DOCUMENT RESUME

ED 060 517 EA 004 017

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TITLE The Effect of Junior High School Dropout Rate on the Local Government's Ability To Pay for Its Responsibilities.
PUB DATE 3 Dec 71
NOTE 53p.

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS Academic Achievement; *Dropout Prevention; Dropout Rate; *Dropouts; Educational Finance; Educational Research; Junior High Schools; *Junior High School Students; *Models

ABSTRACT

In this study, the author examines the effects of various decisions on the cost of education in school districts that have many remedial students. As the focal point of the investigation, a junior high school population (grades 7-9) was selected. The junior high years represent a critical period in the education of remedial students -- those with low IQs, those who have failed several grades, or those who are unable to perform high school work. Most States permit students of 14-16 years to drop out of school. This age group corresponds to the junior high school level. Having dropped out, people with poor junior high school educations have great difficulty finding work, and many of these dropouts turn to unemployment, welfare, or crime. The author uses a model to show that by reducing the number of dropouts and by providing better education, the community burden of supporting these people may be decreased. (Author)

THE EFFECT OF JUNIOR HIGH SCHOOL DROPOUT RATE ON THE LOCAL GOVERNMENT'S ABILITY TO PAY FOR ITS RESPONSIBILITIES

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Industrial Dynamics
ISE 611
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December 3, 1971

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INTRODUCTION

Recently, much attention has been focused on the fiscal problems of education. In this study the author examines the effects of various decisions on the cost of education in school districts that have many remedial students. As the focal point of the investigation, a junior high school population (seventh, eighth, and ninth grade) was selected. This is a critical period in the education of a remedial student, one who has a low IQ or has failed several grades or does not have the ability to do high school work. Most states permit a student to drop out between the ages of 14 to 16 years, which corresponds to junior high school level. Having dropped out, a person with a poor junior high school education has great difficulty in finding work during his lifetime. Thus, the majority of these dropouts turn to unemployment, welfare, or crime. By reducing the number of dropouts and providing a better education, the communities' burden of supporting these people may be decreased.

The magnitude of this problem is tremendous. For example, if only 2% of all students were in this category, the cost to the community over the next 50 years could be $150 billion dollars. From interviews that the author had over the last two summers with school personnel from The Bronx, Detroit, Hartford, Philadelphia, Dallas, Jacksonville, Hammond (Indiana), Witchita, Seattle, and other school districts, the remedial population in public schools could exceed 15 million of the

45 million students enrolled. Present research into this problem is severely limited by lack of funds and the personnel who are qualified to perform the analysis.

Previous attempts at solving this problem were frustrated by the nonlinearities of the problem, the feedback effects, intangeable relationships between parts of the system, and the inability to take an overall approach to the problem. Several papers have been written on the cost analysis and resource allocation in education. All but two ignore the above items. See the author's master's project for two models that consider feedback effects.

When a particular subproblem has been selected, better results have been obtained; although the impact of the solutions is relatively minor. For example, several school districts have optimized school bus routes. Transportation costs less than 4% of the school budget, and a much smaller percentage if local welfare costs are added.

The author has three objectives in this study:

1. education in systems dynamics
2. generation of intuition in this particular system's behavior
3. determining effects of particular structure and parameter values on the system.

By satisfying the last two objectives, the first is largely satisfied.

MODEL OF REMEDIAL JUNIOR HIGH SCHOOL/DROPOUT EFFECTS ON THE ABILITY OF THE LOCAL GOVERNMENT TO FINANCE WELFARE AND EDUCATION

For the purposes of this study, the local government is assigned two responsibilities:

1. to educate the population
2. to pay welfare to those people not able to support themselves

This is not an unrealistic assumption because most governments have separate funds for welfare and education. The author assumes that other government services are self financing and do not generate a surplus.

One hypothesis the author tests is that by increasing the expenditures in education, expenditures for welfare may be reduced.

Several computer runs testing the sensitivity of the drop-out rate (see Dictionary of Variables) to total expenditures were done, in addition to testing the cost of a second system of education that is currently available but little used, and testing the effects of inflation on costs. From the author's previous work, both costs and inflation data is available.

STRUCTURE OF THE MODEL

In this model there are four sections; each describing one of the following:

1. initial conditions
2. inflation effects
3. basic model
4. Dynamo output and specifications

Historically, the basic model and Dynamo specifications were developed first, then the initial conditions, and lastly, the inflation effects.

BASIC MODEL

This part of the model describes the flow of students through junior high school and the flow of money spent by the local government.

Three rate equations describe the number of dropouts in the seventh, eighth, and nineth grades. The general form of the equations is that the number of dropouts equals some percentage of the number of students enrolled. Data for dropouts from public schools are usually expressed as a percentage of enrollment. The equations below reflect this method of recording data.

R DRCP7.KL=ENRCLL7.K*DRCP	DRCPCUTS IN 7 GRADE
R DRCP8.KL=ENRCLL8.K*DRCP	DRCPCUTS IN 8 GRADE
R DRCP9.KL=ENRCLL9.K*DRCP	DRCPCUTS IN 9 GRADE

For a definition of each of the variables or constants, refer to the Dictionary of Variables and Constants at the end of this paper.

Next are three level equations describing the number of students enrolled in each grade. For this study the incoming number of students to the seventh grade is fixed. For the other two grades the enrollment is the number of students enrolled in the next lower grade the previous year minus the dropouts in the lower grade from the previous year. The

strange form of these equations was to eliminate some variables.

```
A NRCL789.K=ENRCLL7.K+ENRCLL8.K+ENRCLL9.K    JR HIGH ENROLLMENT
L ENRCLL7.K=ENRCLL7.J+DT*0
L ENRCLL8.K=ENRCLL8.J+DT*(ENRCLL7.J-DRCP8.JK-ENRCLL8.J)
L ENRCLL9.K=ENRCLL9.J+DT*(ENRCLL8.J-DRCP9.JK-ENRCLL9.J)
L JHSGRAD.K=JHSGRAD.J+DT*(ENRCLL9.J-DRCP9.JK-AVEHS.JK-BELOWHS.JK)
```

The last equation above describes the number of graduates from junior high school and is of the same strange form as the other level equations.

Graduates of junior high school are divided into two categories: average and below average. Because the study concerns remedial education, the assumption was made that no above average students existed which is not unrealistic. Research describing how achievement in junior high school relates to achievement in high and beyond is limited because most of the remedial students have achievement levels much below the mean and this limits the validity of the data. In the absence of better information, the author chose one half the average achievement in grade levels per year as the fraction of the junior high school graduates that would be high school graduates. The other students are below average. The equation below describes the above situation. When achievement is high, a large fraction of the junior high school graduates will be average high school graduates; but not all students will be average. Note that AVEHS.JK + BELOWHS.JK = JHSGRAD.J.

```
R AVEHS.KL=JHSGRAD.K*(MIN(AVEACH.K/2,1))    DIVIDE HIGH SCHOOL INTO
R BELOWHS.KL=JHSGRAD.K-AVEHS.JK                AVERAGE .BELOW AVE.
```

The next three equations determine the number of high school dropouts and the total number of dropouts for all grades. The auxiliary equation determines the total number of dropouts from the junior high school graduates. For this study, dropouts are assumed to come from the below average high school population. While this assumption may not seem justified, empirically most high school dropouts did poorly in school so the assumption has an intuitive basis. Following the determination of total dropouts from an entering high school class which are the junior high school graduates, a third order delay is used to generate the number of dropouts from high school each year. Lastly, a summation equation determines the total number of dropouts from all grades. From state laws, one can assume that elementary schools have no dropouts. This is not exactly true because the author has completed a study in which the national dropout rate in the third grade over a ten year period was one percent. However, for this project the assumption is quite reasonable.

```
A  DRCPHS1.K=BELOWHS.JK*DRCP*PER          TOTAL HIGH SCHOOL DROPOUT OVER
R  DROPHS.KL=DELAY3(DROPHS1.K,PER)                    3 YEARS
L  TOTDROP.K=TOTDROP.J+DT*(DRCP7.JK+DRCP8.JK+DRCP9.JK+DROPHS.JK)
```

In the local community there are two kinds of employees: average and below average. Below average high school graduates become below average employees and, similarly, average high school graduates become average employees. Two rate

equations using third order delays compute the number of graduates of each type which are then added to the existing levels of employees.

```
R BLCGRAD.KL=DELAY3(BELCWHS.JK,PER)
R AVEGRAD.KL=DELAY3(AVEHS.JK,PER)
L EMPLOY1.K=EMPLOY1.J+DT*BLCGRAD.JK      # OF BELCW AVE EMPLCYEES
L EMPLOY2.K=EMPLCY2.J+DT*AVEGRAD.JK      # OF AVERAGE EMPLCYEES.
```

One might consider that a certain percentage of graduates should be siphoned out of the employee pool as being unemployeed. To present a conservative view of the system, this was not done. In addition, the assumption is that deaths or workers leaving the labor pool are offset by immigration into the locality.

A series of monetary flow equations are next. The total tax revenue consists of taxes on employees and an outside source. Taxes are higher for average employees because their salaries are, on the average, higher than below average graduates' salaries. The outside source could be state or federal allotments, or business taxes. From the total income the cost of dropouts must be deducted. This cost is assumed to be linear over a wide range; that is, for each dropout, so much welfare, extra community workers and policemen are needed. In addition, the tax revenues must finance elementary and high school education which is based on a cost per student enrolled, the commonly used method by school districts. The remaining funds are the net seventh, eighth, and nineth grade dollars. Non-teacher expenses, such as for books, transportation, buildings, utilities, are subtracted from the available junior high school funds. These

Generally, the TAs indicated high job satisfaction but expressed some personal concerns and recommendations for change. This information was then relayed to the Curriculum Associates by the DS Coordinators. Several changes are occuring and different results appear to be emerging during the second year of the experimental phase. A copy of the actual log sheets used is found in Appendix B.

Reactions from other staff members at Parker and Spring Creek about the role and performance of the TA have been mixed. Staff members feel most positive about the assistance that TAs provide to individuals and small groups of students, the working relationship between TAs and other staff members, and the willingness with which the TAs have performed the tasks requested of them. On the other hand, staff members have been concerned with the difficulty in trying to develop a new role for the district, with identifying when a TA can and cannot work with students on his own, and in overcoming the feelings that the TA is another clerical aide.

Some district personnel (not directly teaching or working in the DS schools) have expressed concern about the future impact of the TA program as it relates to protecting educators. The most usual question from those connected to the professional teaching associations is, "If you can hire three Teaching Assistants for the same amount as one teacher, what is to prevent boards and administrators from replacing some teachers with Teaching Assistants?" The response of the DS Coordinators has been that of recognizing that a potential problem exists and that a solution will have to be found. We do not have the answer ready this instant, but we do feel that the answer is not to abolish the TA position. One of the recommendations in the

following section relates to this issue.

The other major issue, primarily among those involved in personnel practices in the district, is the question of how much time should the TA work directly with students, and what kinds of activities should the TA be allowed to conduct with them. The development of the TA position to date indicates to the DS Coordinators a strong need to produce a clear and concise description of the TA role, with specific guidelines for time allotments for the TAs activities with students. This is necessary to prevent the use of TAs as substitutes for absent teachers, and insure that TAs will not be expected to plan lessons, conduct the activities, and evaluate students. Planning lessons, conducting activities, and evaluating students are aspects of the role of the certificated teacher. Only the second of these, that of conducting activities, should properly be included in the TA role; indeed, it is the basic function of the TA. A second recommendation of the next section is offered as part of the response for those concerns.

In summary, the data so far indicate that Teaching Assistants are generally performing the tasks originally expected of them in the position. Further, there has been no emerging effort on the part of the Spring Creek and Parker staffs to seek more Teaching Assistants by releasing some of their certified teachers. Finally, neither staff has demonstrated a willfull intent to misuse the Teaching Assistants in any way. In fact, there has been a concerted effort in both schools to be extremely careful that the TAs are not misused and that they are asked to perform only their expected role.

RECOMMENDATIONS

The following recommendations are proposed by the DS Coordinators after studying the data gathered to date and after much deliberation and consultation with the Personnel Director, Area Directors, principals and teachers in the DS schools, and the Teaching Assistants themselves. They are presented as ideas for the beginning of further discussion and negotiation about the role of the TA and its potential for the Eugene School District.

The first recommendation addresses itself to the issue raised by many professional educators, namely, that the Teaching Assistant program is a major potential threat to teachers because approximately three Teaching Assistants can be employed for one average teaching salary. The recommendation has the following four components:

1) We propose that the district board and administration consider a major change in the budget allotments for the staffing of schools. It is suggested that an allotment be established, as is presently the case, for the provision of a necessary number of professional and clerical staff.

2) A basic change we propose is that the district in addition establish a flexible allotment for staffing each school. There would be no restrictions on the use of this allotment for either professional or non-certified staff. However, each school staff would be required to show evidence to the administration of having evaluated its needs for staff, to indicate to the administration the intended utilization of personnel acquired from the flexible allotment, and to provide a plan of

action for evaluating the results of that staff performance. The flexible allotment would allow each staff to decide whether the needs of the program would best be met by the use of TAs or of other specialists.

3) It is proposed that a school with a well-designed plan for staffing and evaluation of its program at a designated time could request the addition of Teaching Assistants from the monies allotted for certificated or non-certificated staff. It is suggested at this time, however, that a limit be set upon the amount of money that could be used from either allotment.

4) Finally, it is suggested that the EEA TEPS committee, the District Personnel Director, and the area directors work jointly with the DS Coordinators and the TAs to develop final guidelines for the previous three sections of this recommendation. These guidelines would be completed by June, 1972.

The second recommendation relates directly to the role of the Teaching Assistant, and proposes the acceptance of the position in the district's staffing pattern as an alternative way of providing education for students. The recommendation is as follows:

> We propose that the Teaching Assistant position be accepted as a regular position in the staffing pattern of the Eugene School District. Acceptance of this proposal would not necessarily provide each school in the district to have an equal number of TAs. It would mean that the position is available for schools that determine that Teaching Assistants could help them to improve the program

in that school. We mean that the district will have a set of guidelines for selecting Teaching Assistants, a description of the actual roles that the TA can perform, and a policy stating who is responsible for supervision and evaluation of the TA. It is suggested that these guidelines be developed by the same group formed in recommendation number 1.

A final recommendation is that the five elementary schools presently participating in the DS Project be provided monies to continue the Teaching Assistant Program. This provision would cover the transitional period until the studies are completed regarding the methods of budgeting in schools, the final rate of pay, and the TA role description. It is proposed that an increase in salary be granted to those TAs who have worked for one or two years in the project's experimental phase. It is further recommended that the monies needed for this recommendation be drawn from the present budget allotment for the experimental phase of the DS Project.

A FINAL REMARK

In summary, we strongly recommend that the Teaching Assistant position be established in the district as another alternative way to organize staffs for instruction. The data indicate very positive outcomes from the program to date. Recognizing the various concerns and problems also indicated by the data, the DS Coordinators will continue through the rest of this year to make the adjustments necessary to overcome the concerns.

We are convinced that the recommendations proposed in this report are realistic for the district in terms of how the district can finance such a program, how guidelines should be established for further development of the Teaching Assistant role, and what requirements must be placed upon school staffs that decide to utilize the services of the TA.

Appendix A

EUGENE PUBLIC SCHOOLS

Differentiated Staffing Project
May, 1970

PARAPROFESSIONAL ROLE ANALYSIS

Description

The paraprofessional shall provide instructional assistance to the certified staff. The main responsibility will be to serve as teaching technician, performing a number of teaching tasks with students.

Specific Functions

1) Provide individual research help for students seeking assistance.

2) Serve as listener and helper to small reading groups.

3) Serve as a discussion leader for large or small groups.

4) Seek out information and materials for instruction by self or other unit staff members.

5) Provide assistance to teachers in analyzing individual student progress.

6) Assist teachers in the creation of learning packages or programs.

7) Operate audio-visual aids for groups of students.

8) Salary and contract hours are presently being considered.

Personal Qualities Desired

1) Demonstrates positive attitude toward children.

2) Demonstrates awareness of educational goals and objectives.

3) Possesses ability to relate positively with other adults.

4) Demonstrates ability to follow instructions and carry out necessary tasks.

5) Demonstrates desire to improve self skills and instructional skills necessary to the position.

Appendix B

EUGENE PUBLIC SCHOOLS
Differentiated Staffing Project
Instructional Assistants Log - 1970-71

NAME _____ DATE _____
DAY
SCHOOL _____ LOGGED _____

A. Estimate the time in minutes spent on each task.

TASK	NO. OF MINUTES				
	Mon	Tues	Wed	Thurs	Fri
1. Working with Total Class of Students					
a. Discussion					
b. Reading to class					
c. Hearing pupils read					
d. Operating audio-visual aids					
e. Administrating assignments & monitoring tests					
2. Working with Small Student Groups					
a. Discussion					
b. Skill reinforcement - Conducting drill exercises					
c. Hearing pupils read					
d. Assisting with student research					
3. Working with Individual Students					
a. Reinforcement of skills					
b. Assisting with student research					
c. Desk to desk individual help					
d. Reading to a student					
e. Hearing a student read					
4. Working with Staff					
a. Seeking out materials					
b. Attending meetings					
c. Assisting with Evaluation of Students					

	Mon	Tues	Wed	Thurs	Fri
5. Clerical Duties					
a. Reproducing test, worksheets, transparencies					
b. Constructing materials (bulletin boards, games, etc.)					
c. Correcting papers and tests					
d. Housekeeping					
e. Hearing a student read					
6. Supervision Duties					
a. Recess supervision					
b. Noon duty					
c. Halls supervision					
d. Field trips					
7. Working Alone					
a. Planning					
b. Research					

B. List difficulties or problems encountered during the week. How were they resolved?

C. List any tasks performed that do not fit the categories in section A. How much time did the tasks take?

NAME _____ SCHOOL _____

DATE _____

1) From whom do you receive most of your supervision?

2) With whom do you spend most of your time planning for what you do?

3) Discuss any general thoughts or feelings about the position of Teaching Assistant (paraprofessional) that you might have at this time.

4) Are there any particular kinds of training programs that you think would be beneficial at this time in assisting you in fulfilling your responsibilities better?

amounts are expressed in dollars per student so the cost must be multiplied by the enrollment. Interest and loan repayments are also subtracted. Some percentage of the interest should be attributed to high school because the loans are used to pay for the cost of all dropouts. However, two things should be considered. First, if the dropout rate is large, say over 5%, most of the dropouts will be from the junior high school; and second, only the average cost per dropout has been approximated previously. The assumption that junior high school dropouts with less education would be less likely ever to earn income and, therefore, need more welfare than a high school dropout is realistic. For the above reasons, all interest costs are assigned to the junior high school.

Net teacher dollars, or the money available for paying teacher salaries, is the maximum of the net seventh, eighth, and nineth grade dollars minus non-teacher and interest expenses or an amount needed to finance a certain minimal level of teachers. This corresponds to the decision to borrow enough money so that the classes are not larger than a certain size. In the clip function, the first and third arguements are the money available for teacher salaries before borrowing; the second arguement is the money needed for the minimum teacher staff. This function guarantees a minimum amount of money for teacher salaries. Three auxiliary equations compute the funds needed for certain class sizes. Note that the size of the class will determine how many

teachers are needed. In the local government modeled, the class size will vary between a desired class size and a poor class size. NEEDD is the cost of providing the desired student teacher ratio or desired class size, and NEEDD2 is the cost of providing the poor class size. The total junior high school enrollment is divided by the appropriate class size to determine the number of teachers and this is multiplied by the average teacher salary to yield total teacher cost. NEED1 is 90% of the desired class size teacher cost.

```
A TAXCOLL.K=EMPLOY1.K*TAX1.K+EMPLOY2.K*TAX2.K+OTHRTAX.K+SURPLUS.K
A TOTCRPD.K=COSTCRP.K*TOTCROP.K
A OTHSCHD.K=.6*ENROLL7.K*ELED.K+HSD.K*3*JHSGRAD.K
A NET789D.K=TAXCOLL.K-TOTCRPD.K-OTHSCHD.K
A OTHD789.K=NROL789.K*OTH789D.K+TOTBOR.K*INT
A NETTEAD.K=CLIP(NET789D.K-OTHD789.K,NEED2.K,NET789D.K-OTHD789.K,0)
A NEEDD.K=NROL789.K*TEASAL.K/DESST
A NEED2.K=NROL789.K*TEASAL.K/POORST
A NEED1.K=.9*NEEDD.K
```

The next group of equations determines the average achievement of the students in junior high school. A combination Max Min function is used to compute an actual student teacher ratio between the desired and poor student teacher ratio, as a function of the money available for teacher salaries. This represents a decision by the local or state government that class size should be restricted to the range between the desired and poor class sizes. Student teacher effectiveness is the ratio of the difference between the actual and desired student teacher ratios divided by the desired ratio. Average achievement is assumed to be one half grade level per year in a class of the desired size. As class size increases, the assumption is that achievement

decreases linearly with the student teacher effectiveness factor. A minimum achievement of zero is assumed; i.e., attending students, on the average, do not regress in learning. To avoid division by zero, .0001 was chosen as a zero achievement rate.

```
A  ACTST.K=MAX(MIN(POORST,TEASAL.K*NRCL789.K/NETTEAC.K),DESST)
A  TOTACH.K=AVEACH.K*NRCL789
A  AVEACH.K=MAX(.5*(1-STEFF.K),.0001)*DT
A  STEFF.K=MIN((ACTST.K-DESST)/DESST,1.)
```

Additional equations are needed to specify money flows. From previous discussions, one can tell that school decisions in the model are based on current financial ability to pay with disregards for future ability to pay. This is realistic. Local government is concerned with the present crisis or non-crisis, but not with future payment crisis. To represent this, clip functions which cause discontinuities are used, and justifiably so. The borrowing equation computes how much money must be borrowed to pay teacher salaries. The first clip function determines that if the money available for teacher salaries is more than 90% of the amount necessary for the desired student teacher ratio, then enough money will be borrowed to support the desired student teacher ratio. In the test runs, this case did not occur; and, as a result, there is an error in the actual student teacher ratio equation. For this case, that is easily fixed by inserting a clip function. An additional clip function is used to borrow money for guaranteeing class size is less than the poor class

size. The total amount borrowed is a level equation that has inflows of the amount borrowed in this period and the amount necessary to pay for dropout costs that are in excess of revenues and an output of the amount paid in the period. The amount paid is the minimum of 5% of the amount borrowed or tax dollars available after interest and dropout costs.

```
L TOTBOR.K=TOTBOR.J+DT*(BORROW.J-PAY.JK+CLIP(0,TOTDRPD.J-TAXDOLL.J,TAXDO
X  LL.J-TOTDRPD.J,0))
A BORROW.K=CLIP(TEACHD.K,.001,NETTEAD.K,NEED1.K)+CLIP(0,NEED2.K,NET789D.
X  K-CTHD789.K,0)
R PAY.KL=MIN(.05*TOTBOR.K,CTHD789.K-.06*TOTBOR.K)
A TEACHD.K=MAX(.002,NEEDD.K-NETTEAD.K)
```

As the last part of the basic model, some interesting statistics are computed:

1. the surplus or "profit" from the current period
2. the cost per unit of achievement of junior high school
3. the total amount spent by the local government
4. the cost per unit of achievement for all grades

These statistics are used for local government evaluation in this study. Each of the four statistics is computed in the logical way, either by summing the appropriate costs and dividing to yield a unit cost, or summing total costs, or subtracting total costs from total income.

```
A TOTSPNT.K=TOTDRPD.K+OTHSCHD.K+CTHD789.K+NROL789.K*TEASAL.K/ACTST.K
S TOTDACH.K=TOTSPNT.K/(TOTACH.K+.5*(3*JHSGRAD.K+6*ENROLL7.K))
L SURPLUS.K=SURPLUS.J+DT*(MAX(0,TAXDOLL.J-TOTSPNT.J)-SURPLUS.J)
S COSTACH.K=(OTHD789.K+NROL789.K*TEASAL.K/ACTST.K)/TOTACH.K
```

```
PRINT TAXDCLL,TOTDRPD,OTHSCHD,NET789D,OTHD789,NETTEAD,BORROW,NEEDD,NEED1
X ,TEACHD,STEFF,TOTACH,SURPLUS,NRCL789
PRINT 1)ENROLL7,DRDP7/2)ENROLL8,DRDP8/4)ENROLL9,DRDP9/5)DRDPHS1,DRDPHS/6
X   )TOTDRDP/7)JHSGRAD/8)AVEHS,AVEGRAD/9)BELOWHS,BLDGRAD/10)EMPLOY1,EMPL
X  OY2
PRINT AVEACH,DDSTACH,TOTBOR,ACTST,NEED2,PAY,TOTSPNT,TOTDACH
PLOT AVEACH=G(0,1.5)/DDSTACH=$(0,5E7)/TOTBOR=B(0,2E8)/ACTST=S(10,60)/TAX
X  DCLL=T(0,175E6)/SURPLUS=P(0,15E7)/TOTSPNT=N(0,15E7)
SPEC DT=1,LENGTH=50,PRTPER=1,PLTPER=1


N TOTDRDP=250
N TOTDRPD=DDSTDRP*TOTDRDP
N EMPLOY1=2000
N EMPLOY2=2000
N JHSGRAD=ENROLL9*(1-DPDP)
N TAXDCLL=OTHPTAX+EMPLOY1*TAX1+EMPLOY2*TAX2
N ENRDLL7=FIVHUN
N ENRDLL8=ENRDLL7*(1-DPDP*DT)
N ENRDLL9=ENRDLL8*(1-DPDP*DT)
N DPDP=DDNS*DT
C DDNS=.02
N FIVHUN=500*DT
N PER=3/DT
N TAX1=150*DT
N TAX2=400*DT
N OTHRTAX=800000000*DT
N DDSTDRP=3000*DT
N ELED=743*DT
N HSD=1019*DT
N INT=.11*DT
N OTH789D=509*DT                                411+25+73 NONTEACHER COST
N TOTBOR=0
C DESST=20
N POORST=50
N TEASAL=9540*DT
N TOTSPNT=TOTDRPD+OTHSCHD+OTHD789+(ENRDLL7+ENRDLL8+ENRDLL9)*TEASAL/DESST
N SURPLUS=TAXDCLL-TOTSPNT
N NET789D=TAXDCLL-TOTDRPD-OTHSCHD
N OTHSCHD=6*ENRDLL7*ELED+HSD*3*JHSGRAD
N INFLATT=.08*DT
N INFLAT1=.06*DT
N INFLAT2=.04*DT
N INFLAT=.05*DT
```

DYNAMO OUTPUT AND SPECIFICATIONS

The last five statements in the model inform the Dynamo compiler what to print, and plot, and when. Many variables are printed in order to check computations. The axes of the plot are specified so that comparisons between runs can be done. The SPEC card indicates a 50 period simulation with a one period computation interval.

INITIAL CONDITIONS

Several of the initial conditions were based on recent data gathered by the author, while other values were approximated. The significance of the initial conditions is small except for two of them; the cost per dropout and the dropout rate. Purposely, a small number of dropouts was chosen for an initial value in order to accentuate the effect of dropouts. Four thousand employees were chosen on the basis of approximately one student per employee. While for most United States families this would be an absurd assumption, for the larger families of the poorer areas this is reasonable. For example, if the average family size is 5 children per two adults, that would be 10 thousand students--enough to fill the school system for 20 years. Of course, immigration and graduates would help fill up the system with more children. For lack of data, the employees were divided equally into the two categories: average and below average. The input rate of 500 students a year was chosen from the

number of employees. Dropout rates were actual rates from various school districts. The two tax rates are over-estimates of the local revenue generated.per employee through local income, sales, real estate, and miscellaneous taxes. Again this was done to present as favorable a picture as possible of the future. Other taxes collected were arbitrarily chosen as large. Cost per dropout was a reasonable guess of welfare and additional local government costs and based on a poverty level. Teacher salary, elementary and high school costs, and non-teacher costs are based on an actual survey of a thousand school districts. Eleven percent interest is the sum of 5% repayment and 6% actual interest on a loan. According to the author's opinion guided by school administrators' advice, twenty was chosen as a desired student teacher ratio and fifty as a poor ratio.

INFLATION EQUATIONS

Eight factors were chosen as inflating in value over time. A general rate of inflation of 5% was used for taxes collected per employee, other taxes, and cost per dropout. A larger 6% inflation rate was used to compute the increase in elementary and high school costs per student. Teacher salaries have an inflation rate of 8%, while non-teacher costs were assigned a rate of 4%. The above rates for school inflation are based on a study by the author while the general

inflation rates were approximated. As the reader can see from the below equations, the value of one of the eight factors is its previous value increased by the the appropriate inflation rate.

```
L TAX1.K=TAX1.J+DT*(INFLAT*TAX1.J)
L TAX2.K=TAX2.J+DT*(INFLAT*TAX2.J)
L CCSTDRP.K=CCSTDRP.J+DT*(INFLAT*CCSTDRP.J)
L ELED.K=ELEC.J+DT*(INFLAT1*ELED.J)
L HSD.K=HSD.J+DT*(INFLAT1*HSD.J)
L CTH789D.K=CTH789D.J+DT*(INFLAT2*CTH789D.J)
L TEASAL.K=TEASAL.J+DT*(INFLATT*TEASAL.J)
L CTHRTAX.K=CTHRTAX.J+DT*INFLAT*CTHRTAX.J
```

RESULTS FROM DYNAMO SIMULATION

Four basic sets of parameters were studied; three sets related to the dropout rate and one set related to an alternative educational system. One member of each set described a non-inflationary system, while the second member described a system using the inflation rates over the past 5 years. For the highest dropout rate, 10% per year, no inflationary system was run. Several attempts at changing DT were tried, but were not completely successful.

From figure 2, one can see that after the 14 years, the local government has to borrow money. During this period the surplus (not shown) decreased from $17 million to zero. At this time the class size was enlarged to help save money. The increase in class size reduced achievement and, ultimately, reduced the tax revenue because there were more below average

graduates. By the 50th year, the outstanding loan balance was $258 million, and the total dropout cost per year was $36 million and growing exponentially. Clearly, the local government was in a financial crisis. The cost per grade level increase was over $200 million. This particular statistic is very sensitive to the achievement rate chosen for the large class size. However, even if the achievement rate were .2 grade levels or 40% of the smaller class size rate, the cost per unit of achievement would be over $10 million!

Of the total money spent in year 50 ($69 million), $36 million went to supporting dropouts, and approximately $28 million was for interest and loan repayment, and about $4 million went for education.

For a simulation of longer than 50 years, several factors would have to be changed to represent death rates. But for this length of 50 years, one can see that a high dropout rate can cost the community a lot of money. Note that over the 50 years, over $500 million was raised in taxes and still the local government could not support itself.

By reducing the dropout rate to 5%, the local government is able to extend its ability to self finance by 12 years if there is no inflation (see figure 3). Because inflation of costs is greater than inflation of taxes, the local government is able to finance only 18 years instead of 26 years in the non-inflationary case (see figure 4). At the end of 50 years, the non-inflationary and inflationary systems

caused an outstanding loan of $551 million and $49 million respectively. Clearly, inflation has a drastic effect on local government finances inspite of the increase to $2.5 billion in taxes collected. Cost per grade level increase climbed to $551 million in the inflationary system and to only $44 million in the non-inflationary system. Dropout prevention programs that cost many millions of dollars would be worthwhile to decrease the dropout rate from 10% to 5% a year. Over $200 million less had to be borrowed under the 5% dropout rate. This amounts to approximately $1,500 per student per year in seventh grade or above. This is 50% greater than the entire expenditure per student for education!

A further reduction of the dropout rate to 2% yields interesting information (figures 5 and 6). Over the 50 year period, the local government is able to self finance and have a surplus of $100 million. The cost per grade level increase is just under $2,000.

For the inflationary case, even a 2% dropout rate is not low enough to enable the local government to self finance. Over $50 million is owed after 50 years, and this amount appears to grow exponentially. Again, dropouts are the major cost. In the non-inflationary case, about $1 million a year could be spent on dropout reduction to 2%, and the community would owe less money. Almost ten times that amount, or over $3,000 per student, under the inflationary assumptions would result in less borrowing.

An alternative method of education using teacher aids, student incentives, and more materials yielded the statistics in figures 7 and 8. Achievement is higher (1.4 grade level increases per year), and the dropout rate is 2% in this system. Additional savings due to decreased number of years in school can be added; but to be conservative in this system's value, the additional savings were ignored. While the surplus over the beginning years is smaller, the increased achievement, resulting in more taxes, creates a $150 million surplus or $50 million more than the corresponding system for the 2% dropout rate.

In contrast to the normal educational system even under the inflationary case, this alternative makes the local government self financing, leaving a surplus of $306 million. In the two cases, the cost per grade level increases were $1,024 and $14,350, much less than under the previous systems.

CONCLUSIONS

This rudimentary model presented here has shown that the cost of dropouts is an important expense. Large amounts of money can be spent to reduce the dropout rate. Currently, the 5% and 2% dropout rates are merely hopes. The educational alternative, even if the parameters are in error, is clearly better because of its low dropout rate. The temporary increase in educational costs is quickly repaid by avoiding a large increase in dropout costs.

From the above results, one should be able to see that a small increase in the dropout rate has a large, positive feedback effect in the undesired direction.

From this study the author has learned that developing a model is difficult because of lack of data and a clear description of the system. Lastly, while Dynamo appears to be a simple language, its application can be quite difficult and requires much insight. If the project were to be assigned again, a complete revision of the computer model would take place. Overall, the project has served as a useful means to learn industrial dynamics.

Generally, the TAs indicated high job satisfaction but expressed some personal concerns and recommendations for change. This information was then relayed to the Curriculum Associates by the DS Coordinators. Several changes are occuring and different results appear to be emerging during the second year of the experimental phase. A copy of the actual log sheets used is found in Appendix B.

Reactions from other staff members at Parker and Spring Creek about the role and performance of the TA have been mixed. Staff members feel most positive about the assistance that TAs provide to individuals and small groups of students, the working relationship between TAs and other staff members, and the willingness with which the TAs have performed the tasks requested of them. On the other hand, staff members have been concerned with the difficulty in trying to develop a new role for the district, with identifying when a TA can and cannot work with students on his own, and in overcoming the feelings that the TA is another clerical aide.

Some district personnel (not directly teaching or working in the DS schools) have expressed concern about the future impact of the TA program as it relates to protecting educators. The most usual question from those connected to the professional teaching associations is, "If you can hire three Teaching Assistants for the same amount as one teacher, what is to prevent boards and administrators from replacing some teachers with Teaching Assistants?" The response of the DS Coordinators has been that of recognizing that a potential problem exists and that a solution will have to be found. We do not have the answer ready this instant, but we do feel that the answer is <u>not</u> to abolish the TA position. One of the recommendations in the

following section relates to this issue.

The other major issue, primarily among those involved in personnel practices in the district, is the question of how much time should the TA work directly with students, and what kinds of activities should the TA be allowed to conduct with them. The development of the TA position to date indicates to the DS Coordinators a strong need to produce a clear and concise description of the TA role, with specific guidelines for time allotments for the TAs activities with students. This is necessary to prevent the use of TAs as substitutes for absent teachers, and insure that TAs will not be expected to plan lessons, conduct the activities, and evaluate students. Planning lessons, conducting activities, and evaluating students are aspects of the role of the certificated teacher. Only the second of these, that of conducting activities, should properly be included in the TA role; indeed, it is the basic function of the TA. A second recommendation of the next section is offered as part of the response for those concerns.

In summary, the data so far indicate that Teaching Assistants are generally performing the tasks originally expected of them in the position. Further, there has been no emerging effort on the part of the Spring Creek and Parker staffs to seek more Teaching Assistants by releasing some of their certified teachers. Finally, neither staff has demonstrated a willfull intent to misuse the Teaching Assistants in any way. In fact, there has been a concerted effort in both schools to be extremely careful that the TAs are not misused and that they are asked to perform only their expected role.

RECOMMENDATIONS

The following recommendations are proposed by the DS Coordinators after studying the data gathered to date and after much deliberation and consultation with the Personnel Director, Area Directors, principals and teachers in the DS schools, and the Teaching Assistants themselves. They are presented as ideas for the beginning of further discussion and negotiation about the role of the TA and its potential for the Eugene School District.

The first recommendation addresses itself to the issue raised by many professional educators, namely, that the Teaching Assistant program is a major potential threat to teachers because approximately three Teaching Assistants can be employed for one average teaching salary. The recommendation has the following four components:

1) We propose that the district board and administration consider a major change in the budget allotments for the staffing of schools. It is suggested that an allotment be established, as is presently the case, for the provision of a necessary number of professional and clerical staff.

2) A basic change we propose is that the district in addition establish a flexible allotment for staffing each school. There would be no restrictions on the use of this allotment for either professional or non-certified staff. However, each school staff would be required to show evidence to the administration of having evaluated its needs for staff, to indicate to the administration the intended utilization of personnel acquired from the flexible allotment, and to provide a plan of

action for evaluating the results of that staff performance. The flexible allotment would allow each staff to decide whether the needs of the program would best be met by the use of TAs or of other specialists.

3) It is proposed that a school with a well-designed plan for staffing and evaluation of its program at a designated time could request the addition of Teaching Assistants from the monies allotted for certificated or non-certificated staff. It is suggested at this time, however, that a limit be set upon the amount of money that could be used from either allotment.

4) Finally, it is suggested that the EEA TEPS committee, the District Personnel Director, and the area directors work jointly with the DS Coordinators and the TAs to develop final guidelines for the previous three sections of this recommendation. These guidelines would be completed by June, 1972.

The second recommendation relates directly to the role of the Teaching Assistant, and proposes the acceptance of the position in the district's staffing pattern as an alternative way of providing education for students. The recommendation is as follows:

> We propose that the Teaching Assistant position be accepted as a regular position in the staffing pattern of the Eugene School District. Acceptance of this proposal would not necessarily provide each school in the district to have an equal number of TAs. It would mean that the position is available for schools that determine that Teaching Assistants could help them to improve the program

in that school. We mean that the district will have a set of guidelines for selecting Teaching Assistants, a description of the actual roles that the TA can perform, and a policy stating who is responsible for supervision and evaluation of the TA. It is suggested that these guidelines be developed by the same group formed in recommendation number 1.

A final recommendation is that the five elementary schools presently participating in the DS Project be provided monies to continue the Teaching Assistant Program. This provision would cover the transitional period until the studies are completed regarding the methods of budgeting in schools, the final rate of pay, and the TA role description. It is proposed that an increase in salary be granted to those TAs who have worked for one or two years in the project's experimental phase. It is further recommended that the monies needed for this recommendation be drawn from the present budget allotment for the experimental phase of the DS Project.

A FINAL REMARK

In summary, we strongly recommend that the Teaching Assistant position be established in the district as another alternative way to organize staffs for instruction. The data indicate very positive outcomes from the program to date. Recognizing the various concerns and problems also indicated by the data, the DS Coordinators will continue through the rest of this year to make the adjustments necessary to overcome the concerns.

We are convinced that the recommendations proposed in this report are realistic for the district in terms of how the district can finance such a program, how guidelines should be established for further development of the Teaching Assistant role, and what requirements must be placed upon school staffs that decide to utilize the services of the TA.

Appendix A

EUGENE PUBLIC SCHOOLS

Differentiated Staffing Project
May, 1970

PARAPROFESSIONAL ROLE ANALYSIS

Description

The paraprofessional shall provide instructional assistance to the certified staff. The main responsibility will be to serve as teaching technician, performing a number of teaching tasks with students.

Specific Functions

1) Provide individual research help for students seeking assistance.

2) Serve as listener and helper to small reading groups.

3) Serve as a discussion leader for large or small groups.

4) Seek out information and materials for instruction by self or other unit staff members.

5) Provide assistance to teachers in analyzing individual student progress.

6) Assist teachers in the creation of learning packages or programs.

7) Operate audio-visual aids for groups of students.

8) Salary and contract hours are presently being considered.

Personal Qualities Desired

1) Demonstrates positive attitude toward children.

2) Demonstrates awareness of educational goals and objectives.

3) Possesses ability to relate positively with other adults.

4) Demonstrates ability to follow instructions and carry out necessary tasks.

5) Demonstrates desire to improve self skills and instructional skills necessary to the position.

Appendix B

EUGENE PUBLIC SCHOOLS
Differentiated Staffing Project
Instructional Assistants Log - 1970-71

NAME _____ DATE _____
DAY
SCHOOL _____ LOGGED _____

A. Estimate the time in minutes spent on each task.

TASK	NO. OF MINUTES				
	Mon	Tues	Wed	Thurs	Fri
1. Working with Total Class of Students a. Discussion					
b. Reading to class					
c. Hearing pupils read					
d. Operating audio-visual aids					
e. Administrating assignments & monitoring tests					
2. Working with Small Student Groups a. Discussion					
b. Skill reinforcement - Conducting drill exercises					
c. Hearing pupils read					
d. Assisting with student research					
3. Working with Individual Students a. Reinforcement of skills					
b. Assisting with student research					
c. Desk to desk individual help					
d. Reading to a student					
e. Hearing a student read					
4. Working with Staff a. Seeking out materials					
b. Attending meetings					
c. Assisting with Evaluation of Students					

	Mon	Tues	Wed	Thurs	Fri
5. Clerical Duties					
a. Reproducing test, worksheets, transparencies					
b. Constructing materials (bulletin boards, games, etc.)					
c. Correcting papers and tests					
d. Housekeeping					
e. Hearing a student read					
6. Supervision Duties					
a. Recess supervision					
b. Noon duty					
c. Halls supervision					
d. Field trips					
7. Working Alone					
a. Planning					
b. Research					

B. List difficulties or problems encountered during the week. How were they resolved?

C. List any tasks performed that do not fit the categories in section A. How much time did the tasks take?

NAME _____ SCHOOL _____

DATE _____

1) From whom do you receive most of your supervision?

2) With whom do you spend most of your time planning for what you do?

3) Discuss any general thoughts or feelings about the position of Teaching Assistant (paraprofessional) that you might have at this time.

4) Are there any particular kinds of training programs that you think would be beneficial at this time in assisting you in fulfilling your responsibilities better?

Generally, the TAs indicated high job satisfaction but expressed some personal concerns and recommendations for change. This information was then relayed to the Curriculum Associates by the DS Coordinators. Several changes are occuring and different results appear to be emerging during the second year of the experimental phase. A copy of the actual log sheets used is found in Appendix B.

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Appendix A

EUGENE PUBLIC SCHOOLS

Differentiated Staffing Project
May, 1970

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b. Reading to class					
c. Hearing pupils read					
d. Operating audio-visual aids					
e. Administrating assignments & monitoring tests					
2. Working with Small Student Groups					
a. Discussion					
b. Skill reinforcement - Conducting drill exercises					
c. Hearing pupils read					
d. Assisting with student research					
3. Working with Individual Students					
a. Reinforcement of skills					
b. Assisting with student research					
c. Desk to desk individual help					
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4) Finally, it is suggested that the EEA TEPS committee, the District Personnel Director, and the area directors work jointly with the DS Coordinators and the TAs to develop final guidelines for the previous three sections of this recommendation. These guidelines would be completed by June, 1972.

The second recommendation relates directly to the role of the Teaching Assistant, and proposes the acceptance of the position in the district's staffing pattern as an alternative way of providing education for students. The recommendation is as follows:

> We propose that the Teaching Assistant position be accepted as a regular position in the staffing pattern of the Eugene School District. Acceptance of this proposal would not necessarily provide each school in the district to have an equal number of TAs. It would mean that the position is available for schools that determine that Teaching Assistants could help them to improve the program

in that school. We mean that the district will have a set of guidelines for selecting Teaching Assistants, a description of the actual roles that the TA can perform, and a policy stating who is responsible for supervision and evaluation of the TA. It is suggested that these guidelines be developed by the same group formed in recommendation number 1.

A final recommendation is that the five elementary schools presently participating in the DS Project be provided monies to continue the Teaching Assistant Program. This provision would cover the transitional period until the studies are completed regarding the methods of budgeting in schools, the final rate of pay, and the TA role description. It is proposed that an increase in salary be granted to those TAs who have worked for one or two years in the project's experimental phase. It is further recommended that the monies needed for this recommendation be drawn from the present budget allotment for the experimental phase of the DS Project.

A FINAL REMARK

In summary, we strongly recommend that the Teaching Assistant position be established in the district as another alternative way to organize staffs for instruction. The data indicate very positive outcomes from the program to date. Recognizing the various concerns and problems also indicated by the data, the DS Coordinators will continue through the rest of this year to make the adjustments necessary to overcome the concerns.

We are convinced that the recommendations proposed in this report are realistic for the district in terms of how the district can finance such a program, how guidelines should be established for further development of the Teaching Assistant role, and what requirements must be placed upon school staffs that decide to utilize the services of the TA.

Appendix A

EUGENE PUBLIC SCHOOLS

Differentiated Staffing Project
May, 1970

PARAPROFESSIONAL
ROLE ANALYSIS

Description

The paraprofessional shall provide instructional assistance to the certified staff. The main responsibility will be to serve as teaching technician, performing a number of teaching tasks with students.

Specific Functions

1) Provide individual research help for students seeking assistance.

2) Serve as listener and helper to small reading groups.

3) Serve as a discussion leader for large or small groups.

4) Seek out information and materials for instruction by self or other unit staff members.

5) Provide assistance to teachers in analyzing individual student progress.

6) Assist teachers in the creation of learning packages or programs.

7) Operate audio-visual aids for groups of students.

8) Salary and contract hours are presently being considered.

Personal Qualities Desired

1) Demonstrates positive attitude toward children.

2) Demonstrates awareness of educational goals and objectives.

3) Possesses ability to relate positively with other adults.

4) Demonstrates ability to follow instructions and carry out necessary tasks.

5) Demonstrates desire to improve self skills and instructional skills necessary to the position.

Appendix B

EUGENE PUBLIC SCHOOLS
Differentiated Staffing Project
Instructional Assistants Log - 1970-71

NAME _____ DATE _____

DAY

SCHOOL _____ LOGGED _____

A. Estimate the time in minutes spent on each task.

TASK	NO. OF MINUTES				
	Mon	Tues	Wed	Thurs	Fri
1. Working with Total Class of Students a. Discussion					
b. Reading to class					
c. Hearing pupils read					
d. Operating audio-visual aids					
e. Administrating assignments & monitoring tests					
2. Working with Small Student Groups a. Discussion					
b. Skill reinforcement - Conducting drill exercises					
c. Hearing pupils read					
d. Assisting with student research					
3. Working with Individual Students a. Reinforcement of skills					
b. Assisting with student research					
c. Desk to desk individual help					
d. Reading to a student					
e. Hearing a student read					
4. Working with Staff a. Seeking out materials					
b. Attending meetings					
c. Assisting with Evaluation of Students					

	Mon	Tues	Wed	Thurs	Fri
5. Clerical Duties					
a. Reproducing test, worksheets, transparencies					
b. Constructing materials (bulletin boards, games, etc.)					
c. Correcting papers and tests					
d. Housekeeping					
e. Hearing a student read					
6. Supervision Duties					
a. Recess supervision					
b. Noon duty					
c. Halls supervision					
d. Field trips					
7. Working Alone					
a. Planning					
b. Research					

B. List difficulties or problems encountered during the week. How were they resolved?

C. List any tasks performed that do not fit the categories in section A. How much time did the tasks take?

NAME _____ SCHOOL _____

DATE _____

1) From whom do you receive most of your supervision?

2) With whom do you spend most of your time planning for what you do?

3) Discuss any general thoughts or feelings about the position of Teaching Assistant (paraprofessional) that you might have at this time.

4) Are there any particular kinds of training programs that you think would be beneficial at this time in assisting you in fulfilling your responsibilities better?

DICTIONARY OF VARIABLES AND CONSTANTS

Name	Definition
ACTST	Actual student-teacher ratio
AVEACH	Average achievement in grade levels/year
AVEGRAD	Average "quality" high school graduates
AVEHS	Number of junior high school graduates for this period that will be average graduates of high school
BELOWHS	Those junior high school graduates that will be below average graduates or drop-outs from high school
BLOGRAD	Below average "quality" high school graduates
BORROW	Money borrowed in this period
CONS	Constant (dropout rate)
COSTACH	Cost per achievement
COSTDRP	Cost per dropout
DESST	Desired student-teacher ratio
DROP	Rate of dropouts for this DT interval
DROPHS	Dropouts from high school for this period
DROPHS1	Total dropouts from high school
DROP7	Dropouts from seventh grade
DROP8	Dropouts from eighth grade
DROP9	Dropouts from nineth grade
ELED	Elementary dollars per student per year (cost)
EMPLOY1	Total number of below average employees
EMPLOY2	Total number of average employees

Name	Definition
ENROLL7	Enrollment in seventh grade
ENROLL8	Enrollment in eighth grade
ENROLL9	Enrollment in nineth grade
FIVHUS	Constant (500)
HSD	High school dollars per student per year (cost)
INFLAT	General inflation rate
INFLATT	Teacher salary inflation rate
INFLAT1	Overall school cost inflation rate
INFLAT2	Inflation rate of non-teacher salary education costs
INT	Interest and loan payments
JHSGRAD	Junior high school graduates
NEEDD	Needed dollars for desired student-teacher ratio
NEED1	90% of NEEDD
NEED2	Needed dollars for poor student-teacher ratio
NETTEAD	Net teacher dollars available for teacher salaries
NET789D	Net junior high school dollars
NROL789	Enrollment in seventh, eighth, and nineth grades
OTHD789	Other dollar costs for seventh, eighth, and nineth grades (non-teacher costs)
OTHRTAX	Other taxes received by local government
OTHSCHD	Other school dollars (total cost for elementary and high school)
OTH789D	Other seventh, eighth, and nineth grade dollar costs per student

Name	Definition
PAY	Amount of Repayment of loan for this period
PER	Number of DT intervals in 3 years
STEFF	Student-teacher effectiveness
SURPLUS	Surplus money (taxes - costs) for this period
TAXDOLL	Total taxes received for this period
TAX1	Tax rate per below average employee
TAX2	Tax rate per average employee
TEACHD	Amount of money needed to borrow to pay teachers
TEASAL	Teacher salary
TOTACH	Total achievement (in grades/year)
TOTBOR	Total borrowed (in dollars)
TOTDACH	Total dollars per achievement for all grade costs (1-12) and achievement per period
TOTDROP	Total dropouts (number)
TOTDRPD	Total dropout cost for this period

789 Grade Remedial Education Cost Model

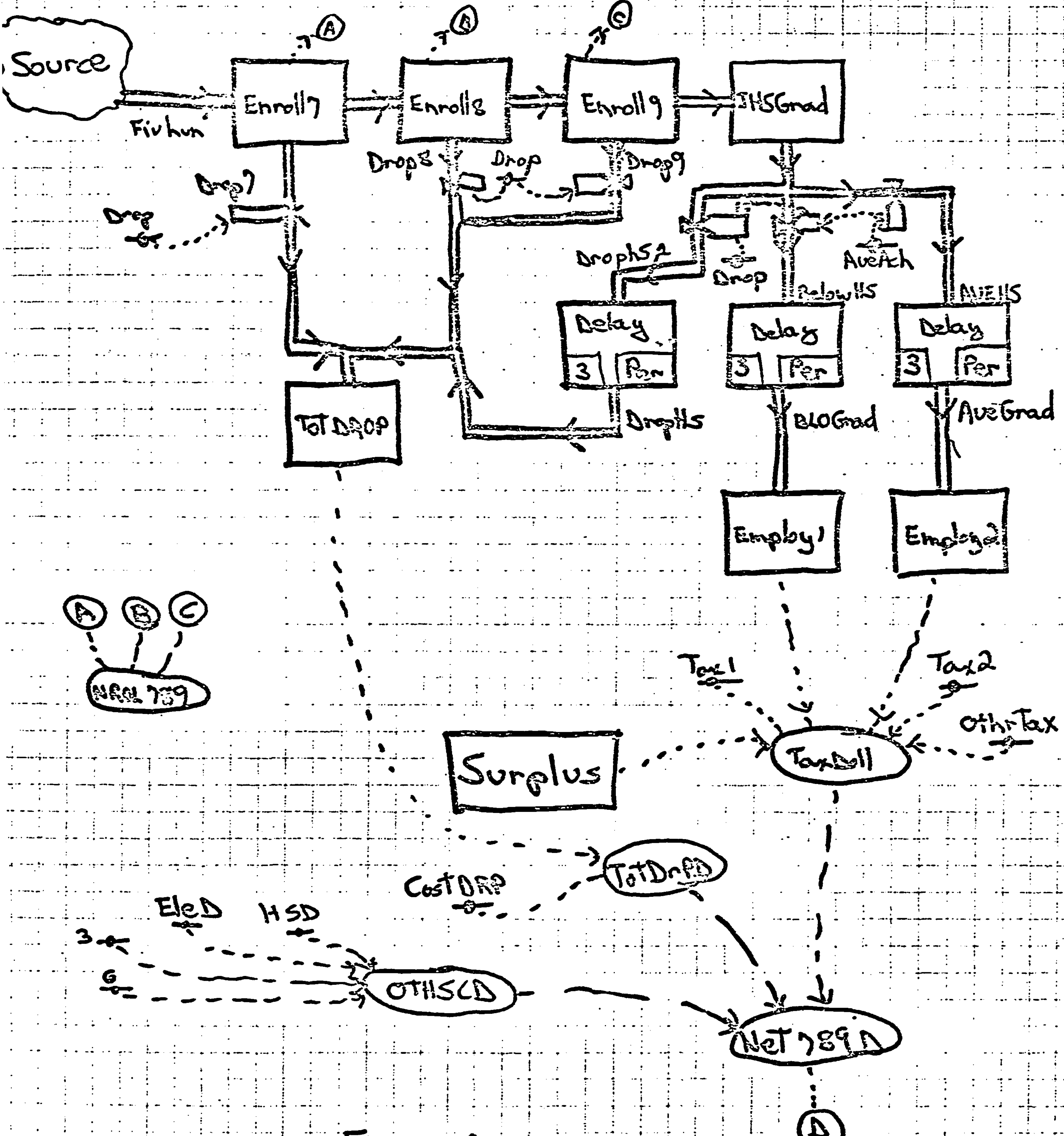
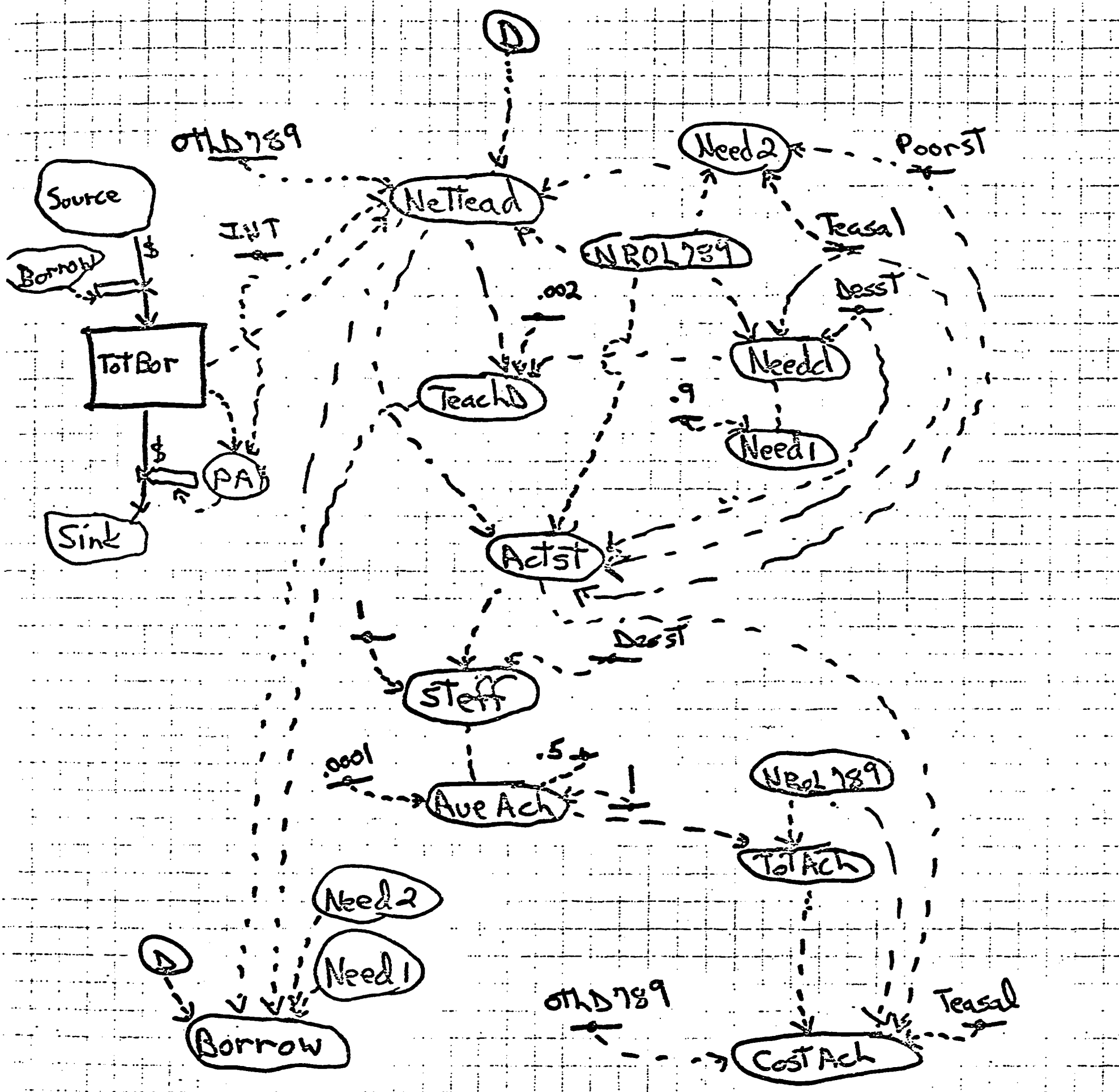


Figure 1

Figure 1 (continued)

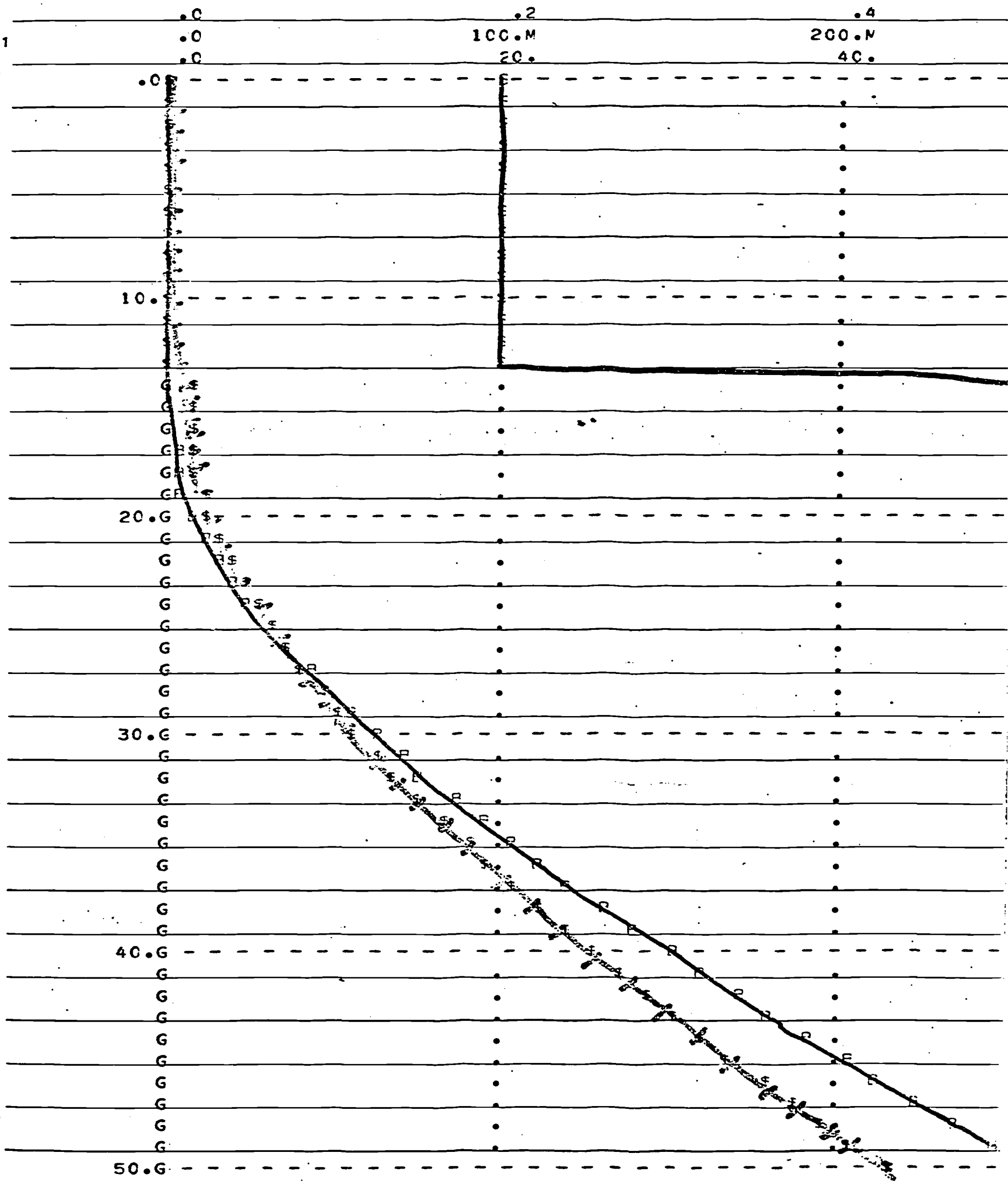


T

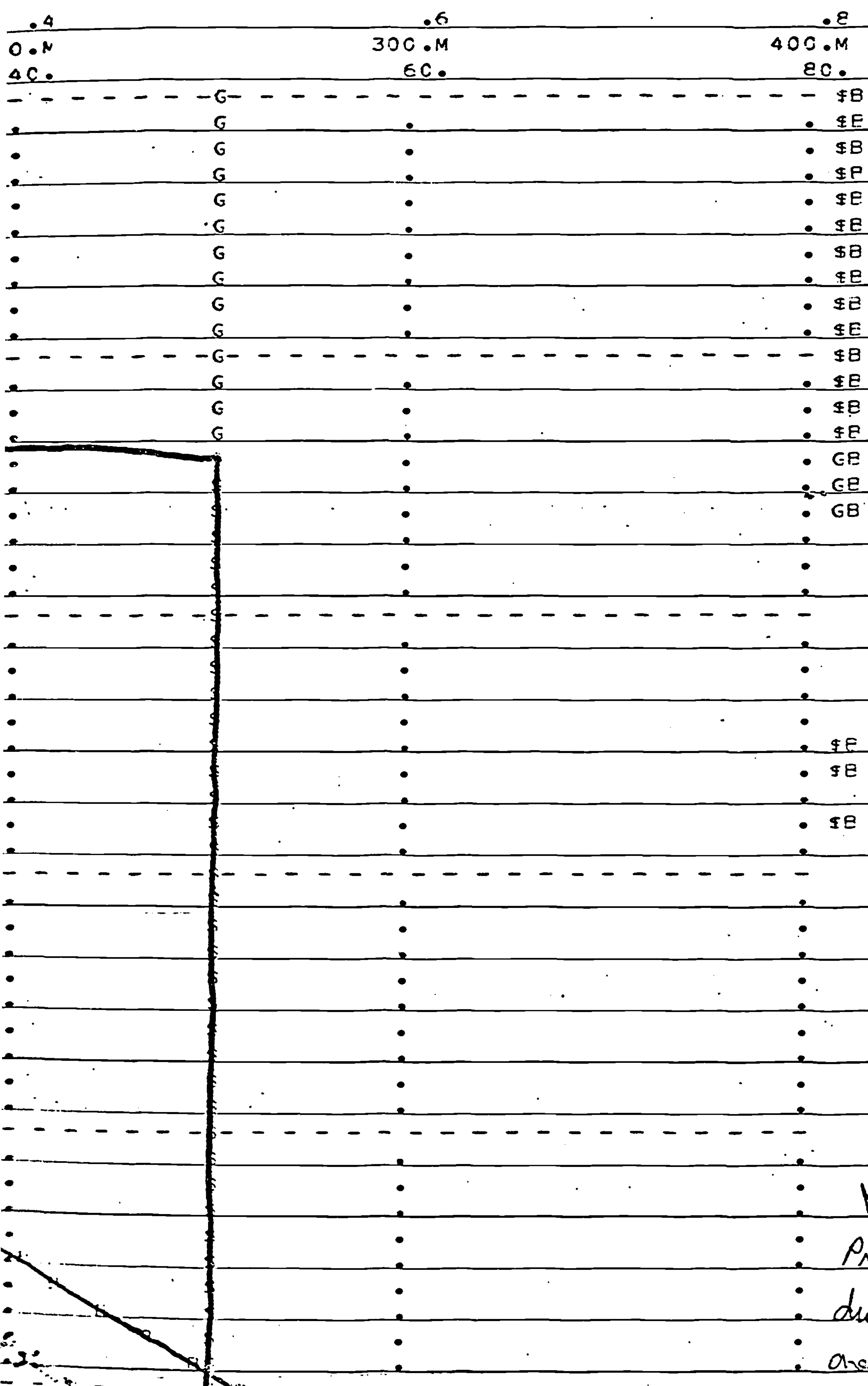
Figure 2

PAGE 8 RUN-2 7 8 9 GRADES REMEDIAL EDUCATIC TAX MCDEL

AVEACH=G, CCSTACH=$, ICTECR=P, ACIST=S



E1



Note: Frequently this Dynamo Compiler plot variable in the wrong location. The hand drawn plots were verified by the printouts.

Note: the associated Printouts are not included due to their length; however one example is given (Figure 9)

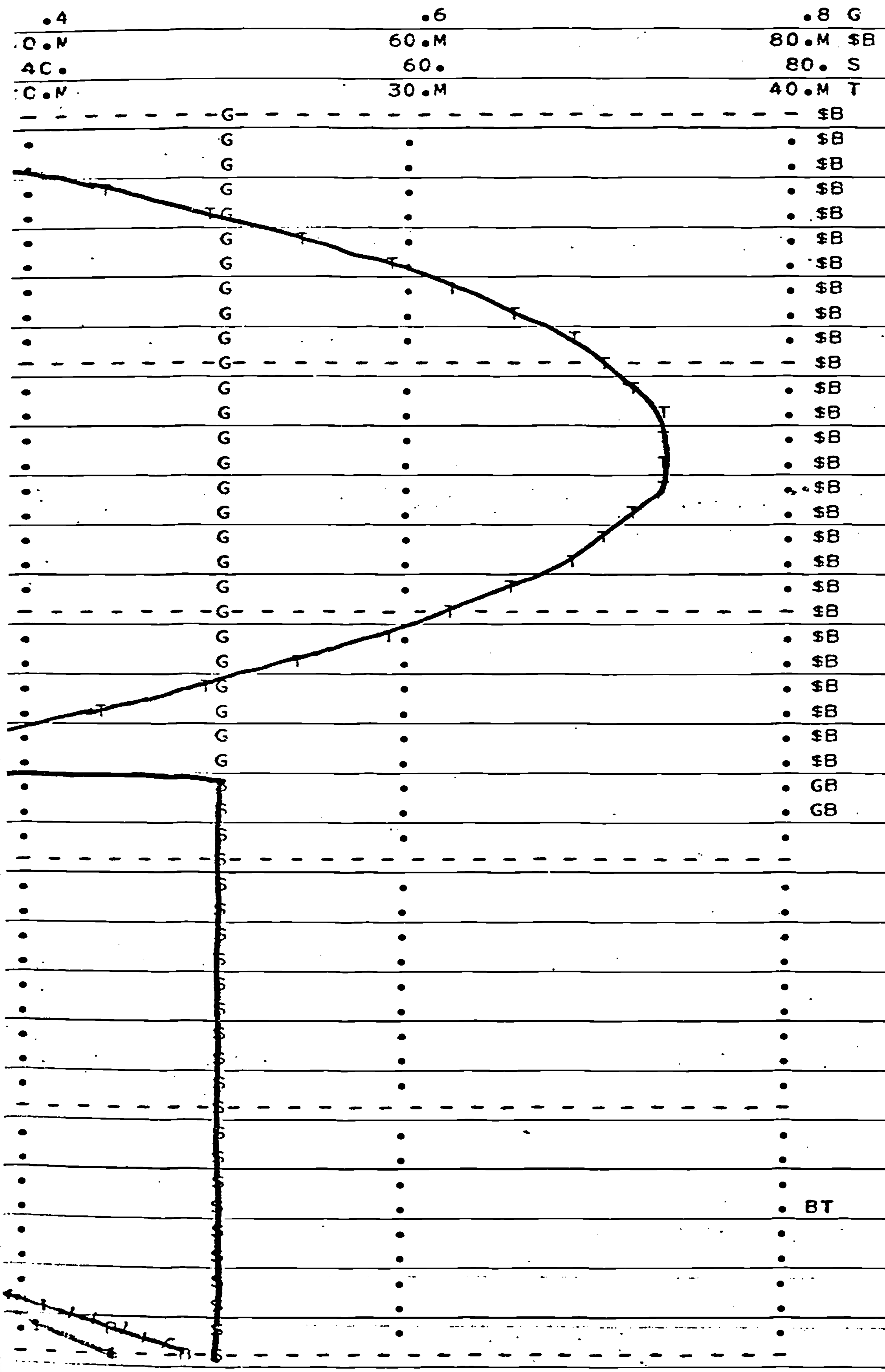
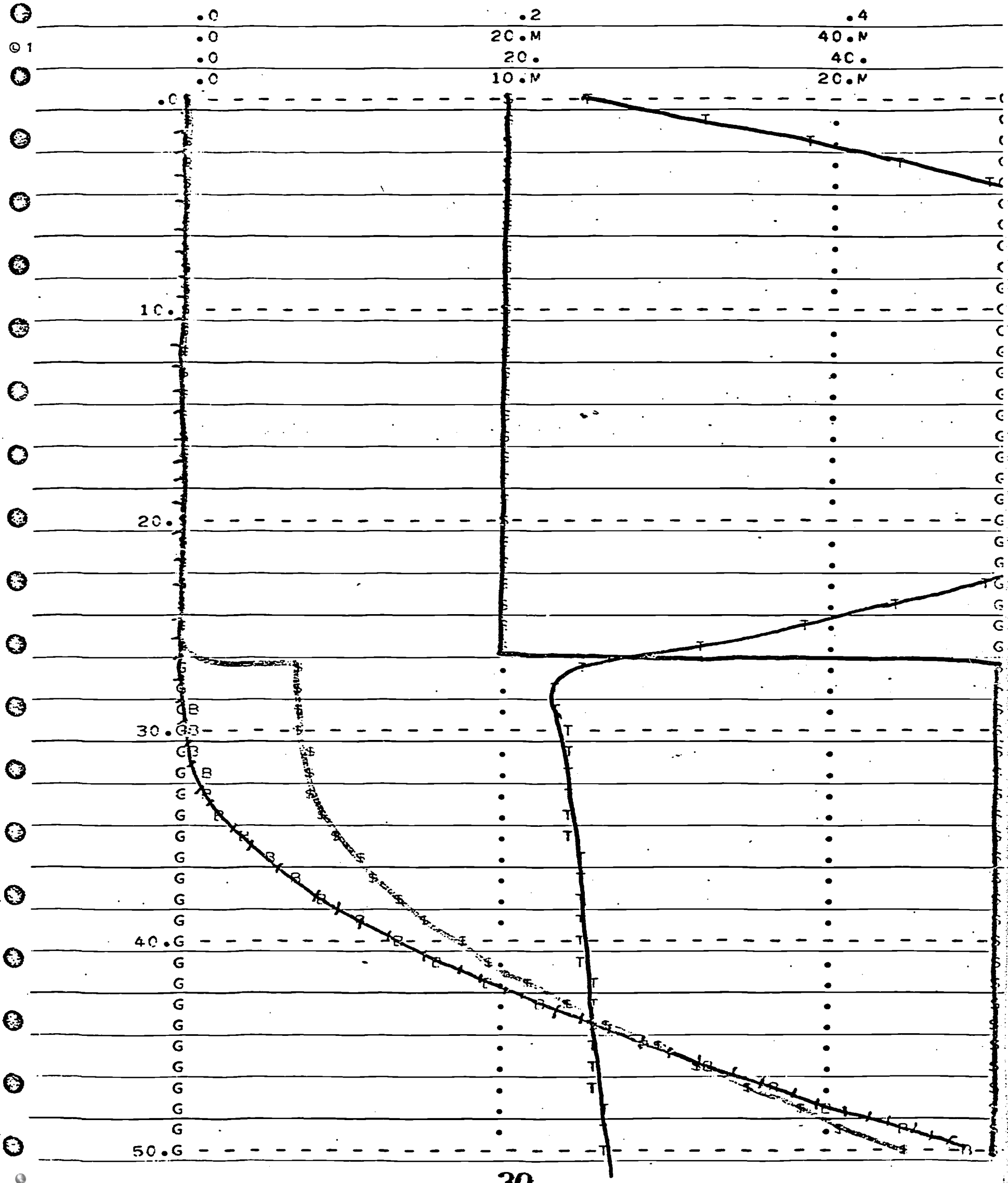

.4
.6
.8 G
0.M
60.M
80.M $B
4C.
60.
80. S
C.M
30.M
40.M T
G
$B
GB
BT

Figure 3

PAGE 8 7 8 9 GRADES REMEDIAL EDUCATIC TAX MODEL

AVEACH=G, COSTACH=$, TCTBCR=B, ACTST=S, TAXDOLL=T



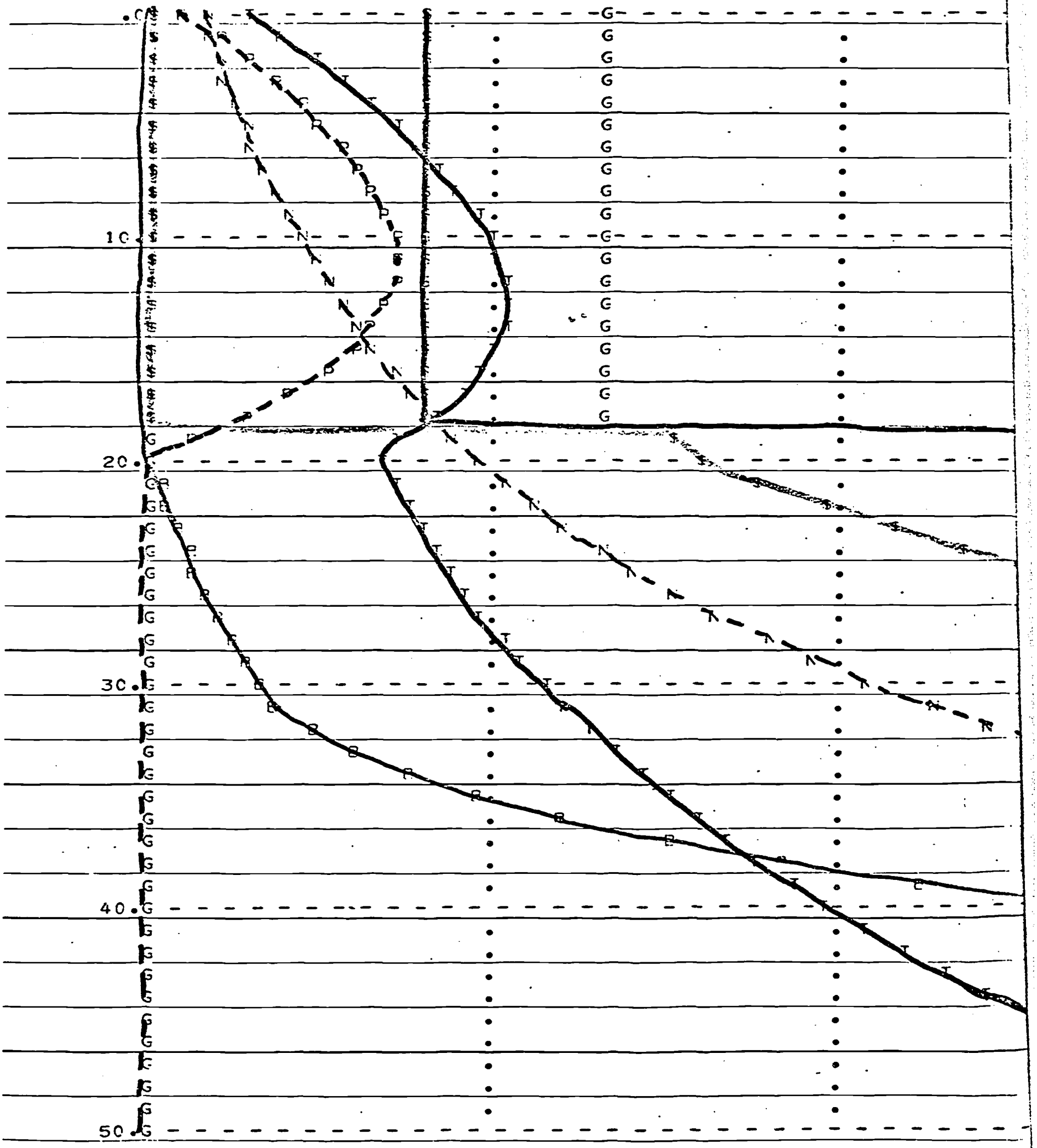
CTSPNT=N

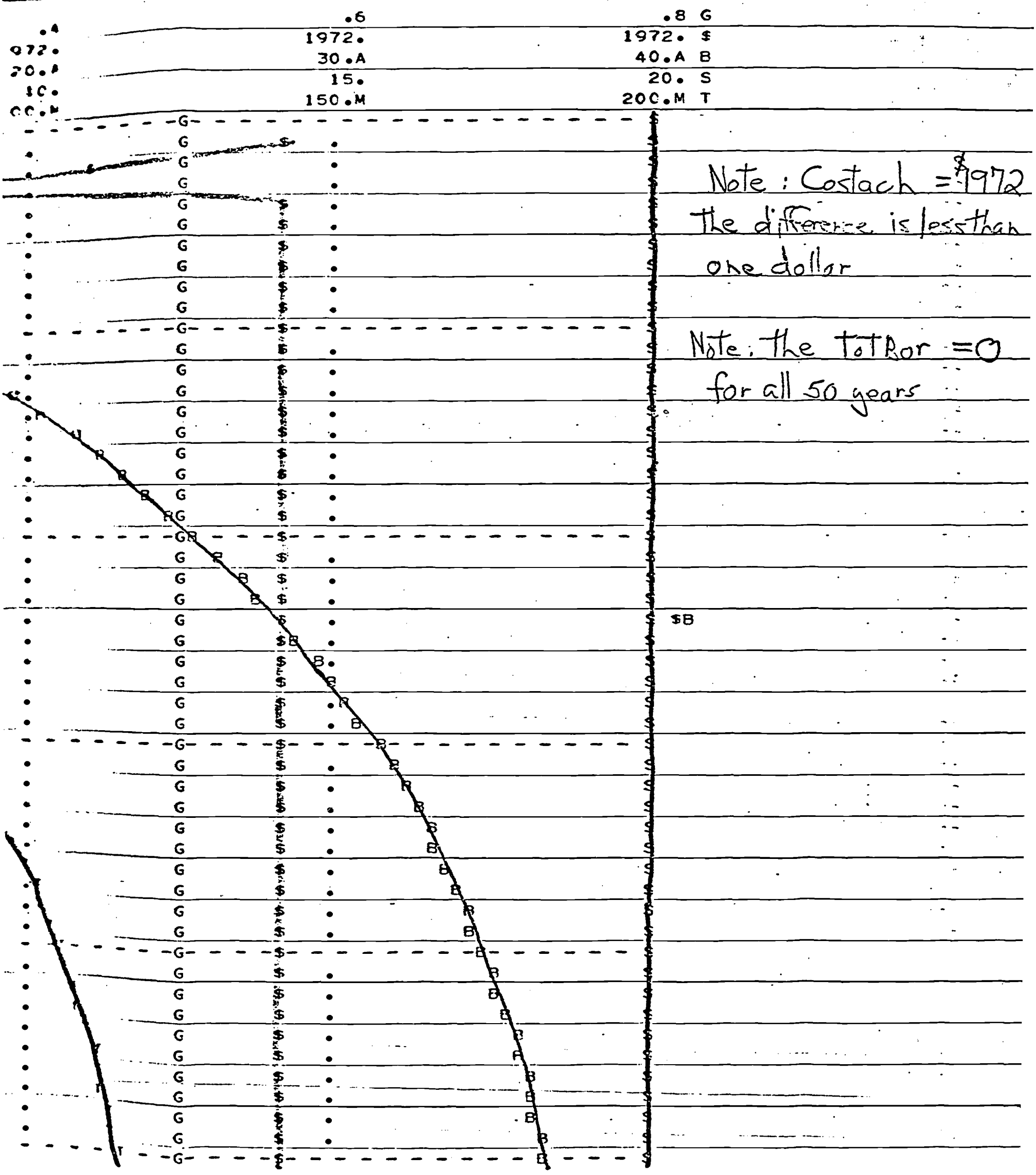
.75	1.125	1.5 G
5.M	37.5M	50.M $
C.M	150.M	200.M B
35.	47.5	60. S
.5M	131.3M	175.M T
5.M	112.5M	150.M PN
		$B
		$B
		$B
		$B
		$B
		$B
		$B
		$B
		$B
		$B
		$B
		$B
		$B
		$B
		$B
		$B
		$B
		$B
		$B,TN
		GB
		GBP
		GP
		GP
		GP
		GP
		GP
		GP
		GP
		GP
		GP
		GP
		GP
		GP
		GP
		GP
		GP
		BS,GP
		GP
		GP
		GP
		GP
		GP
		GP
		GP
		ST,GP
		GP

PAGE 8 7 8 9 GRADES REMEDIAL EDUCATIO TAX MODEL

AVEACH=G,COSTACH=$,TOTBOR=B,ACTST=S,TAXDOLL=T,SURPLUS=P,TOTSPNT=N

.0	.375	.75
.0	12.5M	25.M
.0	50.M	100.M
10.	22.5	35.
.0	43.8M	87.5M
.0	37.5M	75.M





Note: Costach = $1972 the difference is less than one dollar

Note: the TotBor = 0 for all 50 years

PAGE 8 7 8 9 GRADES REMEDIAL EDUCATIC TAX MODEL

AVEACH=G, CCSTACH=$, TOTRCR=B, ACTST=S, TAXCOLL=T

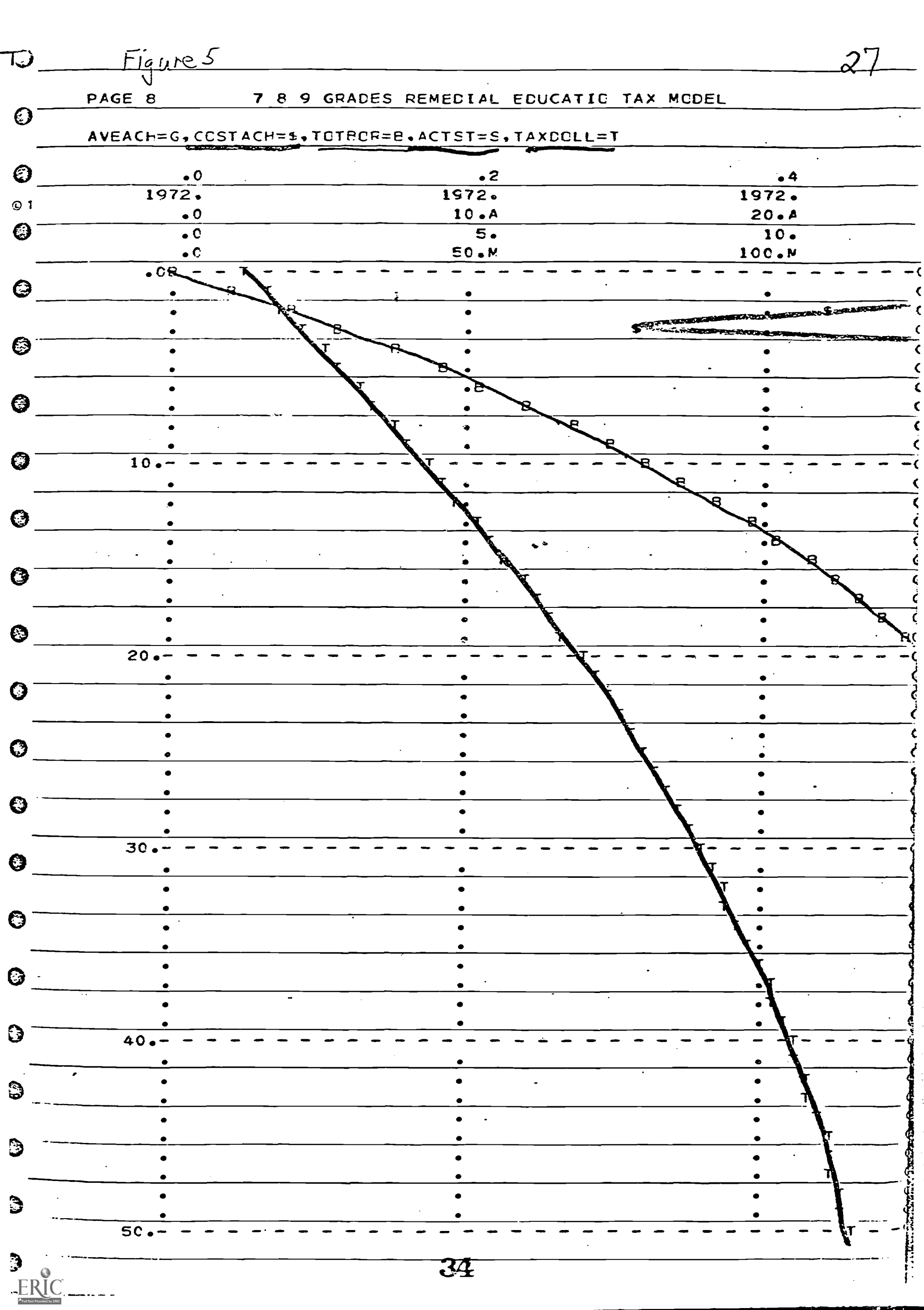
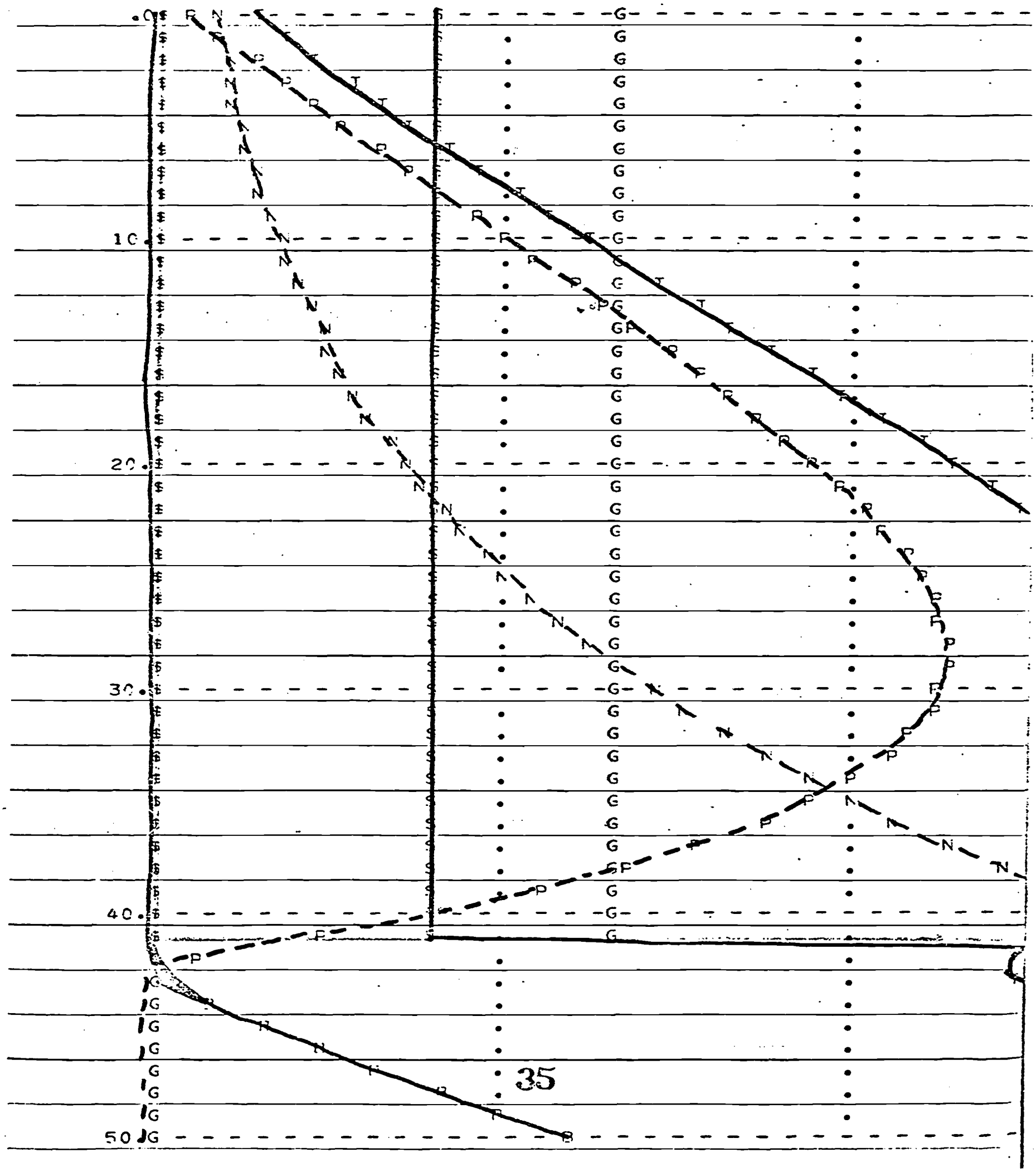


Figure 6

PAGE 8 7 8 9 GRADES REMEDIAL EDUCATIO TAX MODEL

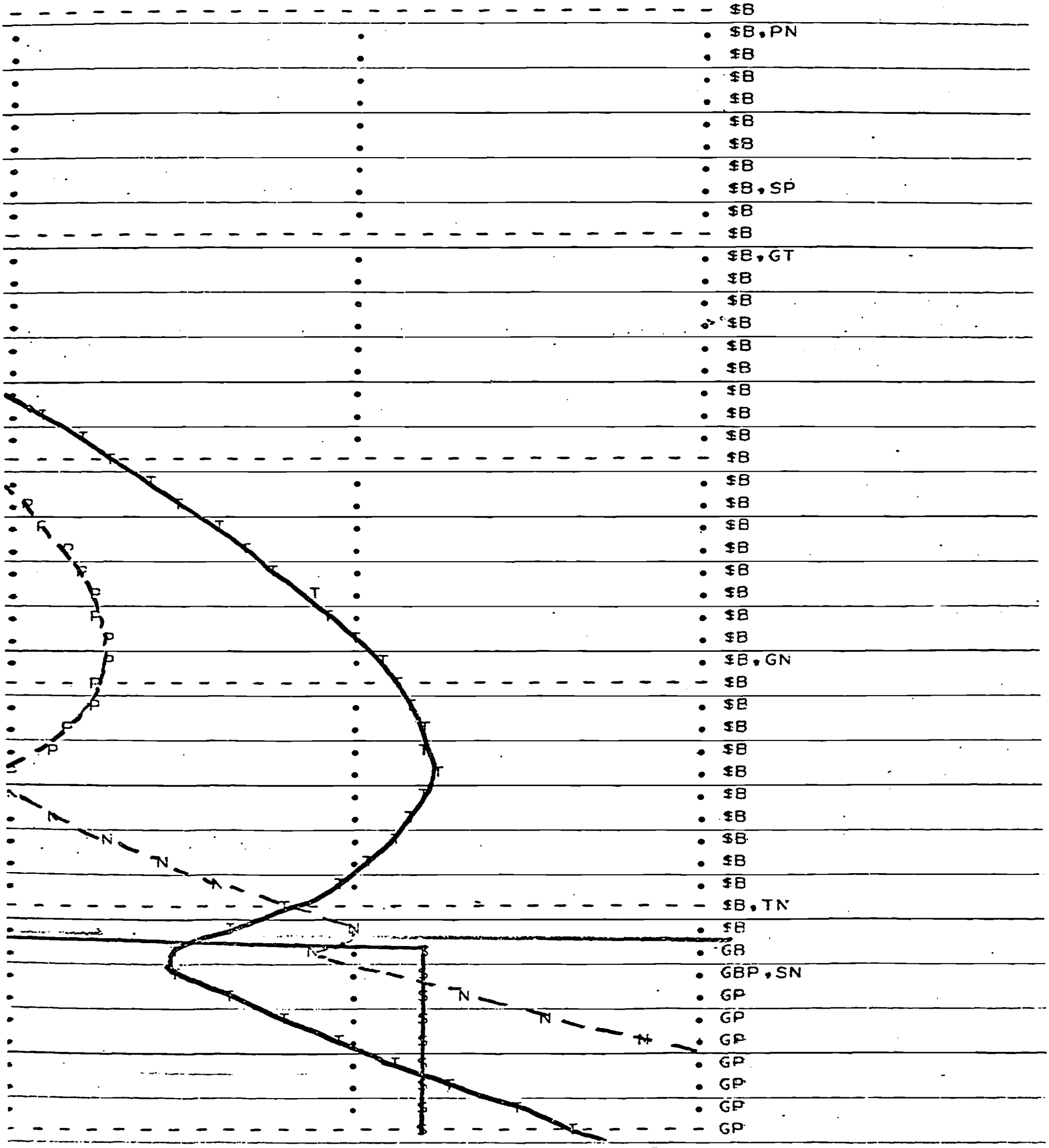
AVEACH=G,COSTACH=$,TOTBOR=B,ACTST=S,TAXCOLL=T,SURPLUS=P,TOTSPNT=N

.C	.375	.75
.0	12.5M	25.M
.0	50.M	100.M
10.	22.5	35.
.C	43.8M	87.5M
.C	37.5M	75.M

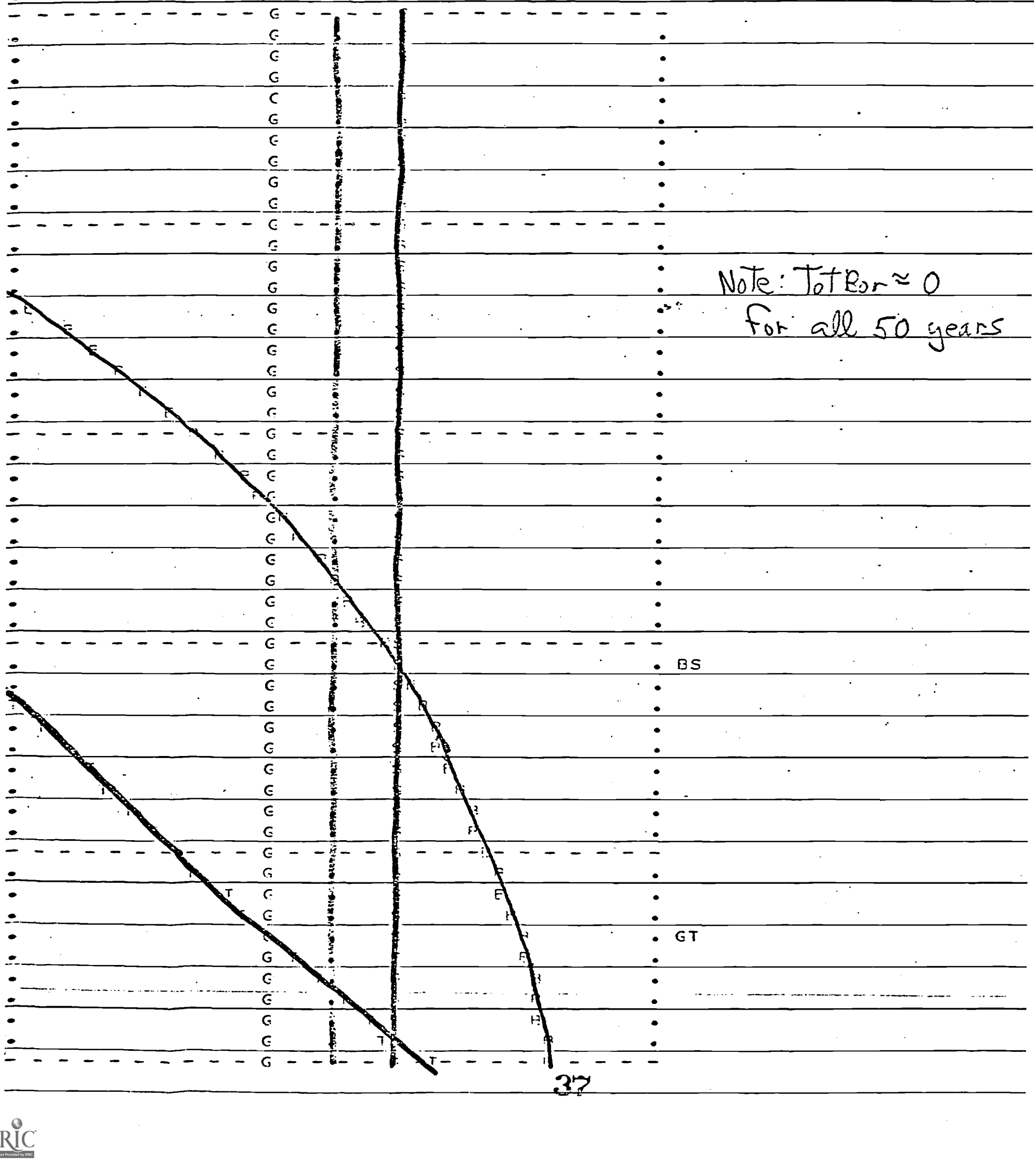


TOTSPNT=N

.75	1.125	1.5 G
25.M	37.5M	50.M $
1C.M	150.M	200.M B
35.	47.5	60. S
.5N	131.3M	175.M T
75.M	112.5M	150.M PN



1. 1.5 2. G
24. 1024.3 1024. $
3.A 30.A 40.A B
10. 15. 20. S
3.N 150.M 200.M T

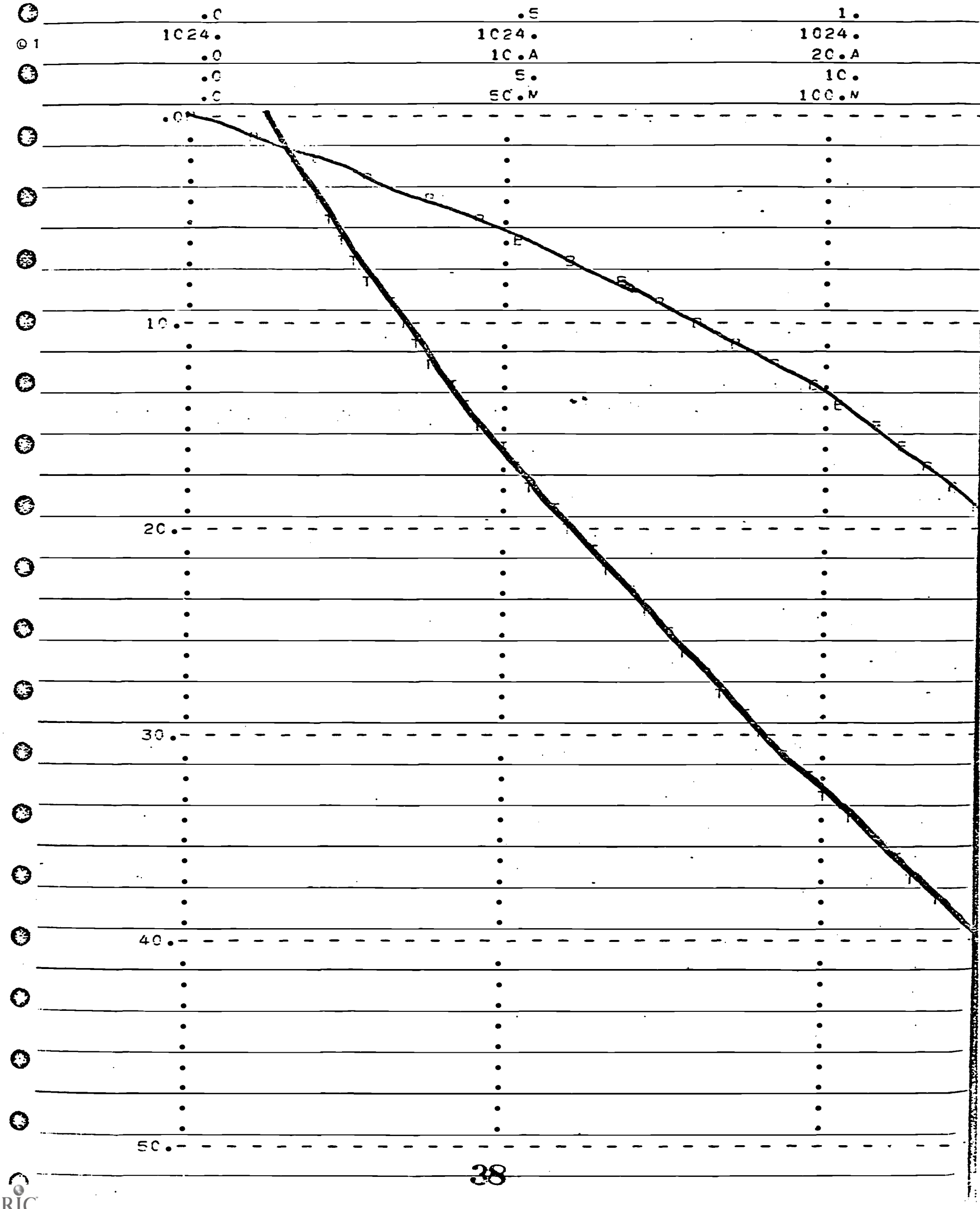


Note: TotBor ≈ 0
for all 50 years

Figure 7

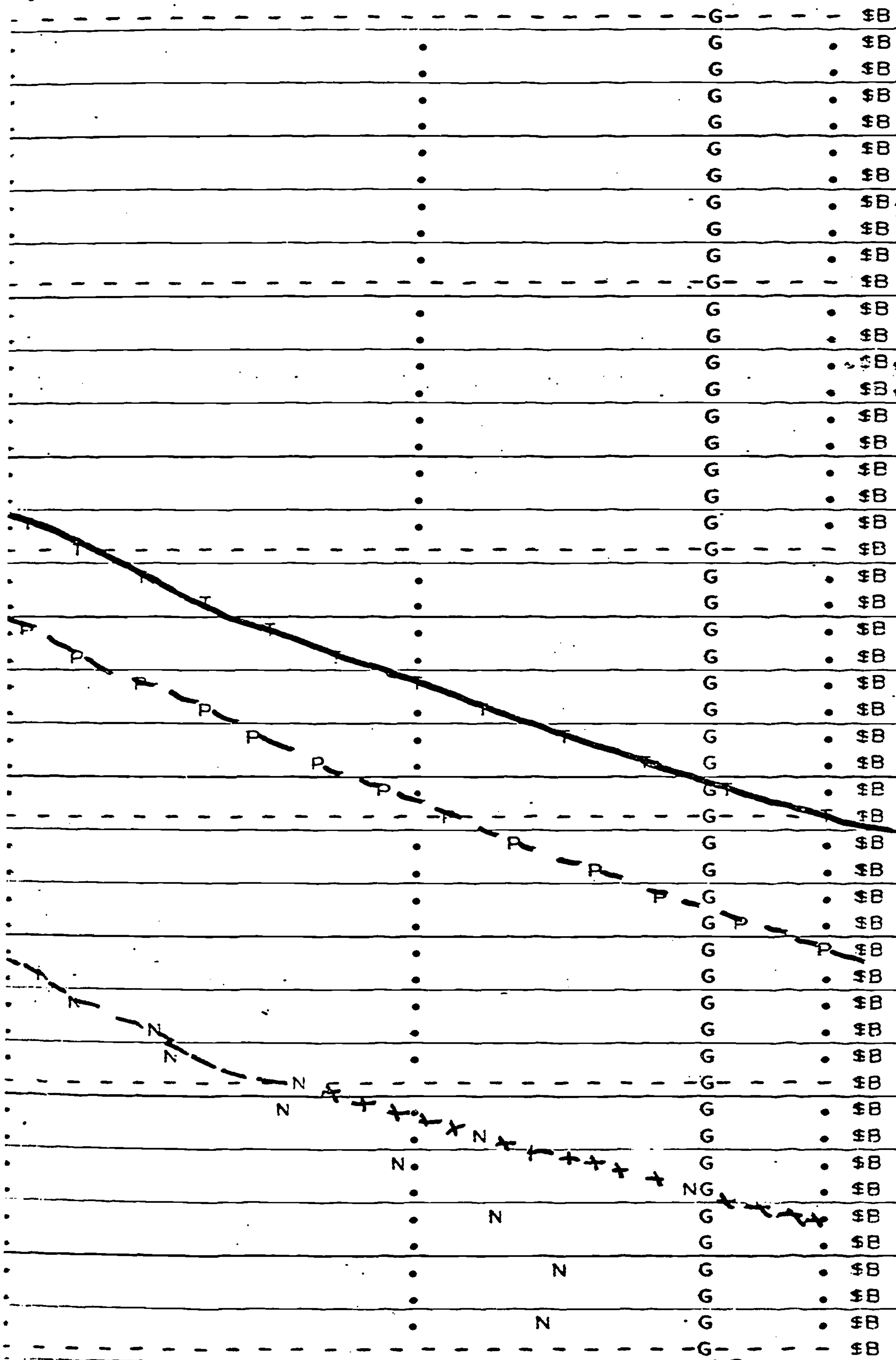
PAGE 5 7 8 9 GRADES REMEDIAL EDUCATIC TAX MCDEL

AVEACH=G,CCSTACH=4,TCTPCR=R,ACTST=S,TAXCOLL=T



-TSPNT=N

.75	1.125	1.5 G
.N	37.5M	50.M $
.N	150.M	200.M B
25.	47.5	60. S
.5N	131.3M	175.M T
.N	112.5M	150.M PN



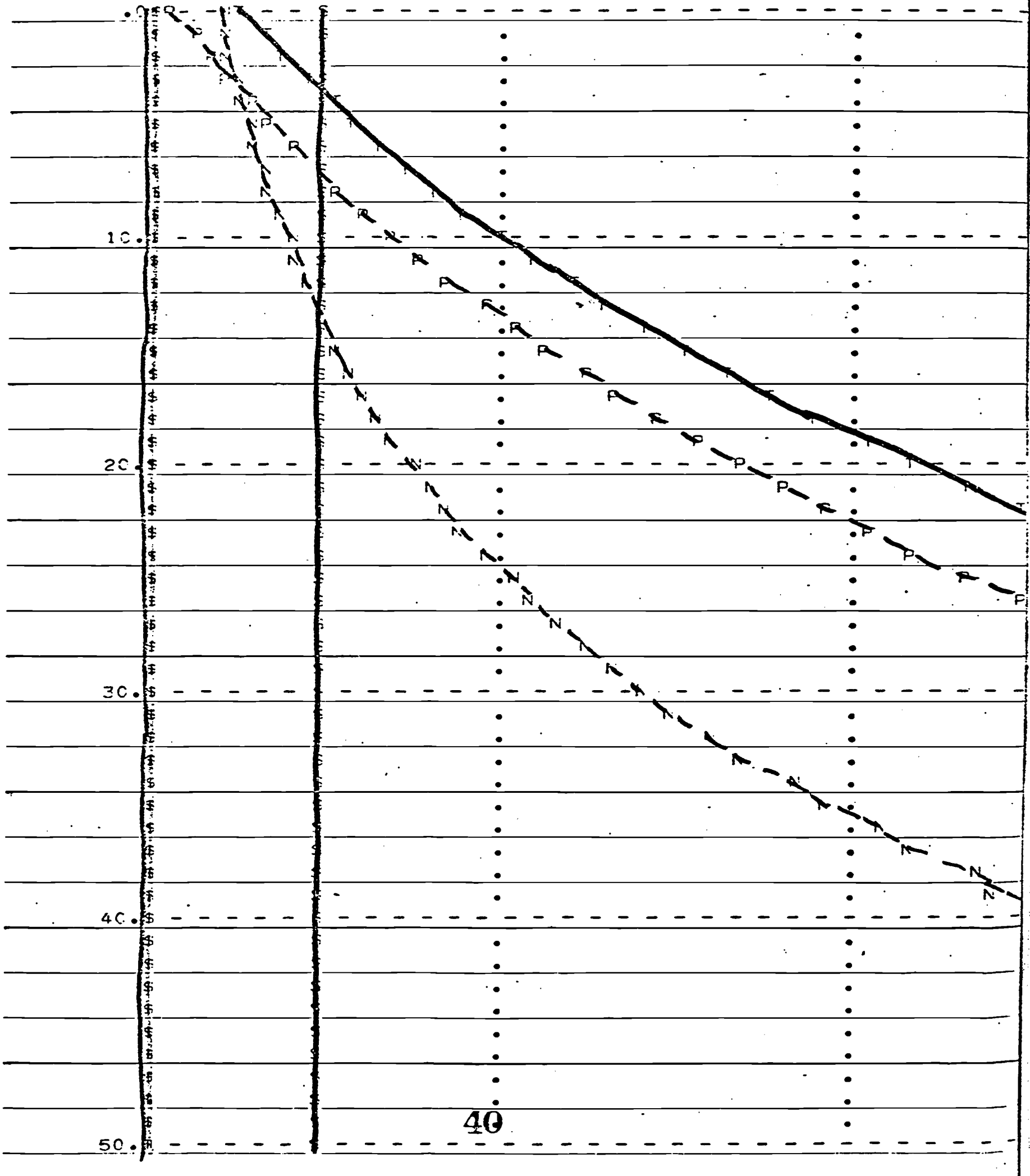
NoT The instability in TOTSPNT is due to initial condition rounding that was amplified over 40+ years

Figure 8

PAGE 8 7 8 9 GRADES REMEDIAL EDUCATIC TAX MODEL

AVEACH=G,COSTACH=$,TCTBOR=B,ACTST=S,TAXDOLL=T,SURPLUS=P,TCTSPNT=N

.0	.375	.75
.0	12.5M	25.M
.0	50.M	100.M
10.	22.5	35.
.0	43.8M	87.5M
.0	37.5M	75.M



E1

Porvrs	Needd	Need1	Teach0		Staff	Totach	Surplus	Need789
ECF	JHSGRAD		AVEHS	EELCWHS	EMPLOY1			
ENT	TOTDACH	AVEGRAD	ELCGRAD	EMPLOY2				
+06	E+03	E+03	E+03	E+03	E+00	E+00	E+06	E+00
+03	E+00	E+00	E+00	E+03				
+06	E+03	E+00	E+00	E+00				
988	.00	646.34	581.70	.00	.0000	677.50	3.671	1355.0
250	364.50	91.125	273.38	2.000				
429	1.993	91.125	273.38	2000.0				
079	.00	650.87	585.78	.00	.0000	682.25	7.341	1364.5
468	364.50	91.125	273.38	2.273				
091	2.232	91.125	273.38	2091.1				
.572	.00	652.80	587.52	.00	.0000	684.27	10.428	1368.5
686	368.55	92.137	277.42	2.547				
763	2.471	91.125	273.38	2182.3				
.476	.00	652.37	587.13	.00	.0000	683.82	12.920	1367.6
.905	371.63	92.908	279.49	2.820				
.428	2.710	91.125	273.38	2273.4				
.803	.00	652.43	587.19	.00	.0000	683.89	14.824	1367.8
.124	371.01	92.754	278.11	3.094				
.083	2.949	91.125	273.38	2364.5				
.548	.00	652.42	587.18	.00	.0000	683.88	16.151	1367.8
.342	372.07	93.018	279.32	3.367				
.742	3.188	92.137	277.42	2455.6				
.717	.00	652.43	587.18	.00	.0000	683.88	16.896	1367.8
.561	371.63	92.909	278.62	3.644				
.397	3.428	92.908	279.49	2547.8				
.303	.00	652.43	587.18	.00	.0000	683.88	17.064	1367.8

Figure 9 Example Printout

PAGE 2 RUN-2 7 8 9 GRADES REMEDIAL EDUCATION TAX MODEL

Time AVEACH	Taxdoll ENROLL7 DROP7 COSTACH	Totdrpd TOTEDR	Other ENROLL8 DROP8 ACTST	Not789D ENROLL9 DROP9 NEED2	7thN789 DROPHS1 DROPHS PAY	TOTDROP TOTSENT	JHSGRAD TOTTEACH A
E+00	E+06	E+06	E+03	E+06	E+06	E+06	E+03
E+00							
	E+00	E+06	E+00	E+00	E+00	E+03	E+00
	E+00		E+00	E+00	E+00	E+06	E+03
	E+06		E+00	E+03	E+06		
.0	12.771	.750	3343.3	8.677	.690	7.988	.00
.50000							
	500.00	.00	450.00	405.00	82.01	.250	364.50
	50.000		45.000	40.500	82.01	5.429	1.993
	.00		20.000	258.53	.000		
1.	16.519	1.403	3343.3	11.773	.695	11.079	.00
.50000							
	500.00	.00	455.00	409.50	82.01	.468	364.50
	50.000		45.500	40.950	82.01	6.091	2.232
	.00		20.000	260.35	.000		
2.	19.683	2.058	3355.7	14.269	.697	13.572	.00
.50000							
	500.00	.00	454.50	414.05	82.01	.686	368.55
	50.000		45.450	41.405	82.01	6.763	2.471
	.00		20.000	261.12	.000		
3.	22.252	2.715	3365.1	16.172	.696	15.476	.00
.50000							
	500.00	.00	454.55	413.09	83.23	.905	371.63
	50.000		45.455	41.309	82.01	7.428	2.710
	.00		20.000	260.95	.000		
4.	24.234	3.371	3363.2	17.500	.696	16.803	.00
.50000							
	500.00	.00	454.54	413.24	83.85	1.124	371.01
	50.000		45.454	41.324	82.01	8.083	2.949
	.00		20.000	260.97	.000		
5.	25.638	4.027	3366.4	18.245	.696	17.548	.00
.50000							
	500.00	.00	454.55	413.22	83.43	1.342	372.07
	50.000		45.455	41.322	82.01	8.742	3.188
	.00		20.000	260.97	.000		
6.	26.462	4.684	3365.1	18.413	.696	17.717	.00
.50000							
	500.00	.00	454.55	413.22	83.80	1.561	371.63
	50.000		45.455	41.322	83.23	9.397	3.428
	.00		20.000	260.97	.000		
7.	26.709	5.344	3366.2	17.999	.696	17.303	.00

EI

.781	372.01	93.002	279.10	3.924				
.058	3.668	92.754	278.11	2640.7				
307	.00	652.43	587.18	.00	.0000	683.88	16.651	1367.8
.002	371.81	92.952	278.80	4.202				
.720	3.910	93.018	279.32	2733.4				
.729	.00	652.43	587.18	.00	.0000	683.88	15.655	1367.8
.222	371.95	92.988	279.00	4.481				
381	4.151	92.909	278.62	2826.4				
.569	.00	652.43	587.18	.00	.0000	683.88	14.077	1367.8
.443	371.86	92.966	278.88	4.760				
.042	4.392	93.002	279.10	2919.4				
.826	.00	652.43	587.18	.00	.0000	683.88	11.916	1367.8
.663	371.92	92.981	278.96	5.039				
.703	4.633	92.952	278.80	3012.4				
.501	.00	652.43	587.18	.00	.0000	683.88	9.173	1367.8
.883	371.89	92.972	278.91	5.318				
.365	4.875	92.988	279.00	3105.3				
.593	.00	652.43	587.18	.00	.0000	683.88	5.848	1367.8
.104	371.91	92.977	278.94	5.597				
.026	5.116	92.966	278.88	3198.3				
.261	260.97	652.43	587.18	391.46	1.0000	.14	1.941	1367.8
.324	371.89	.019	278.92	5.876				
.296	6.947	92.981	278.96	3291.3				
.261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
.545	464.86	.023	464.84	6.155				
.270	6.949	92.972	278.91	3384.2				
.261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
.765	371.90	.019	371.87	6.433				
.714	7.636	92.977	278.94	3477.2				

PAGE 3 RUN-2 7 8 9 GRADES REMEDIAL EDUCATIC TAX MODEI

.50000							
	500.00	.00	454.55	413.22	83.58	1.781	372.01
	50.000		45.455	41.322	83.85	10.058	3.668
	.00		20.000	260.97	.000		
8.	26.374	6.005	3365.6	17.003	.696	16.307	.00
.50000							
	500.00	.00	454.55	413.22	83.73	2.002	371.81
	50.000		45.455	41.322	83.43	10.720	3.910
	.00		20.000	260.97	.000		
9.	25.457	6.666	3366.1	15.425	.696	14.729	.00
.50000							
	500.00	.00	454.55	413.22	83.64	2.222	371.95
	50.000		45.455	41.322	83.80	11.381	4.151
	.00		20.000	260.97	.000		
10.	23.958	7.328	3365.8	13.265	.696	12.569	.00
.50000							
	500.00	.00	454.55	413.22	83.70	2.443	371.86
	50.000		45.455	41.322	83.58	12.042	4.392
	.00		20.000	260.97	.000		
11.	21.877	7.989	3366.0	10.522	.696	9.826	.00
.50000							
	500.00	.00	454.55	413.22	83.66	2.663	371.92
	50.000		45.455	41.322	83.73	12.703	4.633
	.00		20.000	260.97	.000		
12.	19.213	8.650	3365.9	7.197	.696	6.501	.00
.50000							
	500.00	.00	454.55	413.22	83.69	2.883	371.89
	50.000		45.455	41.322	83.64	13.365	4.875
	.00		20.000	260.97	.000		
13.	15.967	9.312	3365.9	3.290	.696	2.593	.00
.50000							
	500.00	.00	454.55	413.22	83.67	3.104	371.91
	50.000		45.455	41.322	83.70	14.026	5.116
	.00		20.000	260.97	.000		
14.	12.139	9.973	3365.9	-1.200	.696	.261	260.97
.00010							
	500.00	.00	454.55	413.22	83.68	3.324	371.89
	50.000		45.455	41.322	83.66	14.296	6.947
	7.00		50.000	260.97	.000		
15.	10.277	10.634	3650.1	-4.008	.725	.261	260.97
.00010							
	500.00	.26	454.55	413.22	83.68	3.545	464.86
	50.000		45.455	41.322	83.69	15.270	6.949
	7.21		50.000	260.97	.013		
16.	10.356	11.296	3365.9	-4.306	.792	.261	260.97
.00010							
	500.00	.87	454.55	413.22	139.45	3.765	371.90
	50.000		45.455	41.322	83.67	15.714	7.636
	7.69		50.000	260.97	.043		

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=CF JHSGRAD	AVEHS	FELCWHS	EMPLOY1				
=NT TOTDACH	AVEGRAD	FLCGRAD	EMPLOY2				
261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
586	371.91	.019	371.89	6.712				
=03	8.019	.019	278.92	3570.2				
261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
2C6	371.90	.019	371.88	6.991				
349	8.430	.023	464.84	3570.2				
261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
427	371.90	.019	371.88	7.456				
254	8.870	.019	371.87	3570.2				
261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
7C3	371.90	.019	371.88	7.828				
380	9.417	.019	371.89	3570.2				
261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
551	371.90	.019	371.88	8.200				
492	9.957	.019	371.88	3570.3				
261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
2CC	371.90	.019	371.88	8.572				
661	10.526	.019	371.88	3570.3				
261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
448	371.90	.019	371.88	8.944				
885	11.120	.019	371.88	3570.3				
261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
656	371.90	.019	371.88	9.316				
101	11.740	.019	371.88	3570.3				
261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8

PAGE 4 RUN-2 7 8 9 GRADES REMEDIAL EDUCATIC TAX MODEL

	AVEACH ENROLL7 DROP7 COSTACH	TOTEOR	ENROLL8 DROP8 ACTST	ENROLL9 DROP9 NEED2	DROPHS1 DROPHS PAY	TOTDROP TOTSPNT	JHSGRAD TOTCACH A
17. .00010	10.435	11.957	3365.9	-4.888	.919	.261	260.97
	500.00	2.02	454.55	413.22	111.56	3.986	371.91
	50.000		45.455	41.322	83.68	16.503	8.019
	8.63		50.000	260.97	.101		
18. .00010	10.477	12.619	3365.9	-5.508	1.104	.261	260.97
	500.00	3.71	454.55	413.22	111.57	4.206	371.90
	50.000		45.455	41.322	83.68	17.349	8.430
	9.98		50.000	260.97	.185		
19. .00010	10.547	13.280	3365.9	-6.099	1.348	.261	260.97
	500.00	5.92	454.55	413.22	111.56	4.427	371.90
	50.000		45.455	41.322	139.45	18.254	8.870
	11.76		50.000	260.97	.296		
20. .00010	10.602	14.109	3365.9	-6.872	1.645	.261	260.97
	500.00	8.62	454.55	413.22	111.56	4.703	371.90
	50.000		45.455	41.322	111.56	19.380	9.417
	13.93		50.000	260.97	.431		
21. .00010	10.658	14.854	3365.9	-7.561	2.012	.261	260.97
	500.00	11.96	454.55	413.22	111.56	4.951	371.90
	50.000		45.455	41.322	111.57	20.492	9.957
	16.61		50.000	260.97	.598		
22. .00010	10.714	15.599	3365.9	-8.251	2.436	.261	260.97
	500.00	15.82	454.55	413.22	111.56	5.200	371.90
	50.000		45.455	41.322	111.56	21.661	10.526
	19.72		50.000	260.97	.791		
23. .00010	10.770	16.344	3365.9	-8.940	2.915	.261	260.97
	500.00	20.17	454.55	413.22	111.56	5.448	371.90
	50.000		45.455	41.322	111.56	22.885	11.120
	23.22		50.000	260.97	1.005		
24. .00010	10.825	17.089	3365.9	-9.629	3.446	.261	260.97
	500.00	25.00	454.55	413.22	111.56	5.696	371.90
	50.000		45.455	41.322	111.56	24.161	11.740
	27.10		50.000	260.97	1.250		
25.	10.881	17.834	3365.9	-10.318	4.026	.261	260.97

45	371.90	.019	371.88	9.687				
57	12.384	.019	371.88	3570.3				
61	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
53	371.90	.019	371.88	10.059				
59	13.051	.019	371.88	3570.4				
61	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
41	371.90	.019	371.88	10.431				
75	13.739	.019	371.88	3570.4				
61	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
50	371.90	.019	371.88	10.803				
34	14.448	.019	371.88	3570.4				
61	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
38	371.90	.019	371.88	11.175				
33	15.176	.019	371.88	3570.4				
61	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
86	371.90	.019	371.88	11.547				
70	15.923	.019	371.88	3570.4				
61	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
35	371.90	.019	371.88	11.919				
42	16.688	.019	371.88	3570.5				
61	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
83	371.90	.019	371.88	12.291				
50	17.469	.019	371.88	3570.5				
61	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
31	371.90	.019	371.88	12.662				
91	18.266	.019	371.88	3570.5				
61	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
80	371.90	.019	371.88	13.034				
62	19.078	.019	371.88	3570.5				

PAGE 5 RUN=2 7 8 9 GRADES REMEDIAL EDUCATIC TAX MODEL

.00010							
	500.00	30.27	454.55	413.22	111.56	5.945	371.90
	50.000		45.455	41.322	111.56	25.487	12.384
	31.34		50.000	260.97	1.514		
- - - - - - - - - -							
26.	10.937	18.579	3365.9	-11.008	4.653	.261	260.97
.00010							
	500.00	35.97	454.55	413.22	111.56	6.193	371.90
	50.000		45.455	41.322	111.56	26.859	13.051
	35.93		50.000	260.97	1.799		
- - - - - - - - - -							
27.	10.993	19.324	3365.9	-11.697	5.324	.261	260.97
.00010							
	500.00	42.08	454.55	413.22	111.56	6.441	371.90
	50.000		45.455	41.322	111.56	28.275	13.739
	40.84		50.000	260.97	2.104		
- - - - - - - - - -							
28.	11.049	20.069	3365.9	-12.386	6.038	.261	260.97
.00010							
	500.00	48.56	454.55	413.22	111.56	6.690	371.90
	50.000		45.455	41.322	111.56	29.734	14.448
	46.05		50.000	260.97	2.428		
- - - - - - - - - -							
29.	11.104	20.814	3365.9	-13.075	6.792	.261	260.97
.00010							
	500.00	55.42	454.55	413.22	111.56	6.938	371.90
	50.000		45.455	41.322	111.56	31.233	15.176
	51.57		50.000	260.97	2.771		
- - - - - - - - - -							
30.	11.160	21.559	3365.9	-13.764	7.584	.261	260.97
.00010							
	500.00	62.62	454.55	413.22	111.56	7.186	371.90
	50.000		45.455	41.322	111.56	32.770	15.923
	57.36		50.000	260.97	3.131		
- - - - - - - - - -							
31.	11.216	22.304	3365.9	-14.454	8.412	.261	260.97
.00010							
	500.00	70.14	454.55	413.22	111.56	7.435	371.90
	50.000		45.455	41.322	111.56	34.343	16.688
	63.41		50.000	260.97	3.507		
- - - - - - - - - -							
32.	11.272	23.049	3365.9	-15.143	9.275	.261	260.97
.00010							
	500.00	77.99	454.55	413.22	111.56	7.683	371.90
	50.000		45.455	41.322	111.56	35.950	17.469
	69.72		50.000	260.97	3.859		
- - - - - - - - - -							
33.	11.328	23.794	3365.9	-15.832	10.170	.261	260.97
.00010							
	500.00	86.12	454.55	413.22	111.56	7.931	371.90
	50.000		45.455	41.322	111.56	37.591	18.266
	76.26		50.000	260.97	4.206		
- - - - - - - - - -							
34.	11.383	24.539	3365.9	-16.521	11.096	.261	260.97
.00010							
	500.00	94.55	454.55	413.22	111.56	8.180	371.90
	50.000		45.455	41.322	111.56	39.262	19.078
	83.03		50.000	260.97	4.727		
- - - - - - - - - -							

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RCF JHSGRAD	AVEHS	PELCNHS	EMPLCY1				
ENJ TGTDACH	AVEGRAD	PLCGRAD	EMPLOY2				
261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
428	371.90	.019	371.88	13.406				
563	19.904	.019	371.88	3570.5				
261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
676	371.90	.019	371.88	13.778				
652	20.744	.019	371.88	3570.5				
261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
525	371.90	.019	371.88	14.150				
447	21.597	.019	371.88	3570.6				
261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
173	371.90	.019	371.88	14.522				
228	22.463	.019	371.88	3570.6				
261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
421	371.90	.019	371.88	14.894				
133	23.340	.019	371.88	3570.6				
261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
370	371.90	.019	371.88	15.266				
260	24.228	.019	371.88	3570.6				
261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
318	371.90	.019	371.88	15.637				
205	25.126	.019	371.88	3570.6				
261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8
266	371.90	.019	371.88	16.009				
175	26.035	.019	371.88	3570.7				
261	260.97	652.43	587.18	391.46	1.0000	.14	.000	1367.8

PAGE 6 RUN-2 7 8 9 GRADES REMEDIAL EDUCATIC TAX MCDEL

	AVEACH ENROLL7 DRCP7 CCSTACH	TOTEOR	ENROLL8 DROP8 ACTST	ENROLL9 DRCP9 NEED2	DRCPHS1 DRCPHS PAY	TOTCRCF TOTSENT	JHSGRAD TOTCACH A
35.	11.439	25.284	3365.9	-17.211	12.052	.261	260.97
.00010							
	500.00	103.23	454.55	413.22	111.56	8.428	371.90
	50.000		45.455	41.322	111.56	40.963	19.904
	90.02		50.000	260.97	5.162		
36.	11.495	26.029	3365.9	-17.900	13.036	.261	260.97
.00010							
	500.00	112.18	454.55	413.22	111.56	8.676	371.90
	50.000		45.455	41.322	111.56	42.692	20.744
	97.22		50.000	260.97	5.609		
37.	11.551	26.774	3365.9	-18.589	14.046	.261	260.97
.00010							
	500.00	121.36	454.55	413.22	111.56	8.925	371.90
	50.000		45.455	41.322	111.56	44.447	21.597
	104.60		50.000	260.97	6.068		
38.	11.607	27.519	3365.9	-19.278	15.082	.261	260.97
.00010							
	500.00	130.78	454.55	413.22	111.56	9.173	371.90
	50.000		45.455	41.322	111.56	46.228	22.463
	112.18		50.000	260.97	6.539		
39.	11.662	28.264	3365.9	-19.968	16.142	.261	260.97
.00010							
	500.00	140.41	454.55	413.22	111.56	9.421	371.90
	50.000		45.455	41.322	111.56	48.033	23.340
	119.92		50.000	260.97	7.021		
40.	11.718	29.009	3365.9	-20.657	17.224	.261	260.97
.00010							
	500.00	150.26	454.55	413.22	111.56	9.670	371.90
	50.000		45.455	41.322	111.56	49.860	24.228
	127.84		50.000	260.97	7.513		
41.	11.774	29.754	3365.9	-21.346	18.325	.261	260.97
.00010							
	500.00	160.30	454.55	413.22	111.56	9.918	371.90
	50.000		45.455	41.322	111.56	51.709	25.126
	135.91		50.000	260.97	8.015		
42.	11.830	30.499	3365.9	-22.035	19.454	.261	260.97
.00010							
	500.00	170.52	454.55	413.22	111.56	10.166	371.90
	50.000		45.455	41.322	111.56	53.579	26.035
	144.14		50.000	260.97	8.526		
43.	11.885	31.244	3365.9	-22.724	20.598	.261	260.97

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415  371.90     .019   371.88   16.381
465  26.953     .019   371.88   3570.7

261  260.97  652.43  587.18  391.46     1.0000     .14     .000  1367.8

663  371.90     .019   371.88   16.753
377  27.880     .019   371.88   3570.7

261  260.97  652.43  587.18  391.46     1.0000     .14     .000  1367.8

511  371.90     .019   371.88   17.125
303  28.816     .019   371.88   3570.7

261  260.97  652.43  587.18  391.46     1.0000     .14     .000  1367.8

160  371.90     .019   371.88   17.497
245  29.760     .019   371.88   3570.7

261  260.97  652.43  587.18  391.46     1.0000     .14     .000  1367.8

408  371.90     .019   371.88   17.869
204  30.711     .019   371.88   3570.7

261  260.97  652.43  587.18  391.46     1.0000     .14     .000  1367.8

656  371.90     .019   371.88   18.241
177  31.670     .019   371.88   3570.8

261  260.97  652.43  587.18  391.46     1.0000     .14     .000  1367.8

905  371.90     .019   371.88   18.613
169  32.636     .019   371.88   3570.8

261  260.97  652.43  587.18  391.46     1.0000     .14     .000  1367.8

153  371.90     .019   371.88   18.984
167  33.609     .019   371.88   3570.8
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PAGE 7 RUN-2 7 8 9 GRADES REMEDIAL EDUCATIC TAX MODEL

.00010							
	500.00	180.93	454.55	413.22	111.56	10.415	371.90
	50.000		45.455	41.322	111.56	55.469	26.953
	152.50		50.000	260.97	9.046		
44.	11.941	31.989	3365.9	-23.414	21.761	.261	260.97
.00010							
	500.00	191.50	454.55	413.22	111.56	10.663	371.90
	50.000		45.455	41.322	111.56	57.377	27.880
	161.01		50.000	260.97	9.575		
45.	11.997	32.734	3365.9	-24.103	22.942	.261	260.97
.00010							
	500.00	202.23	454.55	413.22	111.56	10.911	371.90
	50.000		45.455	41.322	111.56	59.303	28.816
	169.64		50.000	260.97	10.112		
46.	12.053	33.479	3365.9	-24.792	24.139	.261	260.97
.00010							
	500.00	213.12	454.55	413.22	111.56	11.160	371.90
	50.000		45.455	41.322	111.56	61.245	29.760
	178.39		50.000	260.97	10.656		
47.	12.109	34.224	3365.9	-25.481	25.353	.261	260.97
.00010							
	500.00	224.15	454.55	413.22	111.56	11.408	371.90
	50.000		45.455	41.322	111.56	63.204	30.711
	187.27		50.000	260.97	11.208		
48.	12.164	34.969	3365.9	-26.171	26.581	.261	260.97
.00010							
	500.00	235.32	454.55	413.22	111.56	11.656	371.90
	50.000		45.455	41.322	111.56	65.177	31.670
	196.25		50.000	260.97	11.766		
49.	12.220	35.714	3365.9	-26.860	27.824	.261	260.97
.00010							
	500.00	246.62	454.55	413.22	111.56	11.905	371.90
	50.000		45.455	41.322	111.56	67.165	32.636
	205.34		50.000	260.97	12.331		
50.	12.276	36.459	3365.9	-27.549	29.081	.261	260.97
.00010							
	500.00	258.04	454.55	413.22	111.56	12.153	371.90
	50.000		45.455	41.322	111.56	69.167	33.609
	214.52		50.000	260.97	12.902		

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