

Open Policy Analysis: Principles and Applications

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UC Berkeley:
Berkeley Initiative for Transparency in the Social Sciences

GiveWell
August 23rd, 2018

- 1 Why we need Open Policy Analysis (Hoces de la Guardia, Grant & Miguel, 2018)
- 2 Application to policy estimates of the minimum wage.

Policy Analysis And The Evidence-Based Policy Movement

Evidence-Based movement is growing.

- “The golden age of evidence-based policy” (Haskins 2017).
- Credible causal evidence (Angrist & Pischke, 2010)
- Transparency and reproducibility of research (Miguel et al. 2014).
- Commission on Evidence-Based Policymaking (CEBP, 2017)

Policy Analysis is a fundamental link.

- As many definitions as textbooks (Dunn, 2015; Weimer & Vining, 2017; Williams, 1971)
- Common denominator: client-oriented empirical analysis meant to inform a specific policy debate
- Aspires at scientific rigor. (Wildavsky 1979),

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Examples of Policy Analysis

Copy of 2018 GiveWell Cost-Effectiveness Analysis — Version 6 ☆

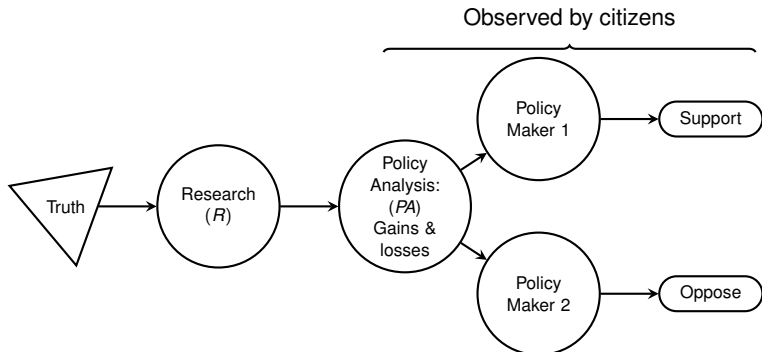
File Edit View Insert Format Data Tools Add-ons Help [All changes saved in Drive](#)

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	A	B	C	D	E
1	Nets	Andrew	Caitlin	Chelsea	Cliff
2	Mortality reduction from net distributions				
3	Deaths averted per protected child under 5 (summary effect from Lengeler 2004 meta-analysis)	0.00553	0.00553	0.00553	
4	Under-5 all-cause mortality from trials included in Lengeler 2004 (per 1,000 child-years)	34.8	34.7977	34.8	
5	Under-5 all-cause mortality in 2016 in AMF countries (per 1,000 child-years)	13.8	13.8	13.8	
6	Mortality in AMF contexts relative to study contexts	40%	40%	40%	
7	Portion of mortality difference attributed to ITNs	25%	25%	25%	
8	Mortality in AMF contexts relative to study contexts (effect of ITNs stripped out)	55%	55%	55%	
9	Deaths averted per child protected after adjusting for lower mortality in today's settings	0.00303	0.00303	0.00303	
10					
11	Net use adjustment	90%	90%	90%	
12	Internal validity adjustment — Nets	95%	95%	95%	
13	Proportion of mortality attributed to malaria in areas AMF works vs. the contexts of trials in Lengeler 2004	100%	100%	100%	

Figure: Screen shot of GiveWell's CE spreadsheet

One Ideal Evidence-Based Policy Link



Reproducibility Crisis In Empirical Research

- Large magnitude of publication bias (Franco et al 2014).
- Evidence of extensive p-hacking across social science disciplines (Gerber et al 2008, Brodeur et al 2016).
- Replication rates are low (Collaboration et al, 2015 , Camerer et al, 2016).
- Computational reproducibility is also low (Stodden et al 2016, Chang and Li 2015, Gertler et al 2018).

The Open Science Movement

- Definition of principles of Open Science/Research Transparency (Miguel et al 2014)
- Development of guidelines to operationalize principles of Open Science (Nosek et al 2015)
- Journals and funders: Journals (Science + 5k other journals), Registries (AEA), Funders (NIH, NSF and multiple donors)

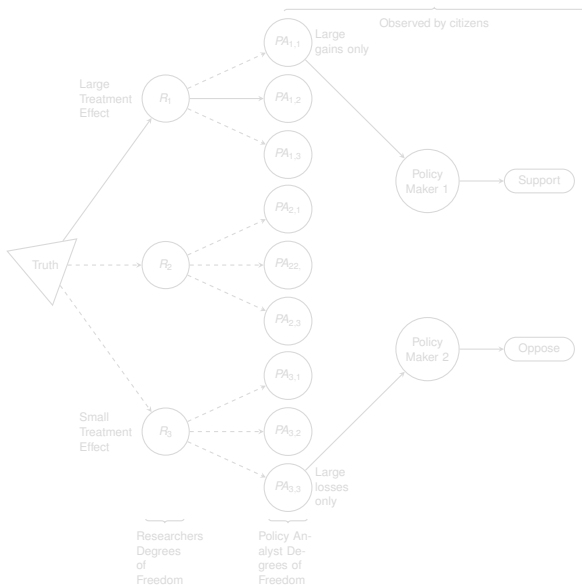
Credibility Crisis Of Policy Analysis

- Incredible Certitudes (Manski, 2013)
- Report wars (Wesselink et al, 2013)
- Alternative facts (“The Death of Expertise” Nichols, 2017; “The Death of Truth”, Kakutani 2018; “Truth Decay”, Rich & Kavanagh 2018)

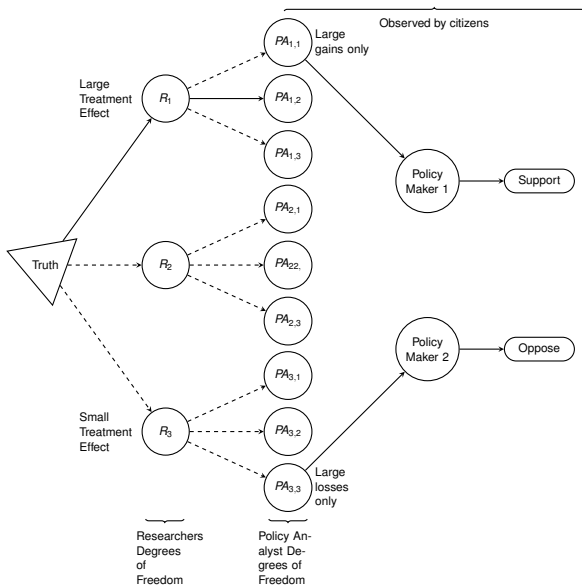
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How This Affects The Evidence Based Policy Link?



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Relevance

Main consequences of policy analysis that lacks openness:

- 1 Cherry picking evidence.
- 2 Challenging to automate and improve systematically recurring reports.
- 3 Difficulty understanding how research informs policy analysis.

Cherry Picking Evidence

“When I was director of the CBO, I was very frustrated when we would write a policy report [saying] a certain policy would have these two advantages and these two disadvantages, and the advocates would quote only the part about the advantages, and the opponents would quote only the part about the disadvantages. That encourages the view that there are simple answers. There aren’t generally simple answers. There are trade-offs.”

— Douglas Elmendorf (Director of CBO, 2009-2015)
Harvard Magazine, 2016

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Difficulty Understanding how Research Informs Policy Analysis

- What happens when new research emerges?
 - ▶ What if $\hat{\tau}(\text{Blattman, Fiala, and Martinez 2020}) = \frac{1}{2}\hat{\tau}(\text{Blattman, Fiala, and Martinez 2013})$? Or $\tau_{2020} = 2\tau_{2013}$?
- Where are the largest unknowns in the policy analysis?
 - ▶ GiveWell lists at least 100 parameters in its cost-effectiveness analysis. What are the 5/10 most important ones?
- Where is the marginal piece of research most informative for this analysis?
 - ▶ Are the gaps in knowledge for this PA guiding the research agenda?

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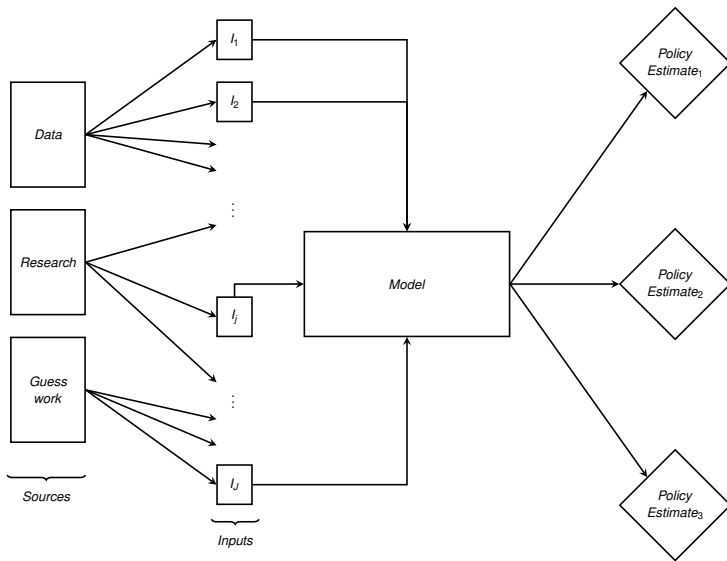
Open Science

	Empirical Research	Policy Analysis
Problems	Reproducibility Crisis	Credibility Crisis
Solutions	<i>Open Science</i> Principles, Guidelines, Applications	

Open Policy Analysis

	Empirical Research	Policy Analysis
Problems	Reproducibility Crisis	Credibility Crisis
Solutions	<i>Open Science</i> Principles, Guidelines, Applications	<i>Open Policy Analysis</i> Principles

The Process of Policy Analysis



Principles for Open Policy Analysis

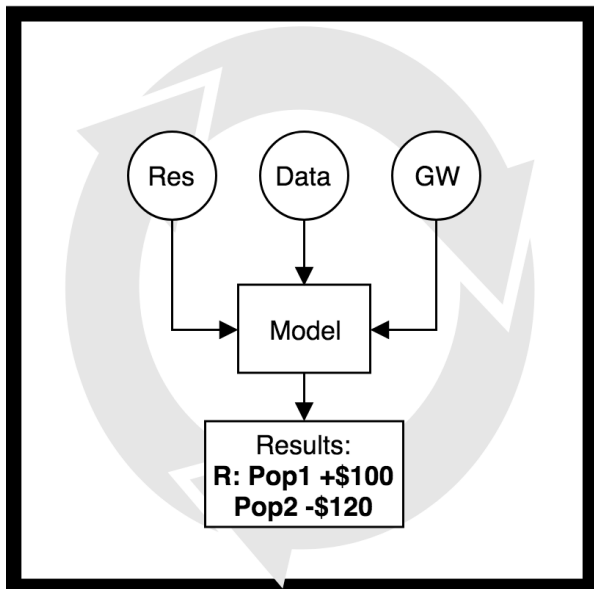
Proposed principles:

- 1 Computational Reproducibility
- 2 Analytic Transparency
- 3 Output Transparency

Principle 1: Stop re-inventing the wheel

Computational Reproducibility

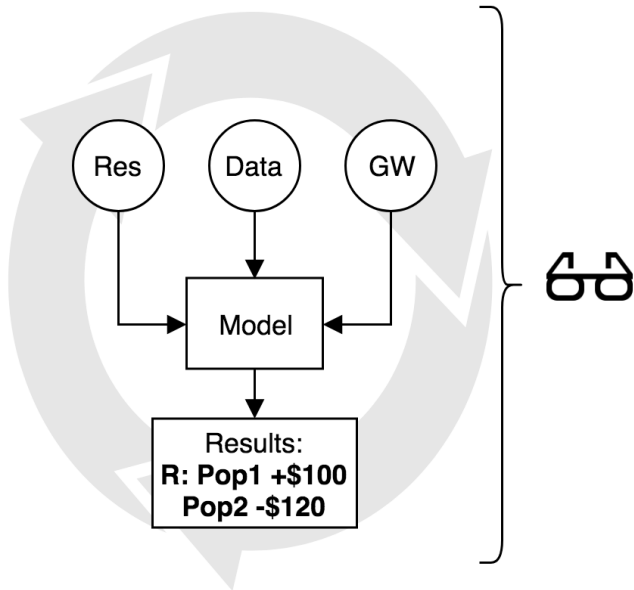
- Literate Programming
- Version control
- File structure
- **Label sources**



Principle 2: Show your work (readable)

Analytic Transparency

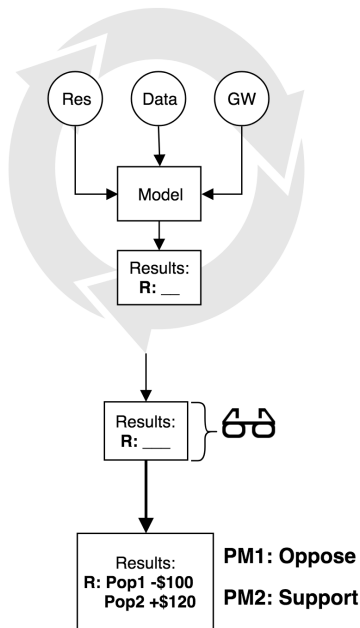
- Open code
- Open data
- Report as Dynamic Document



Principle 3: Let's all agree on one table/viz

Output Transparency

- Pre-committed output display
- Assumptions-output link

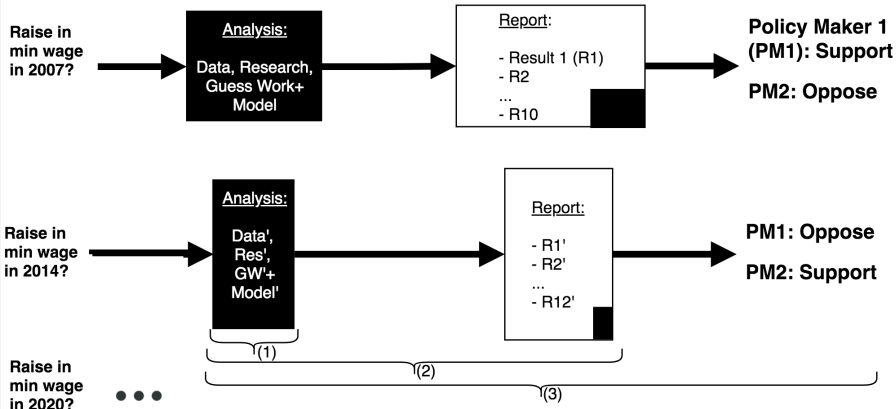


Summing Up: Where We Are

Traditional Policy

Analysis

A



Summing Up: Where Should We Go

Open Policy Analysis

- Raise in min wage in 2007?
- 2014 (changes in + -)
- 2020, 2030, ...

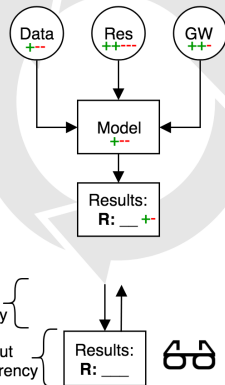
Results:
R: Pop1 -\$100
Pop2 +\$120

PM1: Oppose
PM2: Support

Computational
Reproducibility

Analytic
Transparency

Output
Transparency



B

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- 2 **Application to policy estimates of the minimum wage.**

Description of Case Study

“The Effects of a Minimum-Wage Increase on Employment and Family Income” Congressional Budget Office (2014)

Description: CBO estimated the effects of a raise in the federal minimum wage from \$7.25/hr to \$10.10/hr.

Main policy estimates:

- 500,000 jobs would be lost.
- 16.5 million workers would receive a salary increase.
- Distributional effects: below poverty line (PL) +\$5billion; between one and three PL +\$12billion; between three and six PL +\$2billion; above six PL -\$17billion

Key research estimate: Elasticity of labor demand for teenagers in the labor force.

Adapting TOP Guidelines to Policy Analysis

Eight Standards at Three Levels

	Level 0	Level I	Level II	Level III
Citation Standards	Journal encourages citation of data, code, and materials, or says nothing	Journal describes citation of data in guidelines to authors with clear rules and examples.	Article provides appropriate citation for data and materials used consistent with journal's author guidelines	Article is not published until providing appropriate citation for data and materials following journal's author guidelines.
Data Transparency	Journal encourages data sharing, or says nothing	Article states whether data are available, and, if so, where to access them.	Data must be posted to a trusted repository. Exceptions must be identified at article submission.	Data must be posted to a trusted repository, and reported analyses will be reproduced independently prior to publication.
Analytic Methods (Code) Transparency	Journal encourages code sharing, or says nothing	Article states whether code is available, and, if so, where to access it.	Code must be posted to a trusted repository. Exceptions must be identified at article submission.	Code must be posted to a trusted repository, and reported analyses will be reproduced independently prior to publication.
Research Materials Transparency	Journal encourages materials sharing, or says nothing	Article states whether materials are available, and, if so, where to access them.	Materials must be posted to a trusted repository. Exceptions must be identified at article submission.	Materials must be posted to a trusted repository, and reported analyses will be reproduced independently prior to publication.
Design and	Journal	Journal articulates	Journal requires adherence to	Journal requires and enforces

Figure: Screen shot of TOP Guidelines

Applying Guidelines to Build an Open Report

DEMO

Sensitivity Analysis: Status Quo

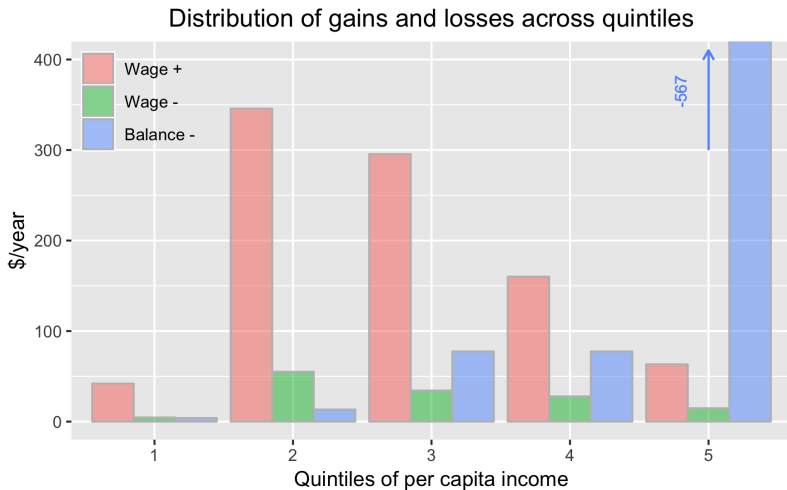


Figure: Default settings

SA: Change in Elasticity of Labor Demand

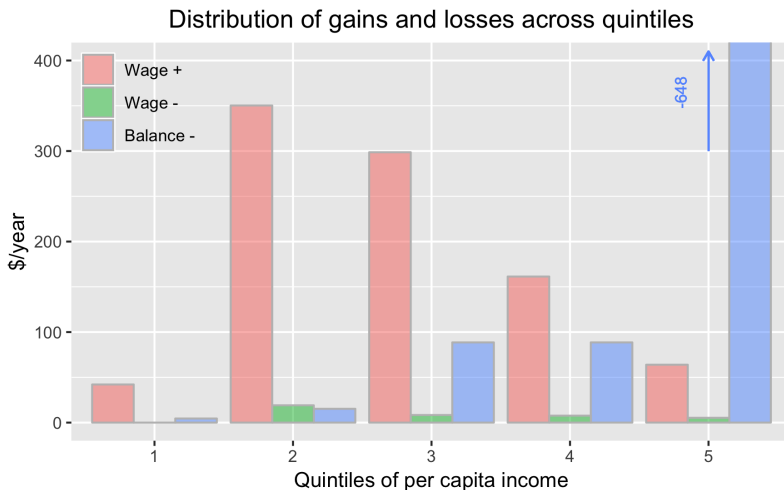


Figure: From $\eta_{lit}^{teens} = -0.1$ to $\eta_{lit}^{teens} = -0.01$ ($\Delta -90\%$)

Sensitivity Analysis: Status Quo

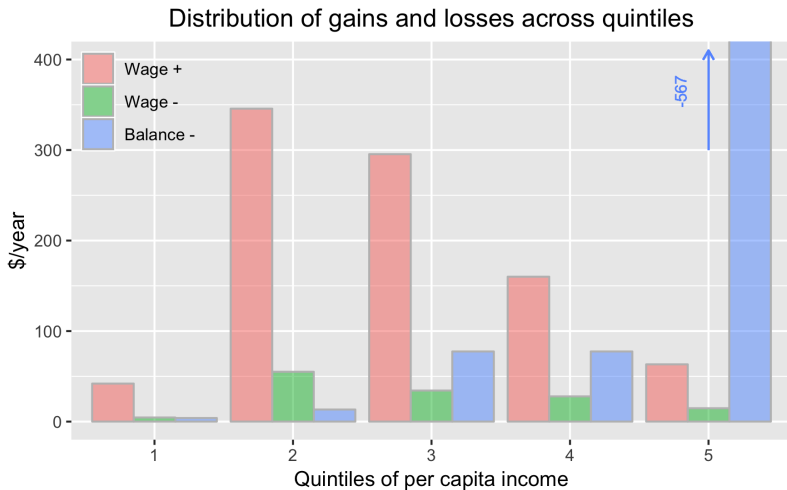


Figure: Default settings

SA: Change in Distribution of Balance Loses

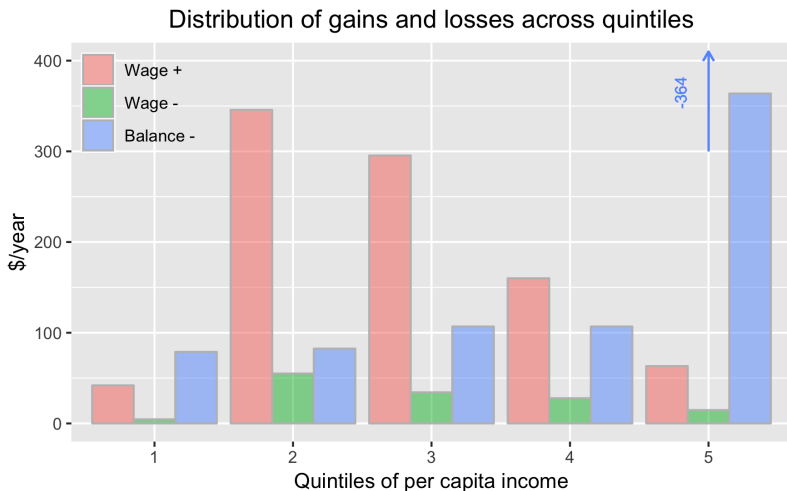


Figure: From (1PL, 6PL) ~ (1%, 29%, 70%) to (20%, 40%, 40%)

Sensitivity Analysis For Multiple Parameters

Table: $\% \Delta W$ for a $\% \Delta$ in inputs. Two sample policy makers.

		Re-distributional Preferences			
		Dislikes ($\rho = -0.1$)		Likes ($\rho = 0.1$)	
Source	Input	$10\% \Delta^+$	$10\% \Delta^-$	$10\% \Delta^+$	$10\% \Delta^-$
Data					
	Annual wage growth (g_w)	-3%	2%	-2%	1%
	Annual growth in N	0.8%	-0.9%	0.5%	-0.5%
Research					
	η_{teen}	-4%	4%	-2%	2%
	Ripple Scope (8.7, 11.5)	37%	-24%	21%	-14%
	Ripple Intensity (50% Δw)	5%	-5%	3%	-3%
Guess Work					
	Extrapolation factor (F_{ex})	-3%	2%	-1%	1%
	Non compliance (α_1)	-7%	7%	-4%	4%
	Substitution factor (F_{sub})		20%		-8%
	Net benefits	-5%	5%	2%	-2%
	Distribution of balance losses				
	Current: (1%, 29%, 70%)				
	(1%, 4%, 95%)	22%		13%	
	(5%, 35%, 60%)	-17%		-9%	
	$1/N$	-129%		-73%	

Limitations

- There is additional scope for reproducibility.
- Complete case study requires extensive institutional knowledge.
- Guidelines need to be build based on consensus of practitioners.

What lies ahead

Let's assume this becomes the new status quo.

- Costs of producing the next report on effects of minimum wage will be very small.
- Every additional effort will imply improvements on the “state of the art” report (e. g. $dB L$; $\eta(MW)$, $\alpha_1(MW)$)
- Learning about one parameter (QALYs, DWL) will update estimates *across* reports.
- Much easier to have a substantive and normative policy debate.
Pilot example: [Shiny App!](#).

Your next steps to push OPA forward

- Collaborate with BITSS to open up your PA.
- Fund OPA: directly or conditionally.
- Train students/analysts in OPA.
- Present/showcase your OPA. Pioneers: GiveWell, AEI.
- Nominate a PA to be open [here](#).

"Democracy Thrives In
Sunlight"

The Wonk Times

Washington DC

VOL.III. . . No.14

AUGUST 23, 2020

THREE DOLLARS

GiveWell Publishes Full OPA

*Report identifies 10 most
relevant unknowns for
researchers to investigate*

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mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

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Strong pressure for World Bank to follow suit

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at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

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Thank you.

Pre-prints:

Why OPA

OPA Case Study

Slides at

<https://tinyurl.com/y9n7uwy5>

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