

**Estimating the Rate of Return to Educational Investments:
A Case Study Using the Big Brothers Big Sisters Mentoring Program**

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Abstract

This paper reviews the method for estimating the rate of return to educational investments. It begins with a justification for using rate of return analysis to evaluate educational programs. Problems and difficulties with the method are also considered. In the main component of our paper we evaluate the mentoring program Big Brothers Big Sisters (BBBS), using rate of return analysis. The evaluation builds on the high-quality impact study and costs analysis of Grossman and Tierney (1998). Bounded estimates of the rate of return to the program are given, although even this high-quality impact study is severely limited as guidance for policymakers. The rate of return to individual participants is positive but modest, unless enjoyment from participation in BBBS is factored in. However, the rate of return to society is clearly positive and compares favorably with other social investments.

1. Introduction

This paper contributes to the literature on the economic evaluation of educational programs. To Economists, it is widely accepted that education is an investment that yields a rate of return; the conventional estimation method is to calculate the discounted earnings premium (net of cost) for each additional year of education. This method has been used intensively, with hundreds of estimates of earnings premia over time, across countries, and across cohorts (see Cohn and Addison, 1998); the resulting consensus on the returns to education has had a strong influence on education policies in many countries.

Given this success, it may be anticipated that this method could be extended to other social programs or activities which resemble education provision. However, economic evaluations of educational programs are remarkably few in number.¹ This paper considers this paucity of economic evaluations, and it contributes to the economic evaluation literature in two ways. First, it reviews and sets out a justification for using rate of return analysis for economic evaluation of educational programs. Second, it offers an economic evaluation of the Big Brothers Big Sisters mentoring program. This case study evaluation serves as exposition of the numerous methodological and practical issues involved in estimating a rate of return.

2. Economic Evaluation Using Rates of Return

2.1 *Justification for economic evaluation using rates of return*

The internal rate of return to an investment is the rate that equalizes the net present value of the costs and benefits of the investment.² There are numerous advantages in calculating rates of return and using these for policy evaluation in education. Primarily, a rate of return is a standard metric, with a general meaning (Weale, 1993): returns to one investment can be directly compared with returns to another (Cohn and Hughes, 1994). Decision rules about program development are relatively straightforward: once a critical threshold interest rate is posited (as per the Office of Management and Budget rate of

¹ An equivalent problem exists for evaluations of crime and justice programs (Welsh and Farrington, 2000); although there is copious economic evaluation in the Health Sciences.

² For an excellent exposition of cost-benefit analysis, but which stops short of calculating a rate of return, see Long et al. (1981); for a similarly high-quality costs analysis for adolescent child-rearing, see Maynard (1996).

7% in 1999), then this provides a benchmark, lower-bound for any rate of return. A precise rate is not necessary, only that the returns are (substantially) above this threshold. And, inference is easier using rates of return: *ceteris paribus*, more investment will reduce the rate of return (as shown by Schultz, 1999).

Yet, there is a considerable antipathy towards rate of return analysis, particularly in the form of cost-benefit analysis. Such analysis distracts us from “tragic questions” and moral concerns, by confining our decisions along pragmatic lines (Nussbaum, 2001); it is “stupid”, and precludes deliberative political decision-making (Richardson, 2001); it is too weak, and rarely enforced (Hahn, 2001); and it is often not appropriate (Frank, 2001).³ Ultimately, the strongest criticism of cost-benefit analysis is the ‘saliency mismatch’: some costs and some benefits are simply too difficult to calculate (Herrnstein, 1997). Not everything is quantifiable or has a price; and what is quantifiable will drown out what cannot be quantified.

However, Posner (2001) counters these criticisms forcefully: simply, no alternative evaluative criterion of sufficient merit has been proposed. Costs analysis and impact analysis are obviously incomplete; especially the latter, which, although it dominates the evaluation literature, fails to address the most basic economic notions of scarcity and opportunity cost. These evaluative criteria are incomplete because there is no simple relationship between the effectiveness of an educational program and its cost. The usefulness of such evaluations for policymakers must therefore be seriously questioned.⁴ Even compared to allied evaluations, rate of return analysis is superior. Cost-effectiveness is a narrower form of evaluation, being restricted to choosing the form of investment, rather than whether to invest at all.

Yet, rate of return analysis has been extremely fecund in evaluation of the economic gains from an additional year in school. Indeed, the relationship between earnings and education is one of the most intensively tested in Economics. The emergent consensus – of strongly positive gains from investment in additional years of education – has had a profound impact on education policies, particularly for higher education. Ironically, this literature is itself partial and runs afoul of the saliency

³ Levin’s (2001b) explanation for the absence of economic evaluations in education is structural. Economic evaluations are rare because: (a) there is no training in leading Schools of Education; (b) there are few interventions that are effective enough to merit cost-effectiveness analysis; and (c) policymakers do not like such analysis as it may close off policy options.

⁴ Perhaps the most striking inconsistency is the presumption in the evaluation literature that treatment effects can be empirically estimated but that there is a saliency mismatch when cost analysis is introduced. Notwithstanding the antipathy to economic evaluations, many impact studies argue (speciously) that an intervention or program will be a good ‘investment’.

mismatch: most of the literature refers to the rate of return to the student, and even that includes only one set of benefits from education. A full schema of the benefits from education is set out in Box 1. The gains from an educational investment fall into four categories: earnings or income premia obtained from enhancements in productivity; other pecuniary advantages, possibly calculated from shadow prices; non-pecuniary gains; and utility from participation, e.g. 'psychic' or consumption benefits. Yet, rates of return to education that are conventionally reported are based only on estimation of the shaded boxes; benefits in the other areas are not included, and rates of return to other agencies are rarely considered.⁵ (One defense of a policy based on such evidence is that it serves as a lower bound on the private benefits of education. This defense is weak because it does not allow for calibration of the amount of subsidy that students should receive, and such calibration is essential for making policy decisions). Notwithstanding this caveat, such rate of return analysis has been widely accepted and used. *Prima facie*, one might expect that such analysis can be extended to other forms of educational investments.

2.2 *Defining the rate of return to general educational investments*

To calculate a rate of return to general educational investments, it is necessary to define terms and parameters. Three entities are needed: the nature of the educational activity; the cost to the investor; and the realm where any benefits are to be recouped. In theory, any discrete educational activity – where treatment effects can be identified – could be subjected to rate of return analysis. The example here is of a mentoring program, but the method is sufficiently general. On calculation of the appropriate costs there is a well-established framework, see Levin and McEwan (2000).

In considering the benefits from an educational activity that is not simply 'one year of attainment', it is clear – based on Box 1 – that the conventional method is incomplete in two important respects. First, the participants' returns to educational activities are not restricted to earnings premia, but are accrued in numerous ways including other monetary gains and advantages that cannot easily be expressed in money terms (e.g. avoidance of criminal activity, or improvement in the quality of family relationships). Where earnings premia poorly capture these benefits – as is likely in the case of programs for at-risk youth, the full returns will be inaccurately estimated.

⁵ The few empirical estimates available show that the other pecuniary gains are probably about the same magnitude as the income gains (Wolfe and Zuvekas, 1997; see also Corman, 1986). The private rate of return is therefore understated by possibly 50 percent.

Second, the benefits from many educational programs will be obtained not just by the participants but also others in the community through externalities. These public gains should therefore be included in the estimates of rates of return, especially for educational investments that most closely resemble social programs.

Thus, for each investment there will be multiple rates of return, for different investors. Four agencies may be interested in calculating their rate of return to an investment: (1) individual participants, i.e. persons undertaking the education (the students) or for whom the program is intended (welfare recipients, at-risk youth); (2) funders, i.e. agencies making a financial commitment to the program; (3) providers, i.e. institutions or organizations actually delivering the service; (4) government/taxpayers/society, i.e. the agency mandating that the service be funded and provided (the collective of individuals within the community). Each agency may invest funds or contribute resources. The individual participant forgoes time spent on alternative activities. A funding agency (e.g. a charity or government department) will have to obtain funds to pay for resources and facilities. The provider organization will also have to obtain funds for its provision; these may be obtained from diverse sources, perhaps at below market price (e.g. donations or grants). The government/taxpayer also contributes to the investment, through tax and subsidy flows of funds: so, in making a charity tax-exempt, the government is forgoing tax revenue from that charity's use of publicly-funded services (e.g. roads). Finally, 'society' is often held to be making an investment. Even though there is some ambiguity over what this agency might be, other than an aggregation of the other agencies, it is the one typically implied in calculations of the social rate of return.⁶ Investment will only take place when at least one of these investors faces a high rate of return.⁷

2.3 *The rate of return to educational investments*

⁶ Existing calculations of social rates of return to education use methods which are inconsistent. Some calculate the social rate of return as the tax gains to a government subsidy of education (HMSO, 1988; Ashworth, 1998; Nonneman and Cortens, 1997); others calculate it based on the benefits that accrue to the wider economy as income-generating externalities (Kremer, 1993; Acemoglu and Angrist, 1999; McMahon, 1999). The confusion arises because some evaluations use the term 'social' to refer to the investor (e.g. the government) and others to refer to the realm where the benefits are anticipated (e.g. from social interactions).

⁷ Gramlich (1986) found that although the private rate of return was low for the Perry Pre-school Project, the social rate of return was relatively high. Thus, there was no independent incentive for the participants to enroll, but there was an incentive for society to fund the program. This disjuncture has obvious implications for participation rates for a voluntary program.

In summary, there is a compelling argument for a greater focus on, but also a greater specificity regarding, rates of return. Ideally, the rate of return to a particular agent should include all the benefits, clearly specifying those which are quantifiably salient. For policy-making, the rate of return to various agencies should be estimated, e.g. both participants and funders. It is insufficient to claim that, for example, higher education should be privately funded because the private returns are high. It is also necessary to establish that the social returns are low.

The calculation of such rates of return is particularly important, given the size of, and growth in, the nonprofit sector (there are now over 1.2 million nonprofit agencies operating in the U.S.). These charitable organizations receive tax-exemption, on the grounds that they provide services which substitute for government services. Yet, charities do use publicly funded services (e.g. roads). It is therefore reasonable for those who pay taxes to evaluate how efficiently these charities provide such services; and this can only be performed using rate of return analysis. At present, the debate is stuck either in appeals to 'fairness' – how could a large charity not be doing good? – or ideologically-motivated attacks on pointless and wasteful programs that only benefit those who work for the charity. Rate of return analysis represents an appraisal method to replace such rhetoric. In making rate of return calculations, however, the main concern is to measure all the costs and benefits accurately, and – in formulating policy – to take reasonable account of what cannot be quantified. In the next section, such measurement is attempted.

3. An economic evaluation of the BBBS program

3.1 Details of BBBS program for economic evaluation

Rate of return analysis is now applied to the Big Brothers Big Sisters (BBBS) mentoring program. BBBS pairs adult volunteers with youths from single parent households, where the adult acts as a sibling for the youth (see Tierney et al., 2000). This sibling relationship is a commitment of at least one year, with regular meetings such that the adult can advise, counsel and befriend the youth. The BBBS volunteers are supported by a charitable organization that matches adults and youth, and employs case managers to provide guidance. The BBBS program is high-profile and nationally recognized; it is educational, in that the adult is supervising and guiding the youth, but it is also social, in

that educational materials are not used and much of the interaction takes place in informal settings.

The preliminary evidence to calculate rates of return is taken from a high quality impact evaluation by Grossman and Tierney (1998). This study is an exemplar of evaluation literature, as it currently stands. Based on a random assignment method for 1,148 youth, Table 1 reports the net impact of participation in BBBS.

Compared to similar youth who did not participate, BBBS participants were less likely to engage in antisocial activities; posted higher test scores; were more engaged in school activities; and reported enhanced family and peer relationships. Each of these gains was statistically significant, at least at the 90% significance level (although it may be the case that these gains are the same gain, differently expressed). Ostensibly, BBBS appears to be a highly effective youth program. Critically, none of these outcomes are expressed in economic terms, and none are compared to the resources required to deliver the BBBS program. There is therefore no justification for the conclusion of Grossman and Tierney (1998, 423) that “the expansion and replication of mentoring initiatives for early adolescents would appear to be a strong and sensible investment”, even though BBBS appears effective.

The costs of providing the BBBS program are available, however (Grossman, 1999). Again, the estimation of costs is high quality, based on primary data from the BBBS agencies. Table 2 shows that the average annual costs incurred by the individual mentor (Big Brother or Big Sister) are \$1,174. These costs are assumed to be recouped in terms of consumption benefits to the mentor (at least as long the mentor participates and is making a rational decision). Table 2 shows that the resource use by the funding agency is \$1,114 per youth. Unfortunately, no information is available on the direct costs incurred by society or the taxpayer.

Based on this high-quality impact study, and reliable information on costs, an economic evaluation may be performed.

3.2 Specifying the rate of return to BBBS

There are three important rates of return needed to evaluate the BBBS program: the rate for youth participants; for adult participants; and for taxpayers (the ‘social rate of return’). The first two rates are needed to establish that there will be participants; the third is needed to justify that BBBS is a worthwhile investment overall and relative to other

social investments. In each case, the formula for translating impact effects into money values is:

$$(1) \quad \text{PV of the monetary benefit per participant} = \frac{\text{Prob(Activity taking place)} - \text{Prob(Activity reduced by BBBS)}}{\text{PV Cost of Each Activity}}$$

This formula is derived from Haveman and Wolfe (1984), where the actual impacts are calculated in money terms, based on what incomes are associated with those types of behavior. For example, around 10 percent of youth were charged or convicted in 1979, and these individuals had wages that were 15 percent lower than the average wage (Grogger, 1998). So, if a social program reduces youth crime by 10 percent, then wage gains would be 1.5 percent per affected youth.

Two other approaches are possible for estimating the monetary benefits. The direct expenditures approach uses aggregate data to estimate what is spent on a particular outcome. So, if expenditures by society on violence and crime amount to \$100 billion per year, and a social program reduces violence and crime by 1 percent for 1 percent of the population, then the total monetary benefits are \$10 million. This method is useful in capturing the spillovers from individual behavior but although it has intuitive appeal, the main difficulty is that ‘top-down’ expenditure data are often highly inaccurate, including many expenditures that may not be affected by the social program. The likely result is that any reduction in crime would be worth the cost of the investment.⁸

The education levels approach traces the effect of the program on the individual’s education levels. When the impact on education levels is known, then a money value can be attributed, based on the literature linking educational qualifications to higher earnings. Given the hundreds of estimates of this parameter, there is reasonable confidence that this earnings premium ranges between 5 and 10 percent (Bils and Klenow, 2001). Each amount of education stimulated by BBBS would therefore generate an earnings premium.

Each of these three methods has flaws, so it is possible to use them all and then triangulate the results. In addition, to obtain robust estimates of the benefits of BBBS the focus is on the short-term gains which can most plausibly be related to the BBBS intervention.

⁸ The aggregate costs of crime for society – medical, lost work, quality of life impacts, and actual monetary losses – appear so high that almost any reduction in crime appears to pay for itself (see the review by Welsh and Farrington, 2000). This difficulty is partly a consequence of the state-level reporting of aggregate data. See tabulations of costs of violence perpetrated by youth, at www.csneirc.org/pubs/tables/youth-viol.htm. However, it is also a consequence of the sensitivity in imputing victimization costs.

3.3 *Estimating the rate of return for BBBS participants*

Youth participants in the BBBS program incur only forgone time (any expenses are typically met by the adult participant or the BBBS agency). At issue is what time-price to put on involvement. If the opportunity cost is work, then at the least the minimum wage should be calculated as the cost. If participation is enjoyable, then the opportunity costs are trivial. Essentially, if there are some monetary benefits, it may be justifiable to assume that the rate of return to youth participants is high such that those who are offered a mentor would accept.

The benefits from BBBS can be estimated from the National Longitudinal Survey of Youth (NLSY), and looking at where BBBS has its strongest effects (neglecting the positive but small influence on family and peer relationships). Appendix Table 1 shows how economic circumstances vary across youth who were aged 14-18 in 1979, at least for the salient activities. (Full details are given in the notes to the Table). Modeling youth behavior is complex: circumstances may change frequently, labor force attachment is intermittent, and many high-achieving youth will still be in school full-time. Therefore, it is necessary to look at both work and schooling over a long duration to identify any meaningful economic gains. Based on behaviors in 1980 and 1982, the Table shows annual pay each year for youth in work, as well as the probabilities of being in full-time education and of neither attending school nor working (economic inactivity) over the period 1980 to 1986. So, the full sample shows average annual earnings of \$6,353 in 1984, with 20.84 percent of youth still in school or college, but 17.02 percent neither working nor declaring any annual earnings for that year. Values for the full sample can be compared to the sub-samples that reported drug usage; alcohol usage (before age 16); involvement in violent activities; truancy; and criminal activity. These are the activities that BBBS appears to reduce. For these sub-samples, ratios against the full sample are reported. So, in 1984 the group with violent tendencies reported earnings of 1.01 times higher than average, being 0.97 times as likely to be in full-time education, but 0.92 times as likely to be economically inactive.

Appendix Table 1 indicates that the sub-sample with involvement in violent activities was comparable to the full sample.⁹ Similarly, earnings and economic activity rates are not adversely affected for those youth who reported drug or alcohol use.

⁹ In fact, annual earnings and educational attainment for the violent sub-sample appear slightly higher, and they post lower levels of economic inactivity. (However, the NLSY information about violence primarily refers to school violence, so this correlation between violence and schooling may be a survey artifact).

However, educational attainment amongst these sub-samples is lower (perhaps indicating flat earnings profiles over the working life). More clearly, the sub-sample of youth who reported high levels of truancy reported lower earnings, faster transitions out of education, and higher rates of economic inactivity in the later years. Weighting for those who were neither in school nor at work in each of the years, the average annual income for all those who reported truancy was 15 percent less than the full sample (i.e. the average student earns 3.84% ($=0.15*0.2558$) less). Therefore, BBBS will raise average earnings by the product of its influence on earnings multiplied by the proportionate reduction in truancy (of 36.7 percent, see Table 1): the average student discount for truancy is 2.43% ($=0.15*(0.2558*(1-0.367))$). Thus, the percent increase in earnings per youth is 1.41%. This earnings premium is not trivial, but, by itself, it seems unlikely to motivate participation in BBBS.

Similarly, youth engaged in criminal activity were adversely affected: both school and work participation rates were lower, and pay was the same.¹⁰ Crucially, there is a strong correlation between criminal activity and each of the other behaviors: controlling for an array of personal and family circumstances in a regression equation, youth were 8.3 percent more likely to commit crime if they used drugs, 10.4 percent more likely if they used alcohol, and 10.4 percent more likely if they were violent (and 3.9 percent more likely if they skipped school). Indirectly, BBBS may have an effect in reducing crime, although the effect on average earnings will be trivially small.¹¹

Overall, it appears that the effect of BBBS on the economic well-being of the participants will be positive, but hardly substantial (although the benefits have been conservatively estimated). There may be some earnings gains and attainment gains from reductions in truancy (and from avoidance of criminal activities). Yet, test scores do not correlate at all well with earnings measures (Levin, 2001a). And, the penalties from 'deviant' behavior such as violence, drug use and early alcohol use appear slight – at least early on in the working life. More ominous are the effects these behaviors may

¹⁰ Again weighting for school or work force participation, the average annual income for all those who reported criminal activity was 2 percent less than the national average in each of the years 1980-86 (for a bigger disparity see Grogger, 1998).

¹¹ These inferences are invariant either to the identification of these behaviors or adjustment for personal characteristics. The NLSY includes various measures of drug and alcohol usage, violence, and criminal activity. Three different measures for each were investigated (e.g. 'age of first drug use' was substituted for by 'used drugs within last year'). Also, a series of Mincerian earnings equations were performed with each behavioral variable included (and with controls for gender, cognitive ability, ethnicity, father's occupation, and mother's education). These estimations showed no statistically significant (and consistent) effect on earnings from the behaviors. Details are available from the author.

have when mediated through lower educational attainment (Heckman and Cameron, 2001).

3.4 *Estimating the rate of return to BBBS for society*

It is possible to build on the private participants' rate of return in order to estimate the rate of return to society. Where the private individual earns more, then the taxable portion of that earnings premium should be included in the societal returns. However, these incremental tax payments are probably trivial (being second order to the gains to the individual). Of real substance are the second-best externalities arising from the reduction in government disbursements (e.g. in welfare payments, or through the criminal justice system) to these youth. Here, we focus on one direct effect – reduced drug usage by BBBS participants – and two indirect effects, whereby fewer deviant behaviors raise education attainment and lower criminal activities.¹² Each of these effects creates negative externalities.

Cohen (1998, Table IV) reports the monetary values to society of saving youth who might be at-risk of being career criminals, heavy drug users, or high school dropouts. These are the unit social costs of such lifestyles (the last item on the righthand side of equation (1)). Again taking the lower bound estimates and focusing on short-term benefits, the present value of a being a heavy drug user is \$370,000. For a high-school drop-out, the social cost is approximated at \$49,000. For a career in juvenile crime, the present value social cost is \$80,000.

Insofar as BBBS reduces drug use, it represents a worthwhile investment. Approximately 11 percent of youth have initiated drug use and only one in ten will be heavy drug users (cocaine or heroin).¹³ This 1 percent probability is 45.8 percent lower after participation in BBBS (see Table 1). Therefore, for every youth in the program, the present value saving is \$1,695 ($\$370,000 \times (0.01 - 0.00542)$). Compared to the present value costs of \$1,114, this yields a social rate of return of 52%.

BBBS has an impact on student attainment, and this yields social benefits if the student does not become a drop-out. (Appendix Table 1 shows that truancy is associated with fewer years of education, as are the other correlated deviant behaviors). The probability of dropping out is around 7 percent (Lillard and DiCicca, 2001), and the effect of BBBS is to reduce that probability to 4.43. This reduction will effect present

¹² The effects via educational attainment and lower criminal activities are classed as 'indirect' because there is no evidence that they are directly influenced by participation in BBBS (as shown in Table 1).

¹³ See www.drugabuse.gov/infobox/HSYouthtrends.htm.

value cost savings of \$1,790 ($0.07 \times 0.522 \times \$49,000$); these savings can be offset against the present value investment of \$1,114. The social rate of return via educational attainment is therefore 61%.

The reduction in criminal activity is also an economic gain. Approximately 9 percent of youth commit a crime (although the figure for at-risk youth is closer to 20-25 percent, see Reynolds et al., 2001; see also Miller et al., 2001). Participation in BBBS reduces the probability by between 0 and 30 percentage points. So, for each youth in BBBS, the probability of being a juvenile criminal is now 6-9 percent. The expected crime cost per youth after BBBS is therefore \$6,120 ($\$80,000 \times 0.0765$) instead of \$7,200 ($\$80,000 \times 0.09$).¹⁴ Thus the cost saving from BBBS is \$1,080. But, as this present value saving is below \$1,114, then the rate of return is negative.

In summary, it proves relatively easy to calculate a rate of return which exceeds 10%. This gives credence to the conclusion that BBBS is a worthwhile investment for society to be making.¹⁵ Indeed, this method provides a meaningful, comparable estimate of the value of BBBS. The highest estimate arises if we assume that BBBS has its strongest effects through reductions in drug usage, but increased student attainment and lower crime rates also establish the economic value of the program. Moreover, these calculations have been extremely conservative, taking the lower bound for monetizing any gains, and examining only one advantage at a time without compounding multiple gains. More emphatically, we should note that 'society' is not making this investment: the BBBS agency is. The social costs are not \$1,114. Rather, all that society forgoes are the taxes that it would have obtained if BBBS had not been declared as a charity agency. This is a fraction of the total cost.

4. Conclusion

The aim of this paper has been to apply economic analysis in the field of policy evaluation in education. The main challenge is that there is very little economic analysis applied to educational programs. The only exception is the estimation of the returns to a year of education, even though this literature suffers from the same defects as other

¹⁴ Myers et al. (2000) estimate an average annual crime cost at \$3000 per individual youth in the general population. With this unit cost, a 15 percent fall in crime would only save \$450 per youth.

¹⁵ Whether BBBS will yield this rate of return when applied to other populations is a different matter. Unless there are substantial increasing returns to scale, the rate of return will fall if the program is applied more intensively.

economic analyses (e.g., a 'saliency mismatch' and the absence of analysis from the perspectives of the multiple agents involved). However, impact analysis – which dominates the literature – is inadequate for establishing whether a program is a worthwhile investment, and so there is some comfort in obtaining an imprecise answer to an important question.

The second aim was more purposive, in estimating the rate of return to the Big Brothers and Big Sisters mentoring program. A high quality evaluation shows that there are positive outcomes to youth participants. When given money values and compared to the costs, it is clear that BBBS has a high positive rate of return for society; the returns to participants are somewhat lower, however, suggesting that the expansion of the program will be limited.

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Box 1
Categories for Calculation of Rates of Return

Investing agency	Form of benefit from investment in education			
	<u>Y</u> Income gains	<u>P</u> Pecuniary benefits	<u>N</u> Non-pecuniary benefits	<u>C</u> Consumption benefits
1. Participant	Earnings premium	Better financial/household management, consumer choice efficiency ⁶	Better health; changes in fertility ¹ ; changes in tastes; marital choice efficiency ⁹ ; value of leisure ⁸	Enjoyment from learning, participation
2. Funder	–			Prestige; goodwill
3. Provider/supplier	Fees for service, donations			Prestige; goodwill
4. Government/ taxpayer/ society	Tax gains from higher earnings to the individual; Earnings premia to others in economy ¹⁰	More charitable giving ⁴ ; lower crime ⁷ ; concern for environment ²	Equitable income distribution ⁵ ; belief in civil rights ² ; political participation ³ ; cultural assimilation	

Sources: [1] Greenwood (1997); [2] McMahon (1999); [3] Schachar and Nalebuff (1999); [4] Becker and Mulligan (1997); [5] Goldin (1999); [6] Behrman and Stacey (1997); [7] Usher (1997); [8] Sander (1995); [9] Herrnstein and Murray (1994); [10] Kremer (1993).

Table 1
Net Impact of Participation in BBBS

Outcome	Follow-up control mean	Impact of participation in BBBS ^a (% change)
<i>Anti-social activities:</i>		
Drugs: Initiating drug use	11.47%	-45.8
Alcohol: Initiating alcohol use	26.72%	-27.4
Violence: No. of times hit someone	2.68%	-31.7
Theft: No. of times stole something	0.26%	-0.3
Crime: No. of times damaged property	0.20%	-0.2
<i>Academic outcomes:</i>		
Grade point average	2.63	3.0
Scholastic competence ^b	16.36	4.3
Skipped class	1.39	-36.7
Skipped day of school	0.90	-52.2
<i>Family relationships:</i>		
Summary measure of the quality of the parental relationship	70.65	2.1
Trust in the parent	23.79	2.7
Lying to the parent	3.72	-36.6
<i>Peer relationships:</i>		
Emotional support	12.51	2.3

Source: Tierney et al. (2000, Tables 10 and 16); Grossman and Tierney (1998, Tables 6 and 7). ^aImpacts are estimated 18 months after application, relative to similar non-program youth. Impacts are statistically significant at 90% confidence level, except for theft and crime. ^bPerceived ability to complete schoolwork.

Table 2
Amount of Investment in BBBS by Agency (\$)

Investing agency	Average costs per youth p.a.	Median costs per youth p.a.
Provider Organization (Budget Costs)	1114	685
Provider Mentor (Incurred Costs)	1175	848
Participant	n.a.	n.a.
Funder	n.a.	n.a.
Government/taxpayer	n.a.	n.a.
Society	n.a.	n.a.

Source: Grossman (1999, Exhibit 6). N.a.: Not available.

Appendix Table 1
Individual Benefits: The Effects of Drugs, Alcohol, Violence, and Crime

	Full sample	Ratio for sub-sample reporting various behaviors against full sample:				
		Violence	Drug use	Alcohol use	Truancy	Crime
<i>Annual pay if working (\$):^a</i>						
1980	2965	1.05	1.04	1.12	0.66	1.00
1981	3603	1.01	1.05	1.08	0.74	0.99
1982	4486	1.01	1.08	1.07	0.83	1.10
1983	5189	1.02	1.09	1.03	0.85	1.09
1984	6353	1.01	1.05	1.00	0.87	0.98
1985	7991	1.05	1.06	1.03	0.89	0.96
1986	9748	1.04	1.05	1.02	0.91	1.02
<i>Full-time education (%):</i>						
1980	67.10	1.06	0.92	0.97	1.26	0.65
1981	52.73	1.06	0.86	0.98	1.19	0.54
1982	39.63	1.02	0.80	0.93	1.02	0.44
1983	27.65	1.01	0.80	0.95	0.93	0.39
1984	20.84	0.97	0.79	0.93	0.93	0.40
1985	15.16	1.04	0.80	1.03	0.96	0.37
1986	12.04	1.02	0.83	0.97	0.99	0.40
<i>Economic Inactivity (%):^b</i>						
1980	5.29	0.74	1.02	0.94	0.28	1.74
1981	9.71	0.88	1.08	1.03	0.65	1.70
1982	11.95	0.84	1.05	1.11	0.83	1.32
1983	17.00	0.92	1.03	0.99	0.99	1.27
1984	17.02	0.92	0.95	1.02	1.06	1.15
1985	15.56	0.86	0.92	1.00	1.03	1.02
1986	15.26	0.89	0.93	1.06	1.04	1.16
<i>Mean years of education attained by 1986 (sd)</i>	13.53 (1.97)	13.41	13.34	13.21	12.85	12.57
<i>Proportion of youth</i>	100.00	20.75	40.98	20.40	25.58	9.16
<i>N</i>	7216	1497	2957	1472	1846	661

Notes: NLSY. Unweighted data. ^a Annual pay in nominal dollars. Truancy: skipped a full day of school at least once without a real excuse. ^b Economic inactivity is the proportion of youth who report neither being in school/college nor having paid work (full-time, temporary, or part-time). Violence: purposely damaged or destroyed property that did not belong to you at least once in past year. Drug use: smoked marijuana or hashish in past year. Crime: booked or charged for breaking a law, either by the police or someone connected with the courts in the past year (not counting minor traffic offenses). Alcohol use: aged under sixteen when first started drinking (e.g. having two or more drinks per week). All behaviors were reported in 1980, except for alcohol use which was reported in 1982.