Income-contingent loans can be thought of as a limited form of “human capital equity” – there is some risk sharing, smoothing not only over time but also across states. One can show that income-contingent loans are preferable to conventional loans – that is, the optimal program entails some income contingency. One can show that, in general, the optimal unemployment *program* consists of a package of loans and insurance, in which there is *some* insurance, complemented by income-contingent loans. This is true despite the possibility of loan default and the corresponding disincentive effects.

The most complicated part of the analysis of the optimal unemployment program arises from the existence of cross-market, intertemporal, and cross-instrument externalities. Providing loans, whether income-contingent or conventional, affects job search, which in turn impacts government losses on unemployment insurance. Providing loans in the first period in the event of unemployment affects job search in later periods.

By the same token, providing better unemployment insurance affects job search, which thereby affects “losses” in income-contingent loan program. Providing unemployment insurance in later periods affects job search in earlier periods.

There are also important externalities extending from the private sector to the public and vice versa, but there is one difference. In principle, the government should take account of the impacts its actions have on others, while the private sector does not. There are, for instance, important externalities from private decisions to public insurance and loan programs: (unobservable) private savings affects search behavior, and therefore losses on government insurance and income-contingent loan programs. If the government could restrict precautionary savings, it would; but in practice, not only is the level of savings hard to monitor, it is even more difficult to differentiate such precautionary savings from other savings.

There is another set of externalities, which we refer to as peer monitoring externalities. If peers have informational advantage over, say, the government and can exert peer pressure, for example, concerning search behavior, then there can exist an equilibrium with co-signing, and a system with co-signing leads to a Pareto improvement.

While the full analysis of the optimal unemployment system (the optimal combination of insurance and income-contingent loans, and the optimal design of the income-contingent loan program) is complicated, there are some general principles. Unlike existing programs, the optimal unemployment program varies with age and history. Unsurprisingly, the extent of insurance or loans depends on search elasticities (the sensitivity of search to the provision of insurance). Correlations between unemployment in different periods are also important: With a high correlation, it is more likely that there will be a large loss, and externalities across periods and instruments may be more significant.

Most importantly from the perspective of this paper, there are real benefits to having a better unemployment program, and such a program should include an income-contingent loan program. There are significant welfare gains from better intertemporal smoothing – from the improved spreading and sharing of risks, which results in better interstate smoothing; and from the greater efficiency in job search. Individuals will be willing to continue to search to find a better match, with greater productivity. Finally, there are benefits from greater transactional efficiency – from the lowering of the costs of administration.

In short, unemployment is another important arena where appropriately designed income-contingent loans can be an important part of the policy mix, improving societal well-being and economic efficiency.

Notes

1. University Professor, Columbia University. This is a revised version of a paper originally presented at an IEA/World Bank Roundtable on Shared Prosperity, Jordan, June, 2014, and part of a special session on Income-Contingent Loans, reporting on some of the results of an earlier International Economic Association Roundtable on Income-Contingent Loans, the proceedings of which are available as Chapman et al. (2014). See the papers in that volume for references to the relevant literature upon which this paper was based. (See also the introduction and summary in that volume.) The work reported here focuses in particular on joint work with Jungyoll Yun on the use of income-contingent loans for unemployment. I am deeply indebted to him, to the participants in the earlier Bangkok Roundtable on income-contingent loans, and above all to Bruce Chapman and Timothy Higgins for organizing both the Roundtable and the session in which this paper was presented.

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2. This is not quite accurate: perfect insurance equates the relevant marginal utilities. Whether individuals are indifferent to different states depends on the level of utility they enjoy in that state.
3. The effects on the equilibrium level of say education can be more ambiguous. Assume a three period model, where the individual max $U(w_0 - E + B) + E U(\rho_1 E - r_1 B) + E U(\rho_2 E - r_2 B)$ where ρ_i is the return on education in the i th period and r_i is the interest rate paid. The first order conditions are $EU'_0 = EU'_1 r_1 + EU'_2 r_2$ and $EU'_0 = EU'_1 \rho_1 + EU'_2 \rho_2$, and can be solved for B and E . The effect on, say, E of better intertemporal smoothing depends on U'' .
4. See Stiglitz and Yun (2013a).
5. Chapman and Hunter (2009) and Chapman (2010).
6. See Stiglitz (2012, 2015).
7. This section is based on joint work with Jungyoll Yun, in particular Stiglitz and Yun (2013b, 2014). It follows on earlier work (Stiglitz and Yun, 2005) attempting to analyze how insurance and loans can and should be combined to protect against unemployment in ways which minimize adverse effects on incentives.

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