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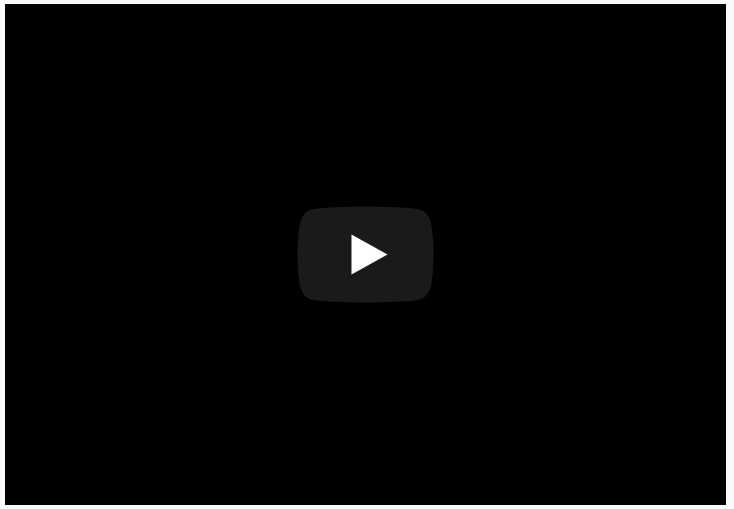
Motivation: Rise of Alternative Facts



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]”

Congressman: “[scoffs] I don’t know which economist you are talking about, but ...”

Possible Mechanism: Opaqueness of Policy Analysis

- Incredible Certitudes (Manski, 2011)
- Report wars (Wesselink et al, 2013)
- Low overall credibility of PA → credibility based on reputation ("serious") → assignment of reputation varies across political positions
- Parallels to "Reproducibility Crisis" and Open Science reponse (Hoces de la Guardia, Grant, Miguel 2020). Propose:
  - Core principles for Open Policy Analysis (OPA) in outputs, analysis and materials (reproducibility)
  - Agenda to implement and document how OPA can be applied into several policy issues
- Growing adoption of open science methods into policy analysis

Deworming Interventions

- Parasitic worm infections are endemic in many countries, disproportionately affecting the poor
- They interfere with regular bodily processes by decreasing nutrient uptake and can thus lead to serious consequences on human health, education outcomes, and long-term economic well being
- Mass deworming interventions, at school level, have been propose as a cost-effective approach to tackle this problem

Different settings for deworming

- Context of original study (Kenya, 1998-99) had very high prevalence rates of worm infections
- Implementation costs where very low ($0.42 per round of treatment)
- Length of treatment was relatively short (2.4 years)
- Current deworming settings have with lower prevalnce rates, varying implementation costs and length of treatments

Strong debate around initial results

- Ozier (2020) summarizes differences between original findings (Miguel and Kremer 2004) and a re-analysis (Aiken et al, 2015). Emphazises the role of communication of results in a reanalysis.
- This type of debate (result/re-analysis) can be seen in several other topics. For example: minimum wage, inmigration, taxation.
- OPA need not guarante agreement on key research finding, but should help avoid multiple policy reports

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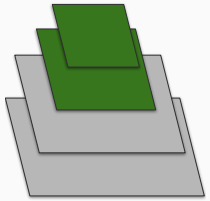
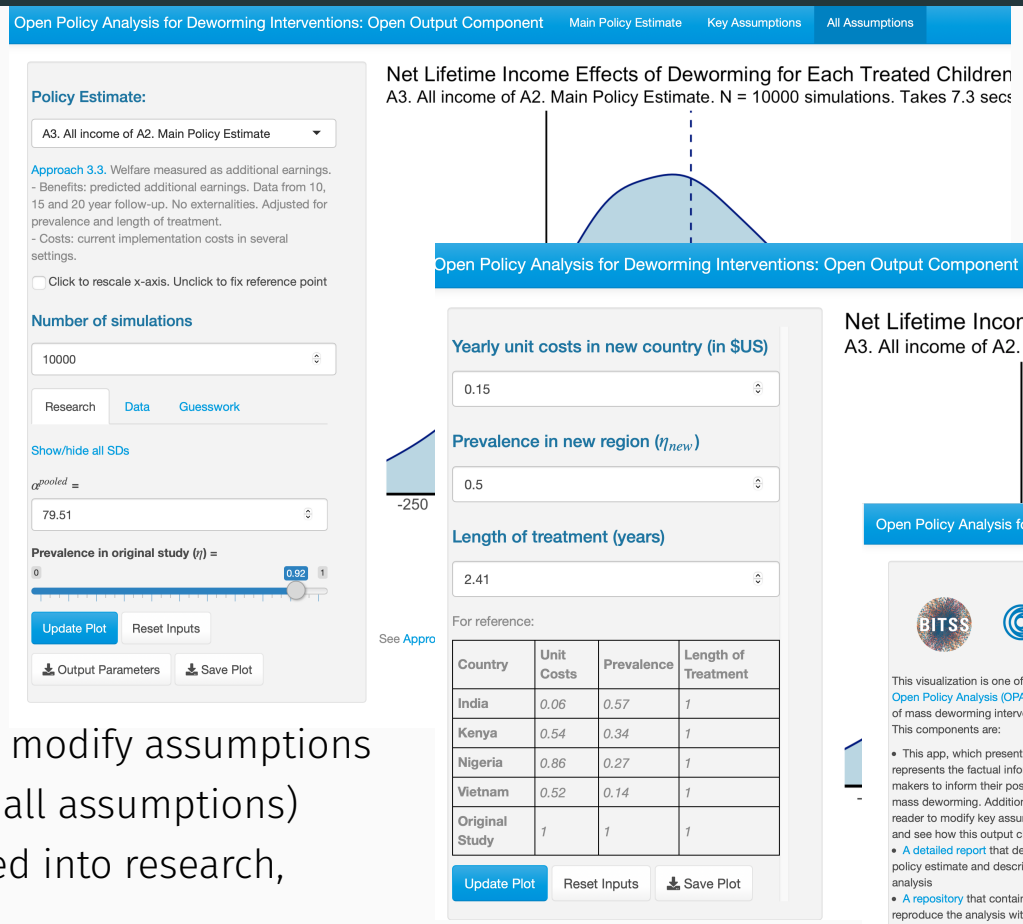
Open Output

Demo



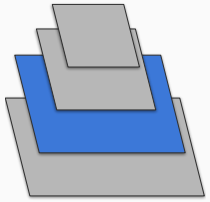
Main features

- 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



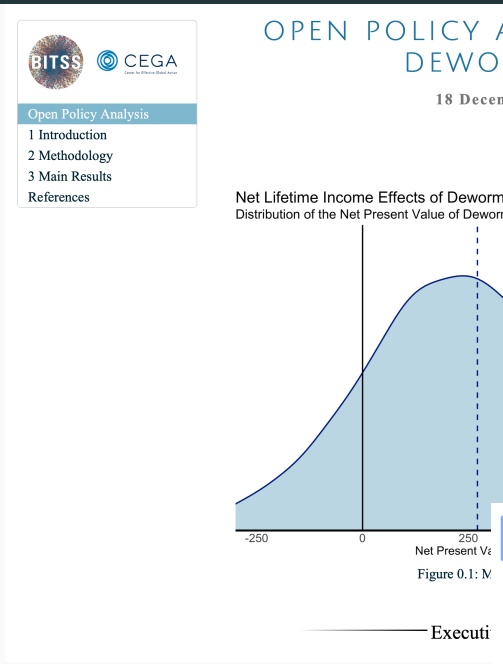
Open Analysis

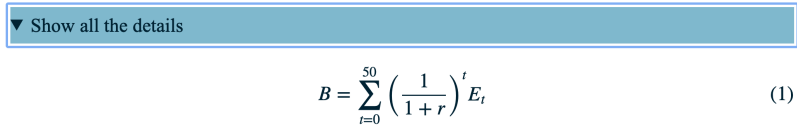
Demo



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 Icon figure





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.

Hide

```
# - 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)
    }
```

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What happens if one principle fails: Opaque Output

- 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 × 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) × Coverage of treatment school students within 6 km (R, 68.1%) × [$Q(S)$ 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) × 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) × 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	λ_1 × starting wage × 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 × 16.575% tax rate − Direct schooling costs
Panel C: With health spillovers				
Annual increase in per person earnings	\$0.00	\$26.77	\$83.11	$(\lambda_1 + (\frac{p}{R})\ \lambda_2)$ × starting wage x 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 × 16.575% tax rate − (Direct + externality schooling costs)

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 though exercise can be done with opaque materials

Lessons for future OPA projects: Timeline

1. Reviewed existing documentation
2. Review code/spreadsheets and write down missing documentation.
3. Add equations to reflect any additional clarifying steps.
4. Translate analysis to code scripts (ideally open source software)
5. Check for computational reproducibility and consult with original analysts for discrepancies/further questions
6. Discuss with policy partner on target policy estimate
7. Draft doodle of app
8. Incorporate any potential new analysis (repeat steps 1 - 3)
9. Present draft of OPA (DD and doodle of app) to policy partner
10. Incorporate comments into documentation of the OPA
11. Build app based on analysis of dynamic document
12. Incorporate any additional features requested by policy partner
13. Verify that all three components produce the same output
14. Publish v1.0

Useful practices developed during the project

Documentation of analysis and app are connected

- Each analytic step is declared in the documentation and wrapped in a function
- All this steps are used to produce the results in the documentation
- The steps are also stored in a file that is later sourced in the app.
- If something changes in the report, it will update the app.

Style guide

- Group objects according to use: only within the documentation, for simulations, and for the app
- Use diagram trees to depict nested relationships

Lessons for future OPA projects: Costs

- Costs (approx bandwidth over a year at full time):
  - Principal Investigator 30-50%
  - Research assistant/programmer 100-150%
  - Program Manager 20%-30%
  - Original researcher: 1-5%
- Not all policy analysis justify this level of effort
- Characteristics that might justify an OPA:
  - Topics with strong disagreement on the facts among analysts
  - Recurrent reports (eg. ex-ante economic analysis from development banks/agencies)
  - Topics that have large expected welfare effects (eg. tax reform, social cost of carbon)
- With each new OPA project, templates will emerge and costs will likely fall

Additional Benefits of OPA

Easy to update and reuse

After deworming OPA is released, anybody can modify and improve into a newer version

Clearer connection of how evidence from research is used in policy analysis

Researchers can see clearly where their estimates are being used in a policy analysis. For example, the OPA can be used to justify power calculations of potential new studies.

Connection with forecasting

When there is little information for a parameter used in an OPA, a forecasting exercise can be carried out to elicit expert knowledge (DellaVigna, Pope, Vivalt 2019).