

NOTES ON THE EDUCATIONAL OPPORTUNITY BANK

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IN A RECENT article [5], my colleagues and I studied the economics of the Educational Opportunity Bank, a contingent repayment loan program for higher education proposed by the Zacharias Panel [2] in 1967, but traceable to the 1955 contribution of Milton Friedman [3]. In its December 1968 Special Report [1], the Carnegie Commission on the Future of Higher Education recommended "that a federal contingent loan program be created for which all students regardless of need would be eligible. With interest figured on the basis of federal borrowing costs, the program should be self-sustaining, except for administrative costs which would be met out of appropriations. Undergraduates would be eligible to borrow up to \$2,500 per year, and graduate students up to \$3,500 per year, for educational purposes. No student should be entitled to receive more in loans, all types of grants, and work-study payments in any year than the costs of education, including subsistence costs, as officially recognized by the institution in which he is enrolled."¹

While endorsing the contingent repayment loan idea, the Carnegie Commission called for further investigation of some of the detailed workings of the scheme. There was an explicit call for a more detailed analysis than is available

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¹ [1], p. 29.

in [5] of the problem of possible adverse selection of participants in the Ed Op Bank.² Implicit in the Commission's recommendation was a call for further study of the quantitative effect on repayment-tax rates of the unprecedentedly high market interest rates that now prevail in the American economy. In this note, I present some calculations that bear on these two problems. In addition, I analyze the implications of basing repayment on individual income less some personal exemption. Some brief remarks on the design of an Educational Opportunity *Grant* system and the workings of a contingent-repayment loan scheme for medical education are also included.

1. *The personal income exemption: recalculation of the relationship between the repayment-tax rate and the rate-of-return.*³ In our earlier study [5], we proposed that for each college class a given repayment-tax rate, τ , per \$1,000 borrowed be applied to every dollar of income.⁴ In doing so, we rejected the argument of Vickrey [6] and others that the repayment-taxes should be based on the increment in earned income attributable to postsecondary education. The Vickrey argument follows from the notion of mutualization of risk, since it is only this increment which is involved in the individual decision to invest in education. We rejected this approach because

² See [1], p. 28. For definition of terminology and notation used in the present paper, see Shell *et al.*, [5].

³ Virginia Smith of the Carnegie Commission staff first urged me to investigate the feasibility of introducing a personal income exemption.

⁴ In our calculations [5], we employed the Census Bureau's broad definition of income, including wages, salaries, dividends, and capital gains.

of the difficulty in defining "incremental income" and since such an approach would lead to high marginal tax rates, we felt that it might have serious consequences on the supply of work effort put forward by participants in the scheme.

There is, however, a middle course. In calculating, repayment-tax liability a modest personal income exemption (of, say, \$600 or \$1,000) could be employed. This would go some way toward the ideal suggested by the theory of risk mutualization. It would also make the repayment-tax schedule somewhat more progressive.

In Tables I and II, the tax rate, τ , is calculated with the stipulated exemption, X , set at \$0, \$600, and \$1,000. Because of the assumed growth of real income and inflation, the tax rate is most sensitive to the stipulated value of X for the current college class. For the college class entering in 1981, the influence of the personal exemption on the tax rate is quite undramatic. (See, for example, the first panel in Table I; in 1981 with $T = 40$ and $X = \$0$, $\tau = .381$ per cent; with $T = 40$ and $X = \$600$, $\tau = .398$ per cent and with $T = 40$ and $X = 1,000$, $\tau = .410$ per cent.) Of course, this indicates an erosion through time of the importance of the personal exemption. To attenuate this erosion, the personal exemption might be increased each year. Such a program is also studied in Table I, where the growth rate 1.9 per cent is chosen to represent some estimate of the long-run rate of inflation. Although the erosion of the personal exemption is somewhat lessened, the effect of X on τ is still most important in the earlier years, because the per-capita growth of money income is expected to be greater than the rate of inflation. In Table III, the rate of return is calculated as a function of the repayment-tax rate for the case where $X = \$600$. The present Table III can be compared with Table IV.1 in [5], where all stipulations are the same except that $X = \$0$.

In preparing Tables I – III, I used the basic computer program that was used in the calculations performed in [5]. The only alteration was to replace Y_t^i , the income of the i th individual in year t , with the expression $\max(0, Y_t^i - X)$. No attempt was made to adjust the incomes data for the recent and intense "Vietnam inflation." To that extent a conservative bias has been introduced into the calculations displayed in these tables. That is, for a given rate-of-return, r , we should expect that the calculated tax rate, τ , suffers from an upward bias.

2. *The problem of adverse self-selection of participants in the contingent repayment loan scheme.* In our earlier article [5], we implicitly assumed that participation in the Ed Op Bank by undergraduates would be independent of expected (and achieved) lifetime incomes. From many quarters, I have become convinced that a defense of this assumption is required.

I would expect that undergraduates from financially poor families (and thus with lower expected lifetime incomes) will find the Ed Op Bank to be attractive, because they can obtain a college education at the cost of only a few extra percentage points in their future income taxes. I would also expect students from rich families to find the Ed Op Bank to be equally attractive. These families can be expected to be sophisticated about financial matters, and to recognize that a loan with an opt-out rate even as high as eight per cent is a very attractive investment considering all the insurance features built into the scheme.⁵ It might be that, at first, students from middle-class families will be disinclined to participate in the scheme – reflecting middle class aversion to debt. At any rate, I would expect middle class participation to increase rapidly to a high level with the dissemination of the advice about the obvious attractiveness of the program.

⁵ Including substantial life and health insurance.

TABLE I*
TAX RATE, r , PER \$1,000 BORROWED FOR THREE STIPULATIONS OF THE INCOME EXEMPTION, X

| College Class Entering In | Repayment Period, T, set at 40 Years | | Repayment Period, T, set at 30 Years | | Repayment Period, T, set at 40 Years | |
|------------------------------|--------------------------------------|------------|--------------------------------------|--------------|--------------------------------------|-----------|
| | X = \$0. | X = \$600. | X = \$0. | X = \$1,000. | X = \$0. | X = \$600 |
| 1969 | .539% | .586% | .691% | .727% | .750% | .539% |
| 1970 | .527% | .563% | .668% | .703% | .738% | .574% |
| 1971 | .504% | .539% | .645% | .680% | .703% | .563% |
| 1972 | .492% | .527% | .633% | .656% | .686% | .504% |
| 1973 | .480% | .492% | .609% | .645% | .668% | .516% |
| 1974 | .457% | .492% | .598% | .621% | .645% | .504% |
| 1975 | .445% | .480% | .586% | .609% | .621% | .492% |
| 1976 | .434% | .469% | .563% | .586% | .609% | .489% |
| 1977 | .422% | .457% | .551% | .574% | .586% | .457% |
| 1978 | .410% | .445% | .539% | .557% | .574% | .445% |
| 1979 | .398% | .434% | .521% | .539% | .551% | .434% |
| 1980 | .387% | .410% | .504% | .527% | .539% | .422% |
| 1981 | .381% | .410% | .492% | .510% | .516% | .422% |
| | | | | | | .398% |
| | | | | | | .381% |

* Rate of return, r , set at 6.0 per cent

Projected annual growth rate of incomes assumed to be 4.5 per cent

Opt-out interest rate, R , set at 8.0 per cent

Cut-off salary for married women, \bar{W} , set at mean college-educated female income, ($\$4,075$)(1.045)^{t-1965}.

TABLE II *

| College Class Entering In | TAX RATE τ , PER \$1,000 BORROWED FOR THREE STIPULATIONS OF THE INCOME EXEMPTION, X | | |
|------------------------------|--|--------------------------------------|--------------------------------------|
| | Repayment Period, T, set at 40 Years | Repayment Period, T, set at 30 Years | Repayment Period, T, set at 30 Years |
| | X = \$600, X = \$1,000. | X = \$600, X = \$1,000. | X = \$600, X = \$1,000. |
| 1969 | .369% | .387% | .510% |
| 1970 | .357% | .387% | .492% |
| 1971 | .346% | .375% | .480% |
| 1972 | .340% | .363% | .469% |
| 1973 | .328% | .352% | .469% |
| 1974 | .316% | .340% | .457% |
| 1975 | .311% | .328% | .445% |
| 1976 | .299% | .316% | .434% |
| 1977 | .293% | .305% | .422% |
| 1978 | .281% | .299% | .410% |
| 1979 | .275% | .293% | .398% |
| 1980 | .270% | .281% | .387% |
| 1981 | .258% | .275% | .375% |

* Rate of return, r , set at 4.5 per cent
 Projected annual growth rate of incomes assumed to be 4.5 per cent
 Opt-out interest rate, R , set at 6.5 per cent
 Cut-off salary for married women, W , set at mean college-educated female income, $(\$4,075)(1.045)^{t-1966}$.

TABLE III *

RATE OF RETURN, τ (IN PER CENT) AS A FUNCTION OF THE TAX RATE, τ , WHEN THE INCOME EXEMPTION⁷ X, IS SET AT \$600

| College Class Entering In | Tax Rate, τ , Per \$1,000 Borrowed | | | | |
|------------------------------|---|----------------|----------------|----------------|-----------------|
| | $\tau = .20\%$ | $\tau = .25\%$ | $\tau = .33\%$ | $\tau = .50\%$ | $\tau = 1.00\%$ |
| 1969 | 2.83 | 3.46 | 4.17 | 4.95 | 5.32 |
| 1970 | 2.92 | 3.55 | 4.24 | 4.99 | 5.31 |
| 1971 | 3.04 | 3.66 | 4.32 | 5.04 | 5.35 |
| 1972 | 3.13 | 3.74 | 4.38 | 5.07 | 5.35 |
| 1973 | 3.22 | 3.82 | 4.44 | 5.11 | 5.36 |
| 1974 | 3.32 | 3.91 | 4.50 | 5.13 | 5.38 |
| 1975 | 3.41 | 3.99 | 4.57 | 5.15 | 5.39 |
| 1976 | 3.51 | 4.07 | 4.62 | 5.19 | 5.41 |
| 1977 | 3.60 | 4.14 | 4.66 | 5.22 | 5.44 |
| 1978 | 3.68 | 4.21 | 4.70 | 5.23 | 5.44 |
| 1979 | 3.77 | 4.26 | 4.73 | 5.25 | 5.46 |
| 1980 | 3.85 | 4.31 | 4.76 | 5.25 | 5.47 |
| 1981 | 3.92 | 4.38 | 4.79 | 5.25 | 5.49 |

* Repayment period, T, set at 40 years

Cut-off salary for women, \bar{W} , set at mean college-educated female income, $(\$4,075)(1.045)^{t-1965}$.

Annual growth rate of incomes assumed to be 4.5 per cent

Opt-out interest rate, R, set at 6.5 per cent

TABLE IV *

ANTICIPATED ADVERSE SELECTION

| College Class Entering In | Tax Rate, τ , Per \$1,000 Borrowed |
|------------------------------|--|
| 1969 | .574% |
| 1970 | .563% |
| 1971 | .545% |
| 1972 | .527% |
| 1973 | .516% |
| 1974 | .492% |
| 1975 | .480% |
| 1976 | .469% |
| 1977 | .457% |
| 1978 | .439% |
| 1979 | .422% |
| 1980 | .410% |
| 1981 | .398% |

* Weighted for adverse selection by 5 per cent increments; lowest decile participation rate equal to 100 per cent.

Rate of return, r , set at 6.0 per cent

Projected annual growth rate of incomes assumed to be 4.5 per cent

Opt-out interest rate, R, set at 8.0 per cent

Cut-off salary for married women, \bar{W} , set at mean college-educated female income, $(\$4,075)(1.045)^{t-1965}$

Repayment period, T, set at 40 years

Income Exemption, X, set at \$0.

With the opt-out interest rate, R, sufficiently low (eight per cent or less, under current conditions), I would not expect there to be substantial adverse self-selection, i.e., a higher participation rate in the program by students with

lower income prospects. Nonetheless, it is important to know how sensitive would be the Bank's rate-of-return to our assumption about participation rates.⁶

To test sensitivity to the participation-rate assumption, I calculated (Table IV) the tax rate, τ , required to achieve a rate-of-return, r , equal to 6.0 per cent, when it is expected that 100 per cent of the college-educated with the smallest decile lifetime incomes will participate in the Bank, 95 per cent of those in the second decile will participate, and so forth, with only 55 per cent of that in the top decile participating. The program is remarkably stable in the face of varying assumptions about the participation rate. Compare Table IV with the first column of Table I. Even under this severe — and to my mind improbable — assumption about adverse selection, the tax rate is increased by less than .05 percentage points.

Another stability exercise is more important: Say that we expect participation rates to be uniform across income deciles. Postulate also that the Bank desires to achieve a rate-of-return, r , equal to 6 per cent, subject to the assumptions and

⁶ The importance to policy decision-makers of such an exercise was suggested by Jeffrey Weiss of the Carnegie Commission staff.

TABLE V *
UNANTICIPATED ADVERSE SELECTION

| College Class Entering In | Tax Rate τ per \$1,000 Borrowed ** | Actual Rate-of-Return, r |
|------------------------------|---|-------------------------------|
| 1969 | .539% | 5.8% |
| 1970 | .527% | 5.8% |
| 1971 | .504% | 5.8% |
| 1972 | .492% | 5.8% |
| 1973 | .480% | 5.8% |
| 1974 | .457% | 5.8% |
| 1975 | .445% | 5.8% |
| 1976 | .434% | 5.8% |
| 1977 | .422% | 5.8% |
| 1978 | .410% | 5.8% |
| 1979 | .398% | 5.8% |
| 1980 | .387% | 5.8% |
| 1981 | .381% | 5.9% |

* Weighted for adverse selection by 5 per cent increments; lowest decile participation rate equal to 100 per cent
Projected annual growth rate of incomes assumed to be 4.5 per cent
Opt-out interest rate, R , set at 8.0 per cent
Cut-off salary for women, \bar{W} , set at mean college-educated female income, $(\$4,075) \times (1.045)^{t-1965}$
Repayment period, T , set at 40 years
Income exemption, X , set at \$0.

** Source: Table I, Column 1.

stipulations of Table I. Not anticipating adverse selection, the Bank sets τ according to the schedule presented in Table I (Table I, Column 1 for the case where $X = \$0$). Suppose that there is unanticipated adverse selection of the type postulated in Table IV. The actual rate-of-return will, of course, be less than the expected rate of 6 per cent because of unanticipated adverse selection. Again, because of the influence of the opt-out provision, the Bank is remarkably stable. As indicated in Table VIII, the shortfall of the actual r from its expected value is never more than .2 per cent.

3. *Miscellany.* (a) In the earlier analysis [5], many of our computations were performed with the then-prevailing government interest rate in mind. Thus, at that time, it was thought to be appropriate to study most intensively programs with $r = 4.5$ per cent and $R = 6.5$ per cent. At this writing interest rates are far higher. I think it is more realistic to em-

phasize programs with $r = 6.0$ per cent and $R = 8.0$ per cent. (See Tables I, IV, and V.) Although when r is increased τ must be increased substantially, there seem to be no inherent difficulties in operating a program designed to yield the higher rate-of-return.

(b) In our earlier study, we expressed some skepticism about the feasibility of the Educational Opportunity Grant program, which was proposed as a complement to the Bank program⁷ and is also an essential feature of the Carnegie Commission's Special Report.⁸ We argued that such grants, based on current family income of the recipient, increase the *effective* marginal tax rate on income. If the Ed Op Grant program is to be of important size, we found that such *effective* marginal tax rates were likely to be very high — even in excess of 100 per cent. In this form, the Ed Op Grant program would have very serious implications for the work habits of the families involved. What we failed to consider, however, was a family income test based on a weighted average of past years' family income. For example, if the income test is based on a simple (moving) average of the previous five years' income, the effective marginal tax rate is essentially reduced to one-fifth of the effective rate for a similar scheme with a one-year income test.⁹

(c) Where now? With a tight federal budget, it is unlikely that very soon we shall see an Ed Op Bank for undergraduates established on a national basis. Furthermore, it is fair to say that for complicated political reasons, administrators of our public universities and land-grant college are quite cool to this approach. The contingent repayment loan idea needs a shot in the arm. One such fillip could come from testing the idea on a pilot-project basis.

⁷ Shell *et al.* [5], especially pp. 38-43.

⁸ See [1], especially pp. 17-21.

⁹ I owe this idea to a conversation with Clark Kerr and Andrew Gleason.

Such a pilot project might be an Ed Op Bank for Medical Education. This is an obvious area in which to implement the idea — in an industry in which the rate-of-return on investment in human capital is very high and the capital mar-

ket is notoriously imperfect. Moreover, at this time the federal government seems to be quite prepared to increase drastically its support of medical education.¹⁰

¹⁰ I discuss these ideas at greater length in [4].

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