

O'Neill School Public Affairs PhD
Policy Analysis Field Exam
August 13, 2021

Part A: Policy Analysis Seminar/PPE

A proposed loan debt forgiveness program allots \$50,000 to all adults in the US with outstanding higher education loans. As an alternative to this forgiveness, individuals without outstanding loan debt would be allowed to opt to receive the same dollar value as a combination of child allowances, direct income support, or college subsidies from the front end (prior to incurring debt). Due to programmatic budget constraints, a compromise must be made to target subsets of the population. One argument is to provide relief to individuals who are already carrying the most student loan debt. Another argument is to target inequality more directly by defining eligibility based on current earnings.

- A. Use a conceptual model to determine which approach would best induce higher rates of human capital investment. Your model may imply that the answer depends on various other contextual parameters. If so, that is ok – describe under what conditions each approach could dominate. It is probably helpful to use some mathematical notation to develop your model, but this is not strictly required. Regardless: make sure to give precise explanations of the inputs to the model, what is being maximized by the agents in the model, and what tradeoffs are at play in the model.

It turns out that State X has previously implemented a pilot version of a loan forgiveness program in 2010. That year some seniors graduating from public universities within the state were made eligible to have 50% of their undergraduate student loans forgiven. To be eligible, a student's parental income had to fall below 250% of the Federal Poverty Level. Among income eligible students, 10% were randomly selected to be granted loan forgiveness (keep in mind it is possible that some of these students did not have any outstanding student loans, because, for example they already had a large scholarship).

The state followed all graduates in this cohort over time and collected the following data:

- i. Eligibility based on the income requirement
 - ii. Among income eligible students, whether they were randomly selected to be offered forgiveness
 - iii. Whether the student took up their offered loan forgiveness
 - iv. Whether the student subsequently attended graduate school
 - v. Earnings in 2020 based on state tax records
 - vi. Occupation in 2020 based on tax records
 - vii. Marital status in 2020 based on state tax records
 - viii. Number of children in 2020 based on state tax records
- B. Based on your model in part A, generate hypotheses about the effect of State X's pilot program on human capital investment.

- C. Does your model also allow you to form hypotheses about other outcomes that the state is interested in (Earnings, Occupation, Marital Status, Number of Children)? If so, describe what the model implies about these outcomes. If not, could you change something about your model or bring in other models to help generate hypotheses about these outcomes (You do not have to formally write down any new models, but talk through intuitively what you would need to do to create hypotheses about these outcomes)?
- D. Based on your model, do you think empirically estimated effects of State X's pilot program will be informative about the proposed Federal program from the beginning of the question? Why or why not?
- E. The state has asked you to implement an evaluation of their pilot program and has granted you access to all of the data described above. You are excited to do so, but also want to expand the analysis into a broader academic paper. You think with the program design and data, you have a unique opportunity to estimate 1) the causal effect of offering loan forgiveness on human capital investment, earnings, and other outcomes, and 2) the causal effect of an individual using loan forgiveness on these same outcomes. Describe a research plan that you would use to estimate these two related but different causal effects. Your plan should clearly describe the key details of your study including:

Unit of analysis

Research design

Statistical model

Identifying assumptions

Threats to validity

Proposed analysis and robustness checks

Part B: Public Programs/PPE

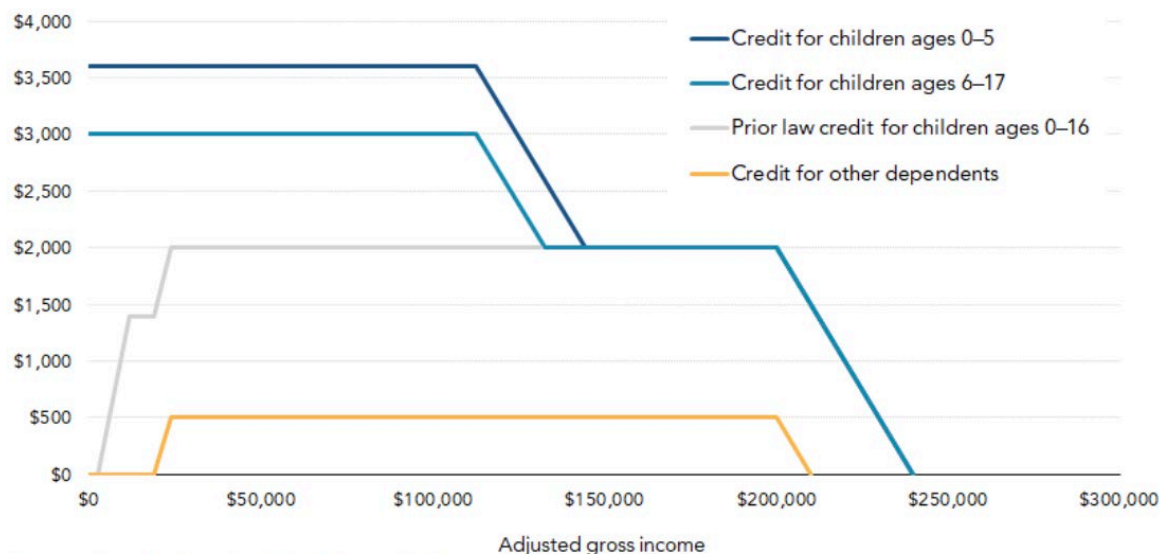
Under 2017's Tax Cuts and Jobs Act, tax payers could claim a Child Tax Credit (CTC) of up to \$2,000 for each child under age 17. The credit phased out for income above a threshold. Specifically, the 2017 version of the CTC decreased the benefit by 5% of AGI over \$200,000 for single parents (\$400,000 for married couples). If the value of a tax filer's CTC exceeded his/her taxes owed, the tax payer could receive up to \$1,400 as a tax refund known as the "additional child tax credit" or refundable CTC. However, under the 2017 rules, the ACTC would be limited to 15 percent of earnings above \$2,500, which means filers with very low income could not claim the credit or they could claim a reduced credit.

The American Rescue Plan of 2021 included a substantial change in the design of the Child Tax Credit (CTC). Under the new law, tax filers receive a benefit of (i) up to \$3,600 per child under age 6, and (ii) up to \$3,000 for each child ages 6 to 17. Only children who are US citizens are eligible for the new 2021 CTC benefits. There is no cap on the total credit that a tax filer with multiple children can claim, and the credit is fully refundable. This means that families with low income can receive the entire CTC benefit even if the value of their CTC benefit exceeds the taxes that they owe. Such families will simply receive the excess amount as a refund.

The 2021 CTC benefit phases out in two steps. The credit begins to decrease once the tax filer's adjusted gross income (AGI) reaches a threshold of \$150,000 for married couples filing jointly, and \$112,500 for single parents filing as a head of household. For tax filers with AGI above the phase out threshold, the CTC benefit is reduced at a rate of 5% until it reaches pre-2021 levels. Then, the value of the remaining credit is further reduced by 5% of income over \$400,000 for married couples filing jointly, and over \$200,000 for single parents filing as head of household.

The graph below shows the CTC benefit schedules for families with a one child under the 2021 law vs prior law. Using a microsimulation model, the Tax Policy Center estimates that 92% of families with children will receive an average CTC of \$4,380 in 2018. Under prior law, 89% of families with children received an average CTC of \$2,310.

FIGURE 1
Child Tax Credit, Single Parent
For one child, tax year 2021



Source: Urban-Brookings Tax Policy Center calculations.

Notes: Assumes all income comes from earnings, and child meets all tests to be a CTC-qualifying dependent. \$3,000 and \$3,600 credits are fully refundable; prior law limited refunds to \$1,400 out of the maximum \$2,000 credit. Credit for married parents first phases out at \$150,000 of income until credit reaches pre-2021 level; begins second phase out at \$400,000 of income. Only citizen children qualify for the \$3,000 and \$3,600 credits for children under 18. Noncitizens under age 18 who meet the dependency tests of eligibility can qualify other dependent credit.

- Allie is worried that the 2021 CTC seems like a return to the cash welfare programs that were abandoned in the 1990s and that the high value of the benefits will discourage work. Evelyn disagrees and says that some people may choose not to work because of the law, but not in the bad ways that Allie is thinking about. Explain what Evelyn means. Do you agree?
- Discuss some of the broader ways that the 2021 CTC might be expected to affect people's choices about the labor supply, earnings and child care arrangements of married couples.
- Most undergraduate economics textbooks provide some good reasons why cash benefits may be a more effective way to reduce poverty than in-kind transfers of specific goods and services. Nevertheless, many countries – including the United States – rely heavily on in-kind transfers to help mitigate poverty. For example, the United States uses Medicaid, SNAP/WIC, Housing Subsidies, etc.

Economists and other policy researchers have suggested some reasons why real world societies (as opposed to the societies depicted in textbooks) may prefer to provide aid in the form of in-kind transfers rather than cash. Do these arguments raise any concerns about the 2021 version of the CTC?

- d) Eva is excited because she thinks the 2021 CTC creates an interesting opportunity to exploit a regression discontinuity or maybe a regression kink design. In particular, Eva wants to study the causal effect of CTC Benefits on outcomes such as maternal labor market earnings and employment. But she is not sure which of two makes the most sense.

In your view, is this a regression kink or a regression discontinuity design? Write down some notation and supporting text explaining the study design and key estimating equations. List and explain the key assumptions of the design? Comment on the credibility of each assumption. Which assumption is most suspicious? Suppose the assumptions do hold, what causal parameter of interest would be identified by this design?

- e) Nila thinks the regression discontinuity/kink idea will likely run into problems of statistical power. Bill says: "If you are worried about statistical power, just run the McCreary test. That will tell you if you are under powered or not." Do you agree with Bill? Explain how to run the test and what you would hope to learn from it?
- f) Alice is also concerned that the discontinuity/kink design is not very policy relevant because it focuses on the wrong people. What do you think Alice means by this?
- g) Alice thinks a difference in difference strategy will ultimately be more reliable than a discontinuity/kink approach. Give an example of a difference in difference analysis of the kind that Alice probably has in mind. Develop some notation and write down any estimating equations you would need to put the method into practice. List and explain the key assumptions of the design? Comment on the credibility of each assumption. Which assumption is most suspicious?
- h) Does the recent work by Goodman-Bacon and others create any problems for the difference in difference estimator that you proposed?