Methodology

Introduction

The *Program* was designed to move families from government dependence to self-reliance. This benefit-cost model was created to estimate the long term benefits to families and taxpayers from the services provided through the *Program*. These services include employment training, wrap-around life skills, and tutoring resources for children. This benefit-cost model examines the long term monetary impacts to clients and taxpayers from changes in client wages, changes in the amount of CalFresh benefits and changes to children's educational outcomes.

This tool does not evaluate the implementation or the effectiveness of the *Program* and is best used alongside of a rigorous outcome evaluation of the program. The outcome data and assumptions were estimated by the staff of the *Program* and the County.

Impact on Increased Wages

The *Program* is designed to increase clients' wages through employment and GED training. This model examines the differences in wages between the *Program* clients and a similar group of individuals who did not receive the *Program* services. The *Program* staff worked to gather wage data for the *Program* participants and similar individuals who did not participate in the *Program*. These wages are entered into the model and the wage difference is used to estimate the long term benefits of the program (see equation 1). Part of the difference in wages is likely a result of the program and part of the difference may be from motivational differences between the two groups. The benefit-cost model allows the user to adjust the causal impact of the program. A number closer to one assumes that most of the wage differences are caused by the program and a number closer to zero assumes that most of the wage differences are caused by some other factor. The *Program* staff will determine the causal percentage to input into the model. The model also allows the user to adjust the number of years the wage benefits persist by adjusting the maximum age of the program impact. The longer the time period over which the benefits are measured, the higher the overall benefits will be. Finally, the user can also adjust the fade out percentage. This allows the user to make an assumption of how much the wage differences will decrease each year after completion of the program. A number close to zero means the wage differences are expected to remain the same into the future. The *Program* staff will determine what value to use for the fade out percentage.

$$(1) \quad PVWageGain = \sum_{y=age}^{maxage} \frac{(ProgWage - NonProgWage) \times \%Causal \times (1 - Fade)^{y-age}}{(1 + Dis)^{y-age}}$$

Impact of Increased Tutoring

The *Program* also provides tutoring for school aged children. Research from around the country has shown that tutoring increases test scores, which increases future wages. The Washington State Institute for Public Policy (WSIPP) has published results from a comprehensive study they have conducted on programs from across the country. Using these results and wage data from the Current Population Survey, the long term gain in wages and increased tax revenue from the wage increases of the children can be estimated (see equation 4 below). The model uses WSIPP's estimates from the national literature on the effectiveness of tutoring for K-12 tutoring by adults ($ESTut$) on children's test scores. Additional research has found that increases in test scores result in higher lifetime earnings for students. This effect has also been estimated by WSIPP and is included in the model ($Causal$). The model uses these estimates to translate the impact of tutoring on increased test scores and the impact of increased test scores into increased wages. Wage data by age from the Current Population Survey is used as a baseline to estimate the wage increases from tutoring. Since kids may receive tutoring services well before graduation and employment, WSIPP has estimated how much the impact of tutoring fades out by age 17 ($Fade17$). The user can enter a second fade out percentage ($Fade$) to account for the potentially diminishing impact of the program after age 17. The fade out percentage past age 17 is also entered into the cost-benefit model by the user. Staff from the *Program* have estimated the number of children who receive general tutoring services per individual in the *Program*. Finally, the model also allows the user to choose the number of years to measure the impact of tutoring by choosing the maximum age that participants receive benefits.

$$(4) \quad PVWageGain = \sum_{y=age}^{maxage} \frac{Wage_y \times ESTut \times Causal \times Fade17 \times (1 - Fade)^{y-age}}{(1 + Dis)^{y-age}}$$

Impact of Increasing the Number of GEDs

The model also can be used to estimate the long term benefits of clients receiving their GED. This calculation is done by examining the wage data from the Current Population Survey by different levels of education. The model takes the difference in wages, by age, between high school graduates and non-high school graduates. Similar to other components of the model, the *Program* staff will need to determine the values for the causal impact, the fade out factor and years the benefits will be measured. They will also need to estimate how many individuals receive their GED as a result of the program. Equation 5 provides further details of this calculation.

$$(5) \quad PVWageGED = \sum_{y=age}^{maxage} \frac{(WageHS_y - WageNoHS_y) \times FBAImpact \times \%Casual \times (1 - Fade)^{y-age}}{(1 + Dis)^{y-age}}$$

Impact of Increased Pre-K Services

The *Program* provides Pre-K services that research has found to have impacts on high school graduation rates. As part of WSIPP's comprehensive review of the literature they estimated the impact of model early childhood education programs. The model uses this estimated effect on high school graduation ($ESPreK$) to calculate the long term benefits of kids receiving Pre-K services. This calculation is done by using the effect size in the WSIPP study, the high school graduation rates ($HSRate$) from the County and the wage data from the Current Population Survey by different levels of education (see equations 6 and 7). The model takes the difference in wages, by age, between high school graduates and non-high school graduate.

$$(6) \quad HSUnits = \left[\left(\frac{(e^{ESPreK \times 1.65} \times HSRate)}{(1 - HSRate + HSRate \times e^{(ESPreK \times 1.65)}) \times HSRate}\right)\right] - 1$$

$$(7) \quad PVWagePreK = \sum_{y=age}^{maxage} \frac{(WageHS_y - WageNonHS_y) \times HSUnits \times (1 - Fade)^{y-age}}{(1 + Dis)^{y-age}}$$

Crime

The model also estimates the benefits from reduced crime. Research by WSIPP estimates that employment training in the community has a significant impact on reducing future recidivism ($ESEmp$). The estimated recidivism reduction can be monetized using the County's three year recidivism rate ($RecRate$) and national research on the cost of crime to victims and to tax payers. A study by McCollister, French and Fang (2010) estimated the costs of crime by crime type. This study, along with arrest data from the County, was used to estimate the overall cost of crime in the County. The estimated avoided crime from employment training becomes a benefit to the taxpayers and citizens of the county. Equations 8 and 9 provide more details on this calculation.

$$(8) \quad CrimeUnits = \left[\left(\frac{(e^{ESEmp \times 1.65} \times RecRate)}{(1 - RecRate + RecRate \times e^{(ESEmp \times 1.65)}) \times RecRate}\right)\right] - 1$$

$$(9) \quad CrimeBenefit = CrimeCost \times CrimeUnits$$

Other

The model also uses a standard discount rate of 3.5% to discount dollars back to present values. It is common practice in these types of economic studies to discount future benefits using this method. The model also uses an estimated tax rate to break out the benefits between the participant and taxpayers. Based on a 2013 study we used a tax rate of 19% which represents the total tax rate for individuals with income in the lowest quintile.

Program Benefit-Cost Calculator

Required Data for the *Program* Cost-Benefit Model

Participant Age is provided by staff from the *Program* based on their clients.

Max Age of Benefits is an assumption entered by the user of the model that is used as the maximum age that the impact of the program lasts.

Percent of Impact that is Causal is an assumption entered by the user of the model to allow for part of the impact to be attributed to factors other than program participation.

Fade out is an assumption entered by the user of the model that allows the impacts of the program to diminish over time.

Annual Wages of *Program* Clients is calculated by staff from the *Program*.

Annual Wages of Others is calculated by staff from the County's Department of Social Services.

Effect Size of General Tutoring is estimated from a meta-analysis conducted by WSIPP.

Gain Earning from Increased Test Scores is estimated from a meta-analysis conducted by WSIPP.

National Wage Data is based on 2012 wages from the Current Population Survey.

Fade out, Under Age 18 is estimated from a meta-analysis conducted by WSIPP.

Fade out, Age 18 and Older is an assumption entered by the user of the model that allows the impacts of the program to diminish over time. For this program an empirically tested fade out value has already been used up to age 18. If the user wishes to further reduce the impacts of the program past age 18 they should use this input.

Average Number of School Aged Children per Participant is calculated by staff at the *Program*.

Percent Impact on GED is calculated by staff at the *Program* and measures the likelihood that a given individual entering the program will receive a GED.

Effect Size of Pre-K Program is estimated from a meta-analysis conducted by WSIPP.

County Graduation Rates can be requested from the Department of Education.

Number in Early Education Program is calculated by staff from the *Program*.

Effect Size of Employment Training is estimated from a meta-analysis conducted by WSIPP.

Percent of Recidivism, New Crime is taken from the state's Department of Corrections.

County's Three Year Recidivism Rate is taken from state's Department of Corrections.

Percent of the Programs Clients Involved in the Criminal Justice System is calculated by staff from the Program.

Discount Rate is based on a standard rate used by WSIPP and other economists but can be adjusted by the user of the model.

Tax Rate is taken from a report by the Citizens for Tax Justice.

Program Benefit-Cost Calculator

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