

Transparency for Policy Analysis: An Application to Deworming Interventions

BITSS Annual Meeting

Fernando Hoces de la Guardia, BITSS
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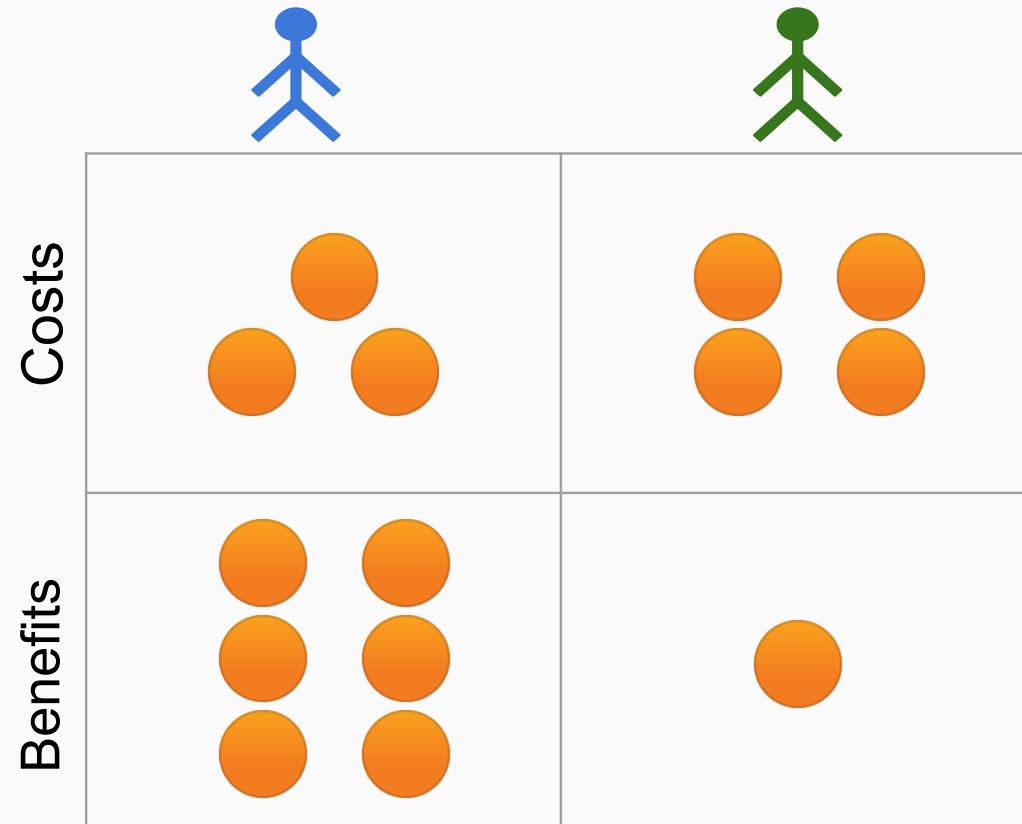
Structure of the Presentation

- The case for transparency in policy analysis
- An application of the Open Policy Analysis framework into a deworming intervention policy

Ideal Policy Analysis Report

- Developed to inform a specific, prospective, policy debate
- Main populations are clearly identified
- Costs and benefits are measured for each population
- All policy estimates are in comparable units

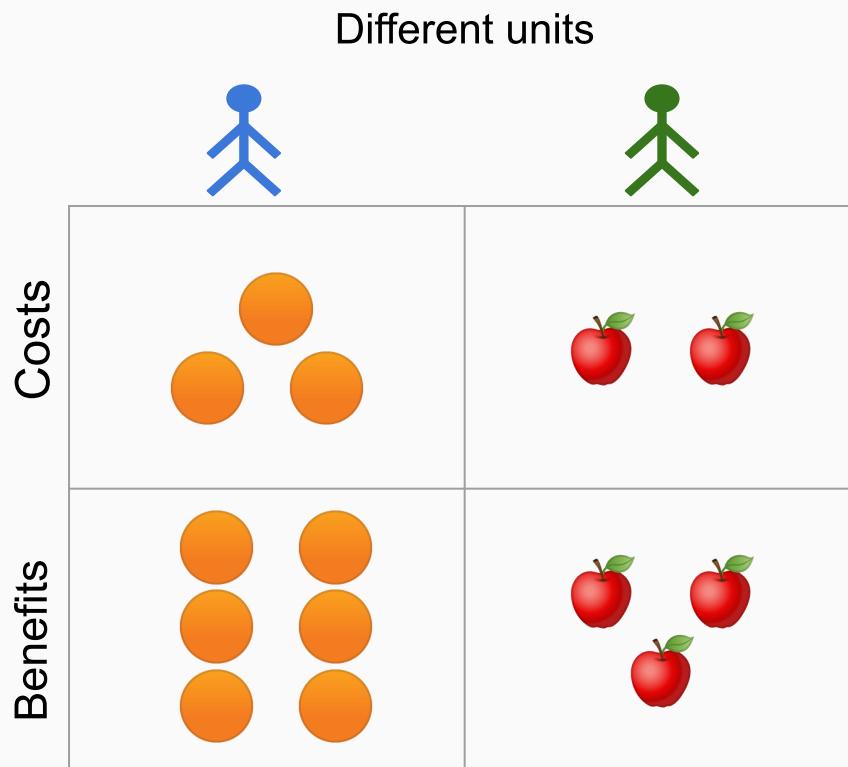
Distributional Effects of Policy X



Support for policy X \Rightarrow Higher normative valuation of blue population

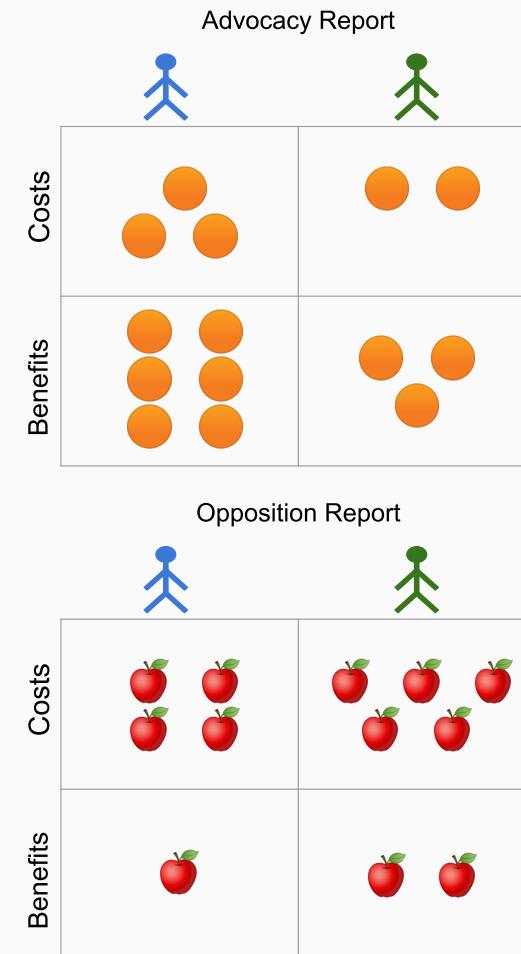
Departures From the Ideal Analysis

- Non-comparable reports



Examples: Analyses for California Ballot Propositions

- Dueling Certitudes/Report Wars (Manski 2013, Wesselink et al, 2013)



Policy makers can pick their own analysis

Senator 1 *discussing facts* on unemployment insurance

Interviewer: "We I have looked at what economist are saying, and [...] there is no measurable evidence that people are staying at home because of [\$600 unemp. insurance]"

Senator1: "[scoffs] I don't know which economist you are talking about, but ..."

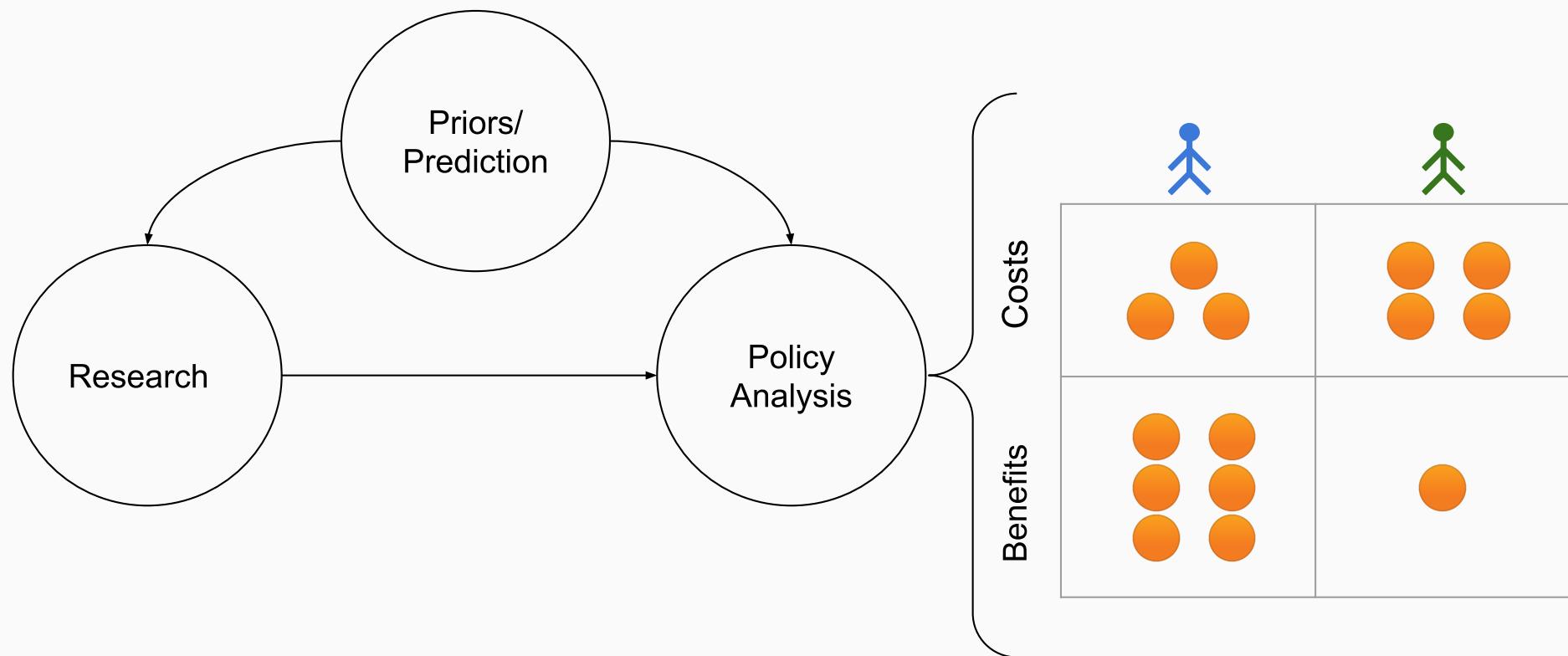


Senator 2 *discussing facts* on costs of healthcare reform

Senator2: "...I don't think there is a study out there that does not suggest suggests that [proposed reform] is far less expensive than [status quo]"

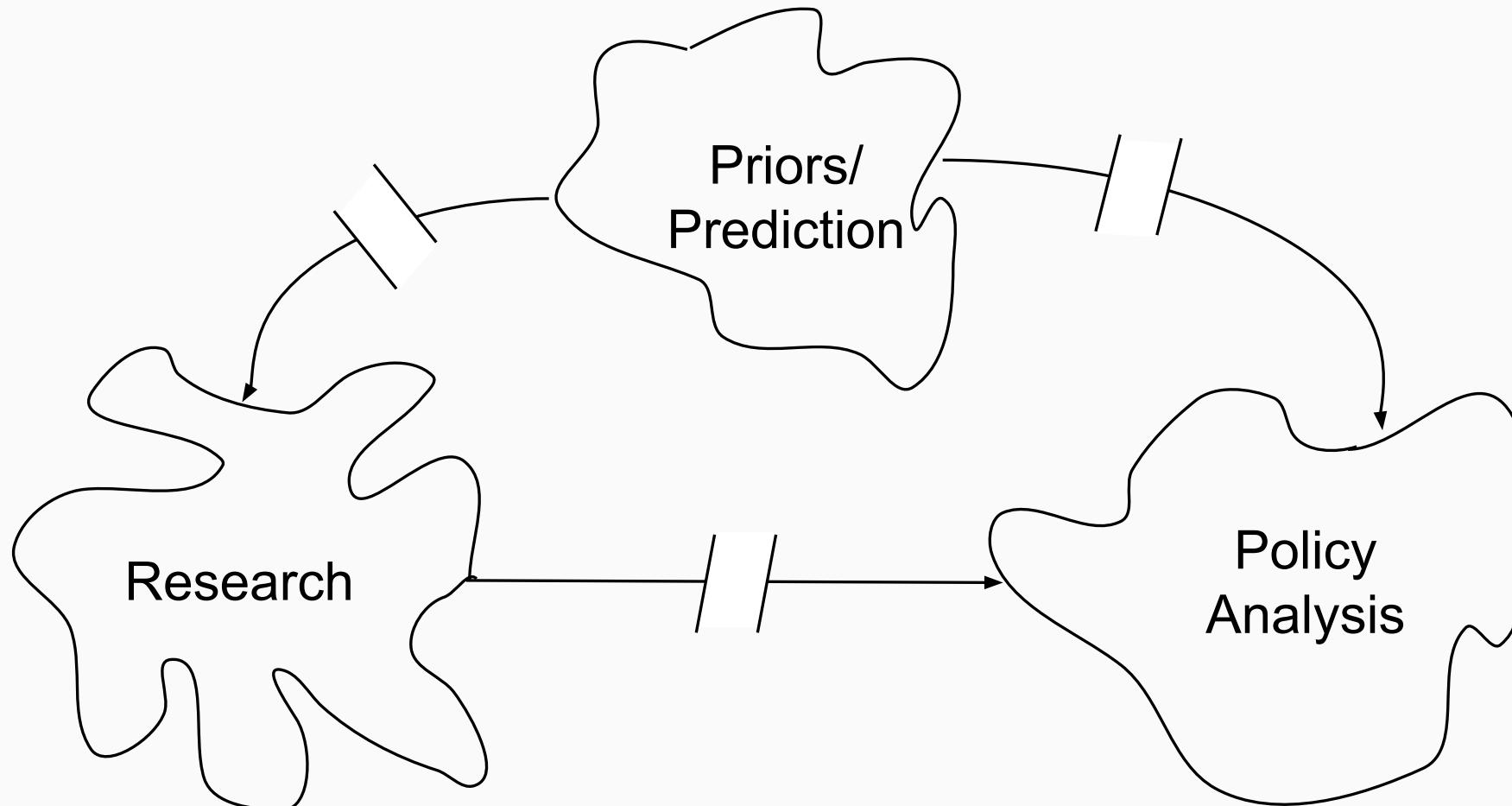
What's wrong with the Evidence-to-Policy Pipeline?

Ideal connection between research and policy analysis



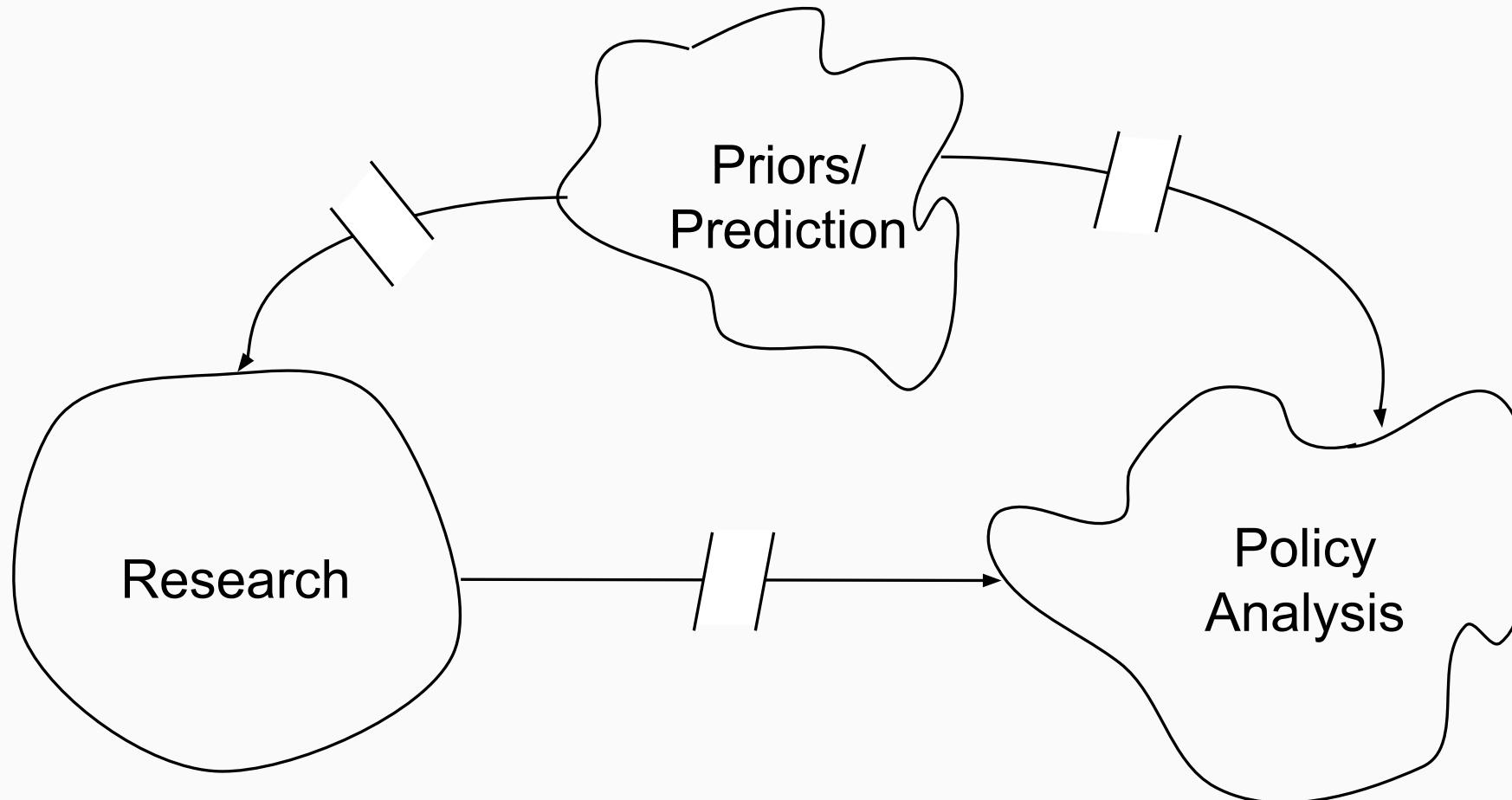
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Pre-Credibility -- Cred. Revo. (1990s) -- Open Science+ (2010s) -->



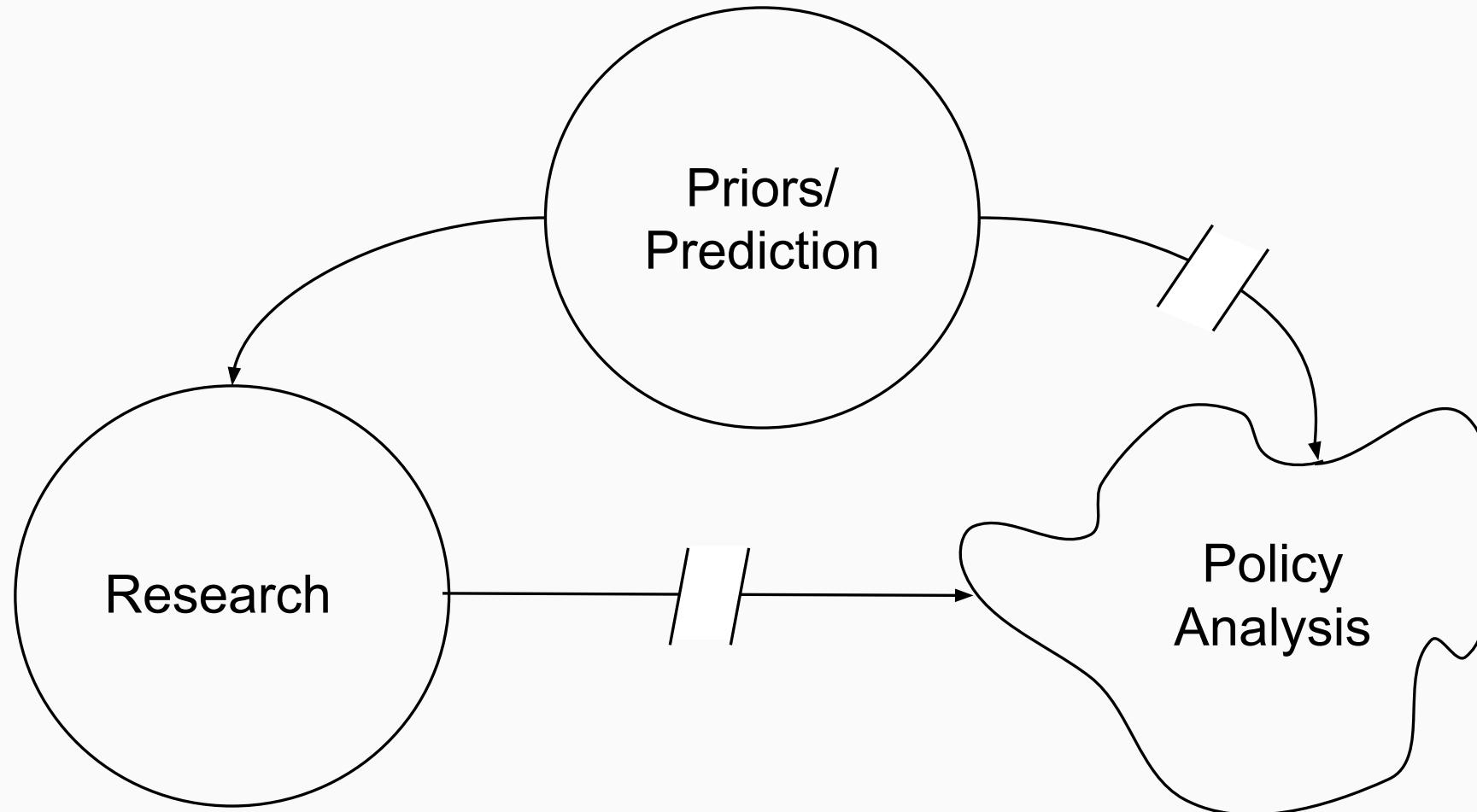
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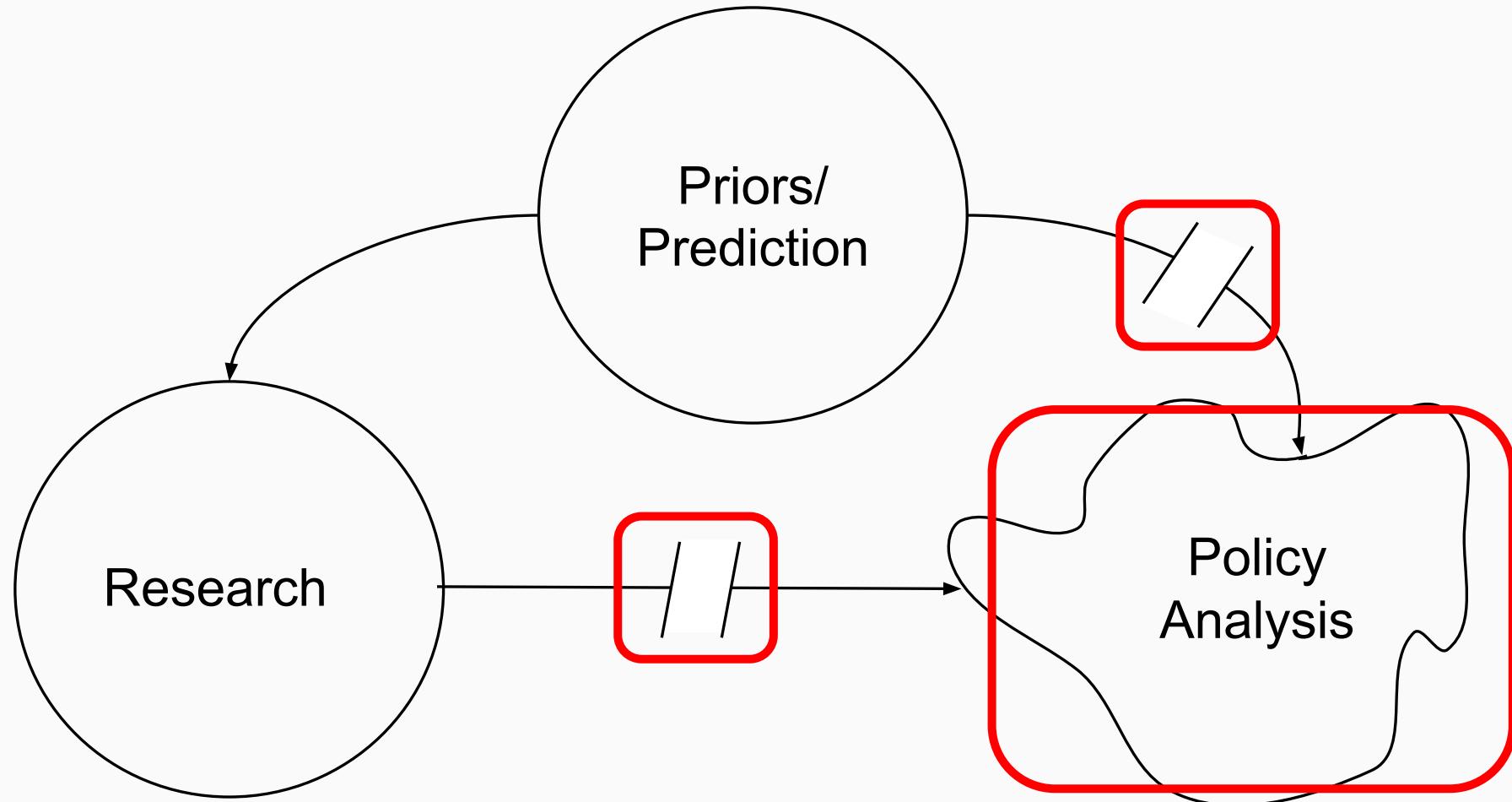
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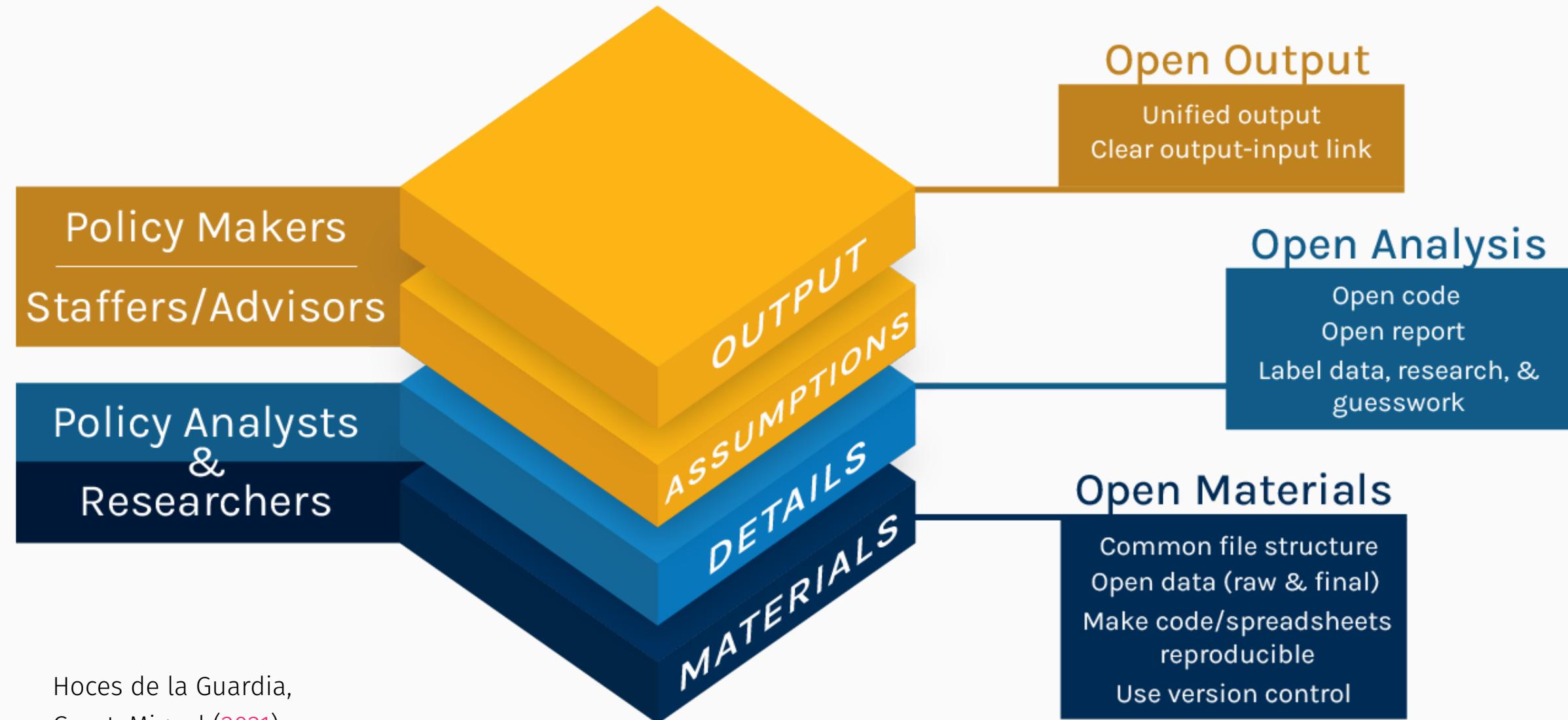


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Our Proposal: A Framework for Open Policy Analysis



Application to Deworming Interventions

Policy issue and proposed policy

- Parasitic worm infections are endemic in many LMICs
- Decrease nutrient uptake and can lead to serious consequences on human health
- Analyze policy of mass deworming interventions, at school level

Extrapolating from research

- Findings come from intervention in Kenya in 1998-99 (Miguel and Kremer 2004, Baird et. al. 2016, Hamory et. al. 2020)
- Current settings around the world vary in prevalence rates, implementation costs, and length of treatments



Contributions of OPA to deworming:

1. Selected one policy estimate among several alternatives and establish a clear link between it and underlying assumptions
2. Added documentation to increase reproducibility
3. Created a public repository with all materials for one-click reproducibility

Barriers to scaling-up: Incentives, incentives, incentives

No single agent/stakeholder has incentives to individually increase transparency.

Policy Markers:

- Better off having a menu of reports.

Policy Analysts:

- Constantly putting down fires, no time to thoroughly improve documentation.
- Opacity in policy analysis increases the value of reputation. Hence, high credentialed analysts have negative incentives to increase transparency.

Researchers:

- Incentive to generate novel and rigorous findings trumps everything else.
- No incentive to increase the rigor of extrapolation exercises ("quick and dirty", "back of the envelope")
- Widespread contempt from academia to policy analysis.

Next Steps for OPA

Deworming OPA v2.0

- Incorporate intergenerational effect on children mortality

Unemployment Insurance OPA v0.3 (w/BIFYA)

- Review and improve Open Materials component

Promote transparency in policy analysis

- Find and support policy entrepreneurs for transparency in policy analysis (e.g. Santiago Levy for Impact Evaluations)

Thank You

openpolicy@berkeley.edu

Back-up Slides

Open Output

Demo



Main features

- One clear output previously agreed in consultation with policy partner
- Two additional tabs to modify assumptions (key assumptions and all assumptions)
- Each source is classified into research, data, or guesswork
- High level equations added to illustrate location of components
- Added feature to modify standard deviations
- Track values of each component

Open Policy Analysis for Deworming Interventions: Open Output Component Main Policy Estimate Key Assumptions All Assumptions

Policy Estimate:
A3. All income of A2. Main Policy Estimate

Approach 3.3. Welfare measured as additional earnings.
- Benefits: predicted additional earnings. Data from 10, 15 and 20 year follow-up. No externalities. Adjusted for prevalence and length of treatment.
- Costs: current implementation costs in several settings.

Click to rescale x-axis. Unclick to fix reference point

Number of simulations
10000

Research Data Guesswork

Show/hide all SDs

$\alpha^{pooled} =$
79.51

Prevalence in original study (η) =
0 0.92 1

Update Plot Reset Inputs

Net Lifetime Income Effects of Deworming for Each Treated Children
A3. All income of A2. Main Policy Estimate. N = 10000 simulations. Takes 7.3 secs

Open Policy Analysis for Deworming Interventions: Open Output Component Main Policy Estimate Key Assumptions All Assumptions

Yearly unit costs in new country (in \$US)
0.15

Prevalence in new region (η_{new})
0.5

Length of treatment (years)
2.41

For reference:

Country	Unit Costs	Prevalence	Length of Treatment
India	0.06	0.57	1
Kenya	0.54	0.34	1
Nigeria	0.86	0.27	1
Vietnam	0.52	0.14	1
Original Study	1	1	1

Update Plot Reset Inputs Save Plot

Net Lifetime Income Effects of Deworming for Each Treated Children
A3. All income of A2. Main Policy Estimate.

Open Policy Analysis for Deworming Interventions: Open Output Component Main Policy Estimate Key Assumptions All Assumptions

CEGA Center for Effective Global Action

This visualization is one of three key components of an [Open Policy Analysis \(OPA\)](#) on the costs and benefits of mass deworming interventions in various settings. This components are:

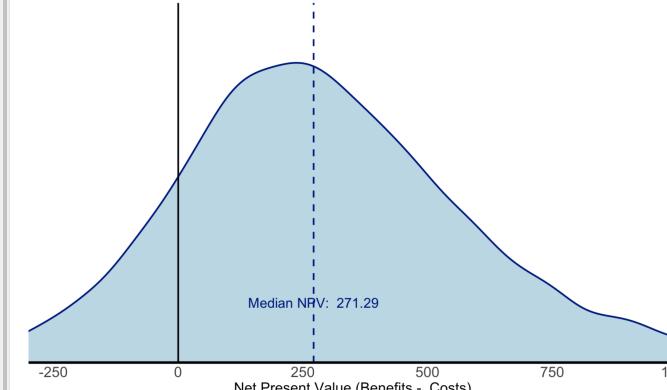
- This app, which presents a single output that best represents the factual information required by policy makers to inform their position regarding a policy of mass deworming. Additional two other tabs allow reader to modify key assumptions and components and see how this output changes
- A [detailed report](#) that describes how to obtain the policy estimate and describes each component of the analysis
- A [repository](#) that contains all the materials needed to reproduce the analysis with minimal effort (report and interactive app).

The app is the result of a collaboration between the [Berkeley Initiative for Transparency in the Social Sciences](#) and [Evidence Action](#).

See a full contributors list [here](#).
See the dynamic document of this shiny app [here](#).
See more OPA projects done by BITSS [here](#).

Description of Results
We simulate finding the lifetime income effects on treated

Net Lifetime Income Effects of Deworming for Each Treated Children
Distribution of the Net Present Value of Deworming Interventions



Open Analysis

Demo



Main features

- Complete narrative description of the methodology
- Translation of each narrative step into an equation
- Implementation of each equation into code
- Combine all of the above into using a dynamic document (RMarkdown)
- Presentation of narrative, equations, and code in layered fashion to avoid overwhelming the reader

BITSS CEGA
Open Policy Analysis

- 1 Introduction
- 2 Methodology
- 3 Main Results
- References

OPEN POLICY ANALYSIS FOR DEWORMING

18 December, 2020

Net Lifetime Income Effects of Deworming for Each Treated Children
Distribution of the Net Present Value of Deworming Interventions

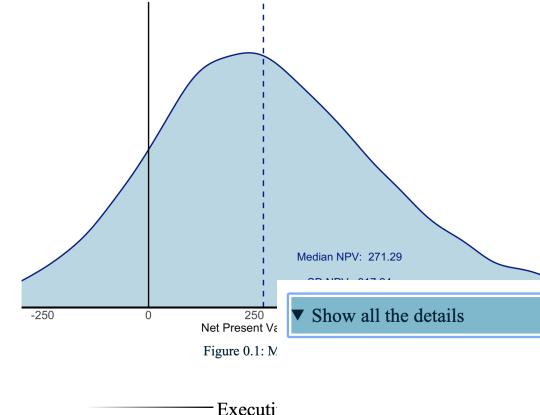


Figure 0.1: Median NPV

Executive Summary

$$B = \sum_{t=0}^{50} \left(\frac{1}{1+r} \right)^t E_t \quad (1)$$

Where:

- E_t : earnings individuals are expected to generate at period t
- r : real interest rate as the discounting rate
- t : period t . Period 0 represents time of intervention. Individuals are assumed to enter the labor market 9 years after treatment.

```
# - inputs: stream earnings, discounting rate, number of periods
# - outputs: function that computes the present value of benefits
chunk_benefits <- function(){
#####
pv_benef_f <- function(
  earnings_var = earnings_in,
  interest_r_var = interest_in,
  periods_var = periods_so
) {
  index_t <- 0:periods_var
  res1 <- sum( ( 1 / (1 + interest_r_var) )^index_t * earnings_var )
  return(res1)
}
```

Open Materials

Demo



Main features

- One-click reproducible documentation and app
- Extensive readme files
- Clear folder structure
- Version controlled
- Open data
- Acknowledgment to all contributors

BITSS-OPA / [opa-deworming](#)

Code Issues Pull requests Actions Projects Wiki Security Insights Settings

master 21 branches 1 tag Go to file Add file Code

fhoces Change title of readmen file 53bb6f1 1 minute ago 728 commits

.binder update install.R 2 months ago

code Merge branch 'master' of <https://github.com/fhoces/opa-deworming> 1 hour ago

data

docs

rawdata

.gitignore

contributors.R

contributors.csv

opa-deworming.Rproj

readme.Rmd

readme.md

OS_final_opa.Rmd

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1 ---  
2 title: "<center><div class= 'mytitle'>Open Policy Analysis for Deworming</div></center>"  
3 date: "<center><div class='mysubtitle'>r format(Sys.time(), '%d %B, %Y')<br><img height='80px' src = '<shiny_app/www/bitsgo_horizontal.png'><br><img height='80px' src = '<shiny_app/www/CEGA_logo.png'></div></center>"  
4 editor_options:  
5 chunk_output_type: console  
6 output:  
7 bookdown::html_document2:  
8 code_download: yes  
9 code_folding: hide  
10 css: style.css  
11 highlight: tango  
12 includes:  
13   after_body: footer.html  
14 keep_md: yes  
15 number_sections: yes  
16 smooth_scroll: no  
17 theme: cerulean  
18 toc: yes  
19 toc_collapsed: no  
20 toc_depth: 3  
21 toc_float: yes  
22 html_document:  
23 df_print: paged  
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26 word_document: null  
27 link_citations: yes  
28 pdf_document:  
29 extra_dependencies: xcolor  
30 fig_caption: no  
31 bibliography: bibliography.bib
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Open Policy Analysis of Deworming

BITSS BERKELEY INITIATIVE FOR TRANSPARENCY IN THE SOCIAL SCIENCES

R version 4.0.0 (2020-04-24) -- "Arbor Day"
(Copyright (C) 2020 The R Foundation for Statistical Computing
Platform: x86_64-apple-darwin17.0 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

Natural language support but running in an English locale

R is a collaborative project with many contributors.
(type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.)

OPEN PO

BITSS CEGA

Open Policy Analysis

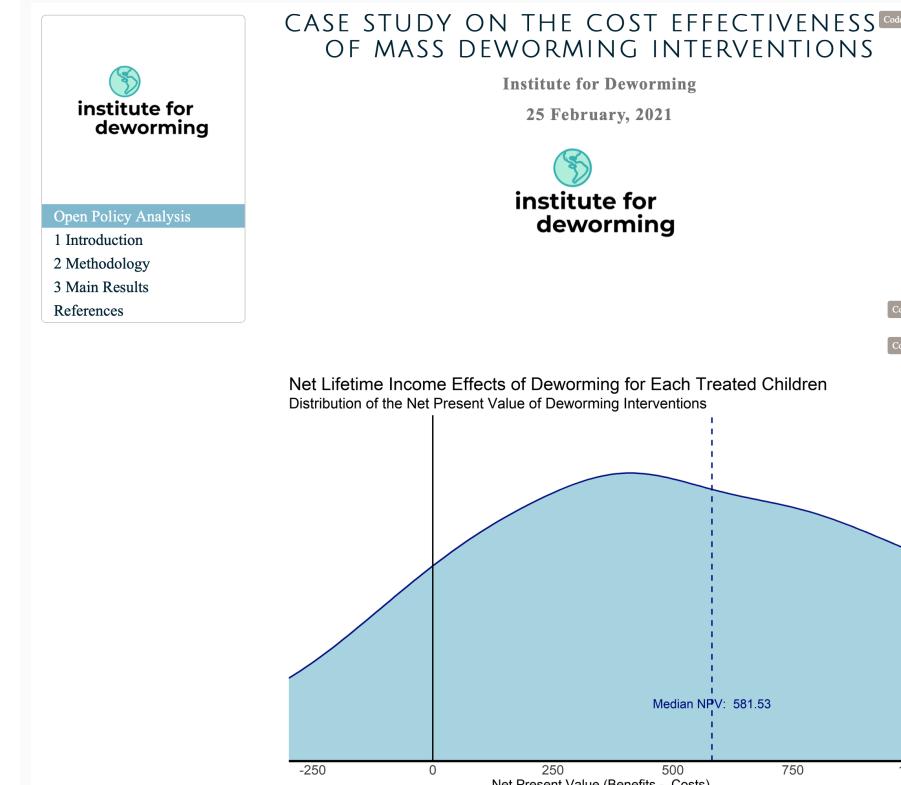
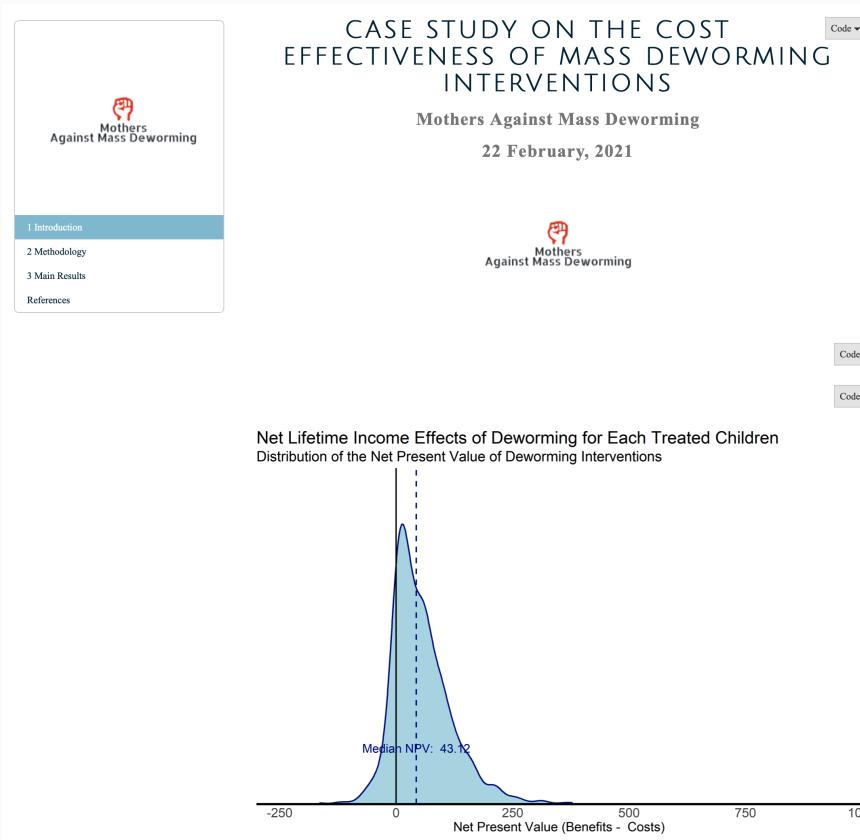
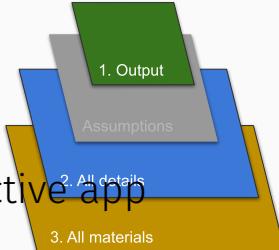
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Net Lifetime Income Effect
Distribution of the Net Present Value

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What If The Policy Analysis Does Not Have Open Output?

- Two fictitious policy analyses
- The connection between all assumptions and final output has been hidden
- Both claim to report on the same fact (policy estimate). Code is available, reproducible, and each as an interactive app and dynamic document.
- Wildly different results by choosing a different policy approach (and not reporting)



Opaque Output: Example #2

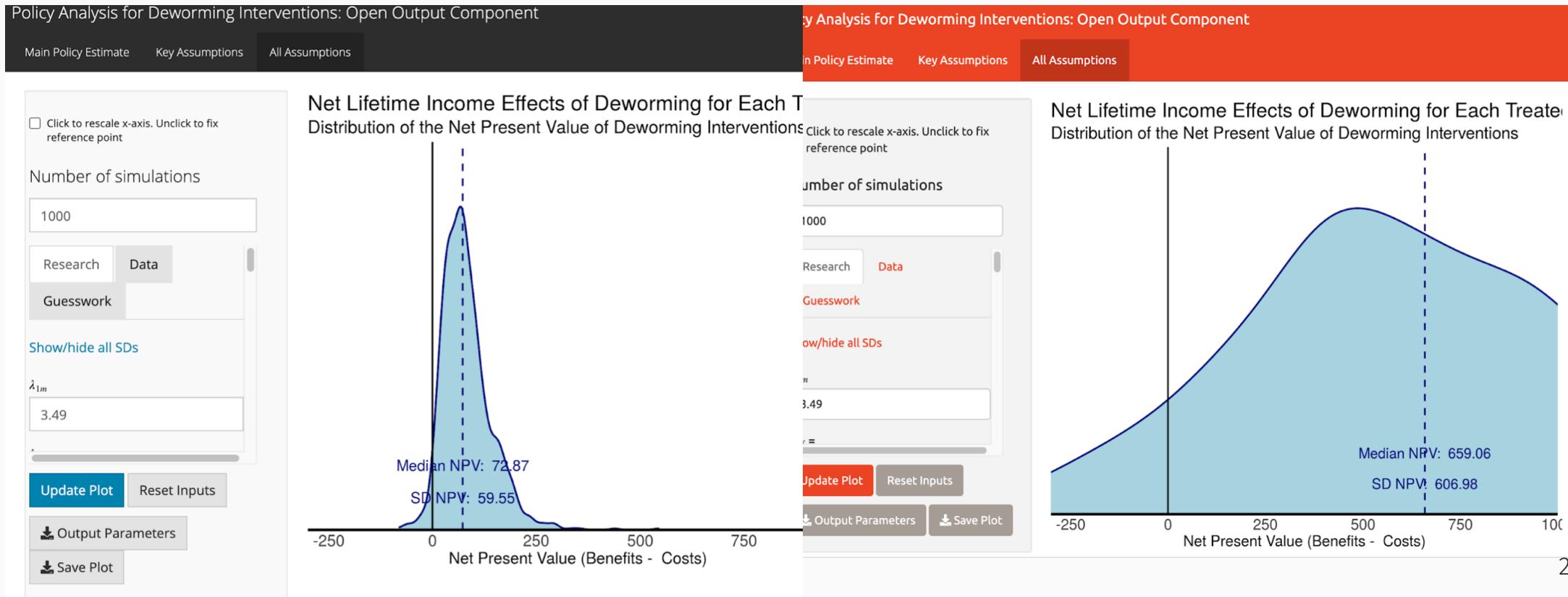
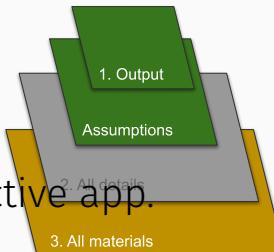
- Policy estimates of approach 2 of deworming (Baird et al, 2016)
- Assume Open Analysis and Open Materials
- Good for researchers
- Unclear for policy analysts
- Allows policy makers to cherry pick results
- Does not disclose uncertainty
- Unclear separation of roles between policy analyst and policy maker (Truman's request for a "one-handed" economist)

TABLE V
FISCAL IMPACTS OF DEWORMING SUBSIDIES

	No subsidy	Partial subsidy	Full subsidy	Notes
Panel A: Calibration parameters				
Size of subsidy: S	\$0.00	\$1.15	\$1.42	From Deworm the World; Kremer and Miguel (2007)
Take-up rate: $Q(S)$	5%	19%	75%	From Kremer and Miguel (2007)
Average per-person cost: $SQ(S)$	\$0.00	\$0.22	\$1.07	Subsidy \times take-up rate
Mean per person increase in work hours/week: λ_1	0.00	0.44	1.75	Men: increase of 3.49 hours/week; women: no change (Table III). Partial subsidy multiplied by $\frac{Q(S)}{Q(\text{full})}$
Mean increase in work hours/week from externality: $p\lambda_2$	0.00	1.76	5.21	10.20 (Table III) \times Coverage of treatment school students within 6 km (R , 68.1%) $\times [Q(S)$ for full subsidy, $\frac{Q(S)}{Q(\text{full})}$ for partial subsidy]
Mean increase in schooling costs	0.00	2.71	10.71	NPV of (additional secondary schooling costs per pupil-year (\$116.85) \times direct increase in secondary schooling). Partial subsidy multiplied by $\frac{Q(S)}{Q(\text{full})}$.
Mean increase in schooling costs from externality	0.00	3.40	13.42	NPV of (additional secondary schooling costs per pupil-year (\$116.85) \times externality increase in secondary schooling). Partial subsidy multiplied by $\frac{Q(S)}{Q(\text{full})}$.
Panel B: no health spillovers				
Annual increase in per person earnings	\$0.00	\$3.91	\$15.44	$\lambda_1 \times$ starting wage \times 52
NPV increase in per person earnings (relative to no subsidy)	—	\$36.08	\$142.43	9.85% annual (real) interest rate in Kenya
NPV increase in per person government revenue	—	\$3.27	\$12.90	NPV earnings \times 16.575% tax rate – Direct schooling costs
Panel C: With health spillovers				
Annual increase in per person earnings	\$0.00	\$26.77	\$83.11	$(\lambda_1 + \frac{p}{R} \lambda_2) \times$ starting wage \times 52
NPV increase in per person earnings (relative to no subsidy)	—	\$246.99	\$766.81	9.85% annual (real) interest rate in Kenya
NPV increase in per person government revenue	—	\$34.83	\$102.97	NPV earnings \times 16.575% tax rate – (Direct externality schooling costs)

What If It Does Not Have Open Analysis?

- Two fictitious policy analyses
- The connection between all assumptions and final output has been hidden
- Both claim to report on the same fact (policy estimate). Code is available, reproducible, and each as an interactive app.
- Wildly different results by slightly modifying the underlying assumptions in the desired direction



Opaque Analysis/Materials

- Assume open output and open materials
- In this scenario we can have two policy analyses: one from advocates and one from opponents
- Each analysis can claim to be open source. Code is available, reproducible, and each as an interactive app.
- But each analysis can bury in their code analytical choices that move the final policy estimate in their favor
- Same thought exercise can be done with opaque materials