

Open Policy Analysis

Evidence Based

Crisis in Research

Open Science

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Suggestion

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Why We Need Open Policy Analysis

Fernando Hoces de la Guardia¹ Sean Grant² Edward Miguel¹

¹UC Berkeley: Berkeley Initiative for Transparency in the Social Sciences ²RAND

Congressional Budget Office March 29th. 2018



Policy Analysis And The Evidence-Based Policy Movement

Open Policy Analysis

Evidence Based

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)

- As many definitions as textbooks (Dunn, 2015; Weimer
- Common denominator: client-oriented empirical
- Aspires at scientific rigor. (Wildavsky 1979). □▶ ◆□▶ ◆토▶ ◆토▶ 토|= 쒼♀♡ 2/34



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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),



One Ideal Evidence-Based Policy Link

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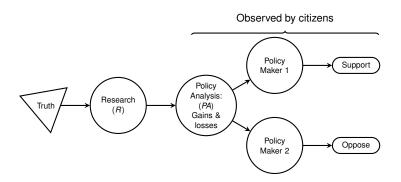
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Conclusion





Reproducibility Crisis In Empirical Research

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Suggestion

■ 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

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Conclusion

- 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

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- Incredible Certitudes (Manski, 2013)
- Report wars (Wesselink et al, 2013)



How This Affects The Evidence Based Policy Link?

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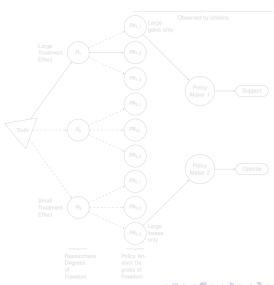
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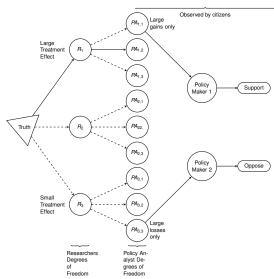
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Relevance

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Research

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Main consequences of policy analysis that lacks openness:

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



Cherry Picking Evidence

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when I was director of the GBO, 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 are trade-offs."

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



Cherry Picking Evidence

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



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Conclusion

	Empirical	Policy
	Research	Analysis
Problems	Reproducibility	Credibility
	Crisis	Crisis
Solutions	Open Science	
	Principles, Guidelines,	
	Applications	



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The Process of Policy Analysis

Open Policy Analysis

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Crisis in Research

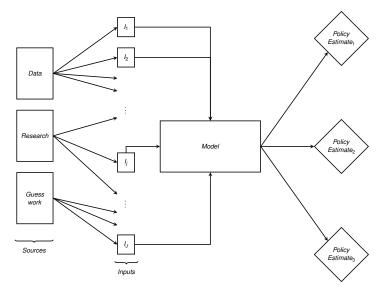
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Principles for Open Policy Analysis

Open Policy Analysis

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Proposed principles:

- Computational Reproducibility
- 2 Analytic Transparency
- 3 Output Transparency



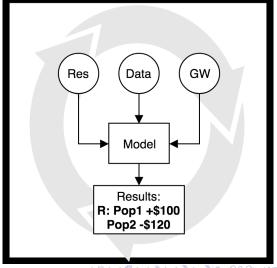
Principle 1

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Computational Reproducibility

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





Principle 2

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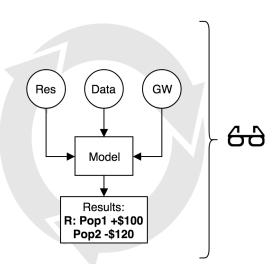
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Analytic Transparency

- Open code
- Open data
- Report as Dynamic Document





Principle 3

Open Policy Analysis

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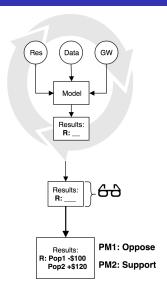
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Conclusion

Output Transparency

- Pre-committed output display
- Assumptionsoutput link





Suggestions

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Suggestions

Conclusion

Suggestions:

- Policy Analysts: Just Post It. Things are moving in this direction. Play a leading role in a credibility revolution for policy analysis.
- Policy Analysis Organizations: Open by Default Boost in credibility, lower costs in the long run. Examples: GiveWell, and AEI.
- Government Agencies and Funders: Support Open Policy Analysis Examples: Require contracted policy analysis to be fully open. Support training and adoption of new tools (VC and DD). Inject resources for the transition



Suggestions

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Suggestions

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Summing Up: Where We Are

Open Policy Analysis

Evidence Based

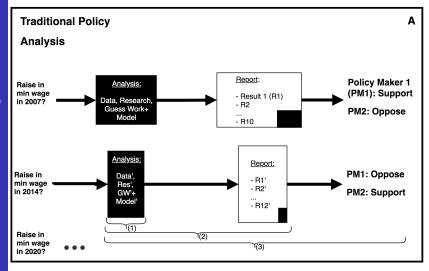
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Summing Up: Where Should We Go

Open Policy Analysis

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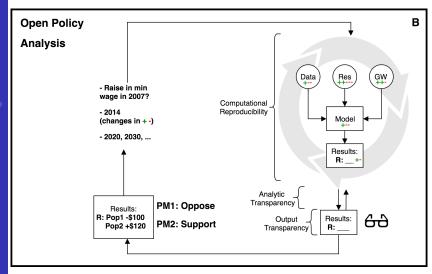
Crisis in Research

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OPA -Minimum Wage

Motivation

Case Study

Application

Sensitivity

Analysis

Discussi

Open Policy Analysis: A Case Study of the Minimum Wage Policy Estimate

Fernando Hoces de la Guardia¹

¹UC Berkeley: Berkeley Initiative for Transparency in the Social Sciences

Congressional Budget Office March 29th, 2018



Motivation 1: Gap On How to Conduct OPA

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Motivation

Case Stud

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Analysis

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Problems	Reproducibility	Credibility
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Motivation 1: Gap On How to Conduct OPA

OPA -Minimum Wage

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Description of Case Study

OPA -Minimum Wage

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.



Reasons for Selecting the Case Study

OPA -Minimum Wage

Motivation

Case Study

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■ Scalable ■ Feasible

Recurrent

■ Relevant:

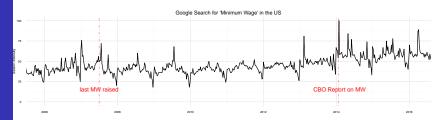


Figure: Google Search Intensity of "Minimum Wage"



OPA -Minimum Wage

Standard	Level 0	Level 1	Level 2	Level 3
Workflow	Policy estimates vaguely described	All the inputs, and their corresponding sources, used in the calculations are listed	Lvl 1 + Policy estimates are listed, in same unit if possible	Lvl 2 + all the components can be modified with little effort
Data	Report says nothing	Clearly stated whether all, some components, or none of the data is available, with instructions for access when possible.	LvI 1 + report and data are in same place	Lvl 2 + Report has specific lines of code that call the data and changes in the data produce traceable changes in the report
Methods & Code	Key assumption are listed	Methods are described in prose. Large amount of work is required to reproduce qualitatively similar estimates	Methods and described in prose, with detailed formulas, and code is provided as supplementary material	Lvl 2 + All is in the same document where changes in the code affect the output automatically



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Applying Guidelines to Build an Open Report

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Map the complete policy analysis

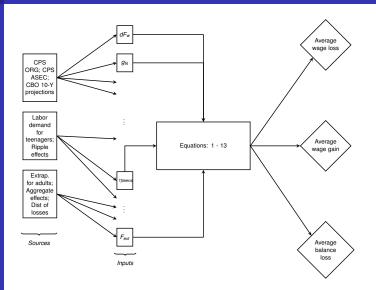
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All in One Output 1/3

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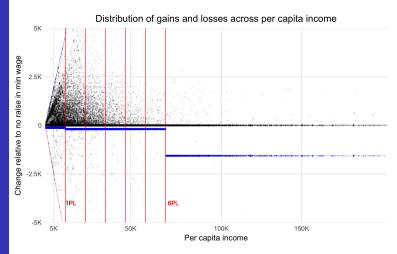


Figure: Gains and losses. Different Units



All in One Output 2/3

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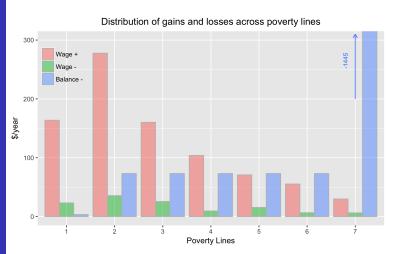


Figure: Gains and losses. Different Denominator



All in One Output 3/3

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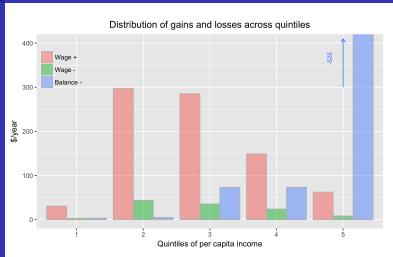


Figure: Gains and losses. Same units and denominator



Sensitivity Analysis: Status Quo

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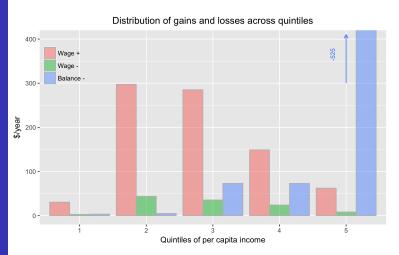


Figure: Default settings



SA: Change in Elasticity of Labor Demand

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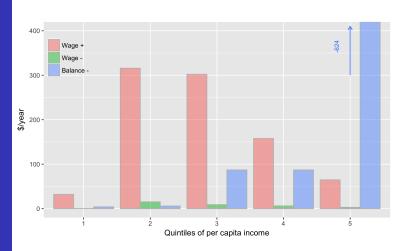


Figure: From
$$\eta_{lit}^{teens} = -0.1$$
 to $\eta_{lit}^{teens} = -0.01(\Delta^-90\%)$



Sensitivity Analysis: Status Quo

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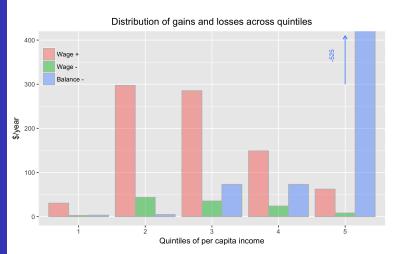


Figure: Default settings



SA: Change in Distribution of Balance Loses

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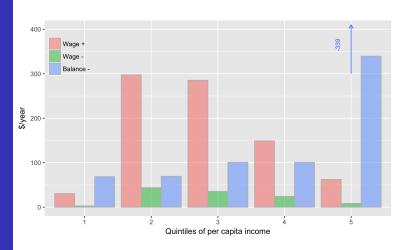


Figure: From $(1PL, 6PL) \sim (1\%, 29\%, 70\%)$ to (20%, 40%, 40%)



Sensitivity Analysis For Multiple Parameters

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Motivation

Case Study

Application

Sensitivity Analysis

DISCUSS

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%Δ+	10%Δ-	10%Δ+	10%Δ-
Data					
	Annual wage growth (g_w)	-3%	2%	-2%	1%
	Annual growth in N	0.8%	-0.9%	0.5%	-0.5%
Researc	Research				
	η_{teen}	-4%	4%	-2%	2%
	Ripple Scope (8.7, 11.5)	37%	-24%	21%	-14%
	Ripple Intensity $(50\%\Delta w)$	5%	-5%	3%	-3%
Guess V	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

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Discussion

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



Discussion

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Discussion

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. dBL; $\eta(MW)$, $\alpha_1(MW)$)
- 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!.



Possibilities for Collaboration

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Discussion

- CBO is a leader in policy analysis. Leading OPA would shield its credibility and encourage others (ala Journal Science for Empirical Research).
- What can BITSS offer:
 - Technical support next case study (funded through) August 2018).
 - Training on research transparency methods.
- Join a group of experts to develop and publish guidelines (APPAM 2018 convening).



An Aspiration

OPA -Minimum Wage

Discussion

"Democracy Thrives In Sunlight"

The Wonk Times

Washington DC

VOL.III No 14

MARCH 29, 2020

THREE DOLLARS

CBO Publishes

Open Report on Minimum Wage

Results Will Be Published Separately in Two Weeks

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Bipartisan Support for CBO Methodology

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Let's work together!



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Thank you.

Pre-prints: Why OPA OPA Case Study

Slides at github.com/fhoces/CBO2018

fhoces@berkeley.edu



OPA -Minimum Wage

Employmer Wages

Back-up slides



Easier Methodological Appraisal. Example: dis-employment effects **Before**

OPA -Minimum Wage

Wages Income Steps taken to verify the analysis & employment variation $(\widehat{\Delta E} \times 1000)$ at each line¹

- **1** Find an elasticity: -0.1 (page 25): $\Delta \vec{E} \approx 300$
- What about adults? $\eta^{adults} = \frac{1}{3}\eta^{teens}$ (page 28)
- (page 26-28 + 2 papers): $\widehat{AF} \approx 1.100$
- The adjustment factors $\frac{1}{p_{w \leq MW}^g} \times \frac{\% \Delta MW}{\% \Delta w^g} = F_{adj}^g$ are not computed from the data (3.2 teens, 19.5 adults).

Instead: $F_{adi}^{teen} = F_{adi}^{adult} = 4.5$ (page 28) $\widehat{\Delta E} \approx 500$

Steps 2-4 took several days of work!

¹Assuming target population \approx 22 million, $\overline{\Delta w_{w \leq MW'}} \approx$ 14%, and non-compliance \approx 15%



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- 11 Find an elasticity: -0.1 (page 25): $\Delta \vec{E} \approx 300$
- 2 What about adults? $\eta^{adults} = \frac{1}{3}\eta^{teens}$ (page 28): $\widehat{\Delta E} \approx 100$
- What about the adjustment? $\eta_{w \leq MW}^g = \frac{\eta_{lit}^g}{p_{w \leq MW}^g} \times \frac{\%\Delta MW}{\%\Delta W^g}$ (page 26-28 + 2 papers): $\widehat{\Delta E} \approx 1,100$
- The adjustment factors $\frac{1}{p_{w \leq MW}^g} \times \frac{\% \Delta MW}{\% \Delta w^g} = F_{adj}^g$ are not computed from the data (3.2 teens, 19.5 adults). Instead: $F_{adi}^{teen} = F_{adi}^{adult} = 4.5$ (page 28) $\widehat{\Delta E} \approx 500$

Steps 2-4 took several days of work!

¹Assuming target population \approx 22 million, $\overline{\Delta w_{w \leq MW'}} \approx$ 14%, and non-compliance \approx 15%



Equations from Model in DD

OPA -Minimum Wage

Employment Wages Income

$$\widehat{\Delta E} = N \times \eta \times \% \Delta w + \text{Other factors}$$
 (1)

$$\widehat{N_{\textit{final}}^s} = g_N(\hat{t}'|t) \times \hat{N_t^s} \times P(\hat{w'} \leq MW^{\textit{new}}|s) \times (1 - \hat{\alpha_1^s} - \hat{\alpha_2^s})$$
(2)

The elasticity for adults from the literature is define as the one for teenagers with an extrapolation factor.

$$\eta_{lit}^{adults} = \eta_{lit}^{teens} \times F_{extrapolation}$$
(3)



Adjustments to the elasticity of labor demand

OPA -Minimum Wage

Employment

Following Neumark and Wascher (2008), Brown (1999). First:

$$\eta_{lit}^s = p_{w \leq MW}^s \eta_{w \leq MW}^s + (1 - p_{w \leq MW}^s) \eta_{w > MW}^s$$
 $s = \{teens, add Second, assume $\eta_{w \leq MW}^s = 0$:$

$$\eta_{W \leq MW}^{s} = \frac{\eta_{lit}^{s}}{p_{W \leq MW}^{s}} \qquad s = \{teens, adults\}$$

And third, adjust for the effective average wage variation for each group ($\%\Delta w^s$):

$$\widetilde{\eta_{w \leq MW}^s} = \frac{\eta_{lit}^s}{p_{w < MW}^s} imes \frac{\% \Delta MW}{\sqrt[9]{\Delta W^s}} = \eta_{lit}^s imes F_{adjs}^s \qquad s = \{teens, adultion \}$$



•Final Effect on Employment

OPA -Minimum Wage

Employment Wages

$$\widehat{\Delta E} = \sum_{g \in \{A, T\}} \left(\widehat{N_g^{final}} \times \widehat{\eta_{W \leq MW}^g} \times \overline{\% \Delta w^g} \right) - \widehat{OF}$$
 (5)



Effect on Wages

OPA -Minimum Wage

Employmen Wages

$$w'' = \begin{cases} w' & \text{if} \quad w \in U[0,1] < \alpha_1 \\ w^{\text{new}} & o/w \end{cases}$$
 (6)

$$w^{new} = \begin{cases} w'/2 & \text{if} \quad w \in U[0,1] < \alpha_{aux} \\ \widetilde{w^{new}} & o/w \end{cases}$$
 (7)

Ripple Effects

$$\widetilde{w^{new}} = egin{cases} MW' & \textit{if} & w' < R_{lb} \ MW' + R^l(w' - R^s_{lb}) & \textit{if} & w' \in [R_{lb}, MW') \ w' + R^l(R^s_{ub} - w') & \textit{if} & w' \in [MW', R_{ub}) \ w' & o/w \end{cases}$$



Computing Income

OPA -Minimum Wage

Employment Wages

$$y'_{i,h} = \sum_{i \in N_h} (g_{nw}(t'|t)nw_i + w'_i) / N_h$$

$$y''_{i,h} = \sum_{i \in N} (g_{nw}(t'|t)nw_i + w''_i) / N_h$$
(9)

Final Policy Estimates

$$WG_{i} = (y_{i}'' - y_{i}') \mathbf{I} (y_{i}'' > y_{i}')$$
(10)

$$WL_i = (y_i' - y_i') \mathbf{I}(y_i'' < y_i')$$

$$\tag{11}$$

$$BL = \sum_{i} WG_{i} - F_{sub} \sum_{i} WL_{i}; \quad BL_{i} = BL \times dBL$$
 (12)

$$\overline{WG_Q} = \frac{\sum_{i \in Q} WG_i}{N_{pop}/5} \quad \overline{WL_Q} = \frac{\sum_{i \in Q} WL_i}{N_{pop}/5}$$

$$\overline{BL_Q} = \frac{\sum_{i \in Q} BL_i}{N_{pop}/5}$$
(13)

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2.3 Get the $\eta \times \Delta w$

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employment
3 Distributional effects

3.1 Computing Family income

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3.3 Computing family income under status quo and minimum wage increase

3.4 Other considerations

4 Results

Reader Companion for CBO report on Min Wage (Preliminary Version. Do Not Circulate)

Fernando Hoces de la Guardia + (hopefully) a lot more people Last edit: 2016-10-16

1 Introduction

The role of policy analysis is to connect research with policy, Because of heavy time constrains, policy analyses are typically ambiguous regarding the details of how the analysis was carried out. This creates three problems: (i) its hard to understand the connection between research and policy, (ii) allows policy makers to cherry pick policy reports, and (iii) hinders systematic improvement and/or automation of parts of the analysis. In this document we demonstrate the use of a reproducible workflow to reduce the ambiguity in policy analysis.

Here we attempt to contribute to the policy discussion of the minimum wage. The minimum wage is a contentious policy issue in the U.S. Increasing it has positive and negative effects that different policymakers value differently. We aim to add clarity on what those effects are, how much do we know about them, and how those effects vary when elements of the analysis change. We select the most up-to-date, non-partisan, policy analysis of the effects of raising the minimum wage, and build an open-source reproducible analysis on top of it.

In 2014 the Congressional Budget Office published the report titled "The Effects of a Minimum-Wage increase on Employment and Family Income". The report receive wide attention from key stakeholders and has been used extensible as an input in the debate around the minimum wage. To this date we consider the CBO report to be the best non-partisan estimation of the effects of raising the minimum wage at the federal level. Although there was disagreement among experts around some technical issues, this disagreement has been mainly circumscribed around one of the many inputs used in the analysis, and we can fit the opposing positions in to our framework."

Our purposes are twoflotf. First, promote the technical discussion around a recurrent policy issue (minimum wage) by making explicit and visible all the components and key assumptions of its most up-to-date official policy analysis. Second, demonstrate how new scientific practices of transparency and reproducibility (T & R) can be applied to policy analysis. We encourage the reader to collaborate in this document and help develop an ever-improving version of the important policy estimates? (related under the province of the province

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2 Employment effects

At a general level the effects on employment $(\widehat{\Delta E})$ will be calculated using a more detailed version of the following equation:

$$\widehat{\Delta E} = N \times \eta \times \% \Delta w + \text{Other factors}$$

Where N represents the relevant population, η the elasticity of labor demand, Δw the relevant percentual variation in wages, and the Other factors will encapsulate effects on employment through an increase in the aggregate demand.

To describe the methodology behind each of those four components we first describe the data used, the wage variable choose. and the procedure used to forecast the wage and population distribution of 2016 using data from 2013.

2.1 Data, wages, and forecast

To simulate the policy effects we need the distribution of wages and employment under the status quo. From the perspective of 2013, this implies forecasting to 2016 data on employment and wages.

2.1.1 Data

The Current Population Survey (CPS) was used to compute the effects on employment. From the analysis in the section on distributional effects we can deduce that the data corresponds to the Outgoing Rotation Group (ORG), CPS is a monthly cross sectional survey. The same individual is interviewed eight times over a period of 12 months. The interviews take place in the first and last 4 months of that period. By the 4th and 12th interview, individuals are asked detailed information on earnings. The CPS ORG file contains the information on this interviews for a given year. We analyze the data for 2013.

Currently three versions of these data sets can be found online: CPS raw files, ORG NBER and ORG CEPR. The analysis will be performed using the CPER ORG data base.

The weights used in our analysis will be orgust/12

2.1.1.1 Code to load the data

Stata

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performed using the CPER ORG data base.

The weights used in our analysis will be orgwgt/12

2.1.1.1 Code to load the data

```
call.cps.org.data <- function(){
 data use <- "CPER ORG"
 # Using CEPR ORG data
 if (data use == "CPER ORG") {
 # Checking if working directory contains data, download if not.
   if ( !("cepr org 2013.dta" %in% dir()) ) {
       # create name of file to store data
       tf <- "cepr org 2013.zip"
       # download the CPS repwgts zipped file to the local computer
       download.file(url = "http://ceprdata.org/wp-content/cps/data/cepr org 2013.zip", tf , mode
       # unzip the file's contents and store the file name within the temporary directory
       fn <- unzip( zipfile = tf , overwrite = T )
   df <- read.dta("cepr org 2013.dta")
 # Using NBER ORG data
 if (data use == "NBER ORG") {
   # Checking if working directory contains data, download if not.
   if ( |("morg13.dta" %in% dir()) ) {
     # Downloading data 53mb
     df <- read.dta("http://www.nber.org/morg/annual/morg13.dta")</pre>
   df <- read.dta("morg13.dta")
```

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 $\times \Delta w$

g effects on

l effects g Family

policy effects g family itus quo and icrease siderations

2.5 Computing effects on employment

Putting all elements together we get:

$$\widehat{\Delta E} = \sum_{g \in [A,T]} \left(\widehat{N_g^{final}} \times \widehat{\eta_{w \leq MW}^g} \times \overline{\% \Delta w^g} \right) - \widehat{OF}$$

2.5.1 Code to compute each component

Stata

Components of Elasticities

Adult	Teer
-0.03	-0.10
-0.23	-0.13
4.50	4.50
13.81	16.65
-0.15	-0.4
	-0.03 -0.23 4.50 13.81

Using all the components described above we get $\overline{\Delta} \cdot \overline{E} = -478$ thousand jobs. The report however computes F_{adjs}^{g} in a different fashion and gets a value of 4.5 (when computing the values of F_{adjs}^{g} from the table below -8 oppose to using historical values -9 eq. $\overline{\Delta} \cdot \overline{E} = -321$ thousand jobs).

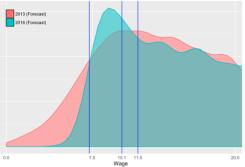
3 Distributional effects

In the first step towards obtaining the policy estimates presented in the introduction we concluded with





Figure 4: Distribution of wages in 2013 and 2016(forecast)



Comparison of 2013 and 2016 under the status quo

	2013	2016: status quo	
Salary workers	122,593,557	129,545,571	
Modine wase	17.70	20 54	/ •

Final replication output (nothing in the "learn more" button yet)

Policy estimates in CBO report and Replication Results

Learn more

	Effects/Policy Estimates	Replication				[3PL,	
wage gains (billions of \$)	31	53.4					
wage losses	~5	7.4		<1PL	3PL)	6PL)	>6PL
(bns of \$)			Balance	~0.3	~3.4	~3.4	~17
Balance losses (bns of	~24	43.9	losses (bns of \$)				
\$)			Net effect	5	12	2	-17
Net effect	2	2	(bns of \$)				
(bns of \$)	_	-	Replication	-0.4	-6.4	-6.4	-30.8
# of Wage	16.5	23.1/16.9	loses				
gainers (millions)		Repl NE	Replication NE	17.6	14.6	-0.1	-30.1
#of Wage losers (millions)	0.5	0.5					



Clear connection between sources and inputs

OPA -Minimum Wage

Employmen Wages Income

Source	Input			
Data CPS ORG 2013 (CEPR version)	Number of salary workers in 2013 $(\widehat{N_{inal}^g} \ g \in \{teen, adult\});$ Fraction of workers below the new minimum wage $(P_{\widehat{w} \subseteq MW^1 g});$ Average wage variation for those below the new min wage $(\sqrt[8]{\Delta} w^g);$ Non-compliance rate (α_1^g)			
CPS ASEC 2012 (CEPR version) State level Min. Wage (DOL) 10-year economic forecast (CBO)	Wages and Non-Wage Income distribution (dF_w, dF_{nw}) ; Household size (N_n) ; Hours/weeks worked (\hat{w}, \hat{h}) Trends in state min. wage (MW_i^s) Predicted worker growth by 2016 (in 2013) $(\hat{g_N})$; Wage growth in by 2016 $(\hat{g_{nw}})$; Non-wage growth by 2016 (g_{nw})			
Research Elasticity of labor demand for teenagers Ripple effects	$\eta_{leen}^{llt}=-0.1$ From $R_{lb}=\$8.7$ to $R_{ub}=\$11.5$ with a "ripple" intensity of $R_I=50\%$			
Guess Work Extrapolation factor from teenagers to adults Net benefits Adjustment to account for effective wage variation and affected population Aggregate consumption effects on employment Distribution of balance loses Fract. of wage loses used to pay	$F_{ex} = 1/3$ $\hat{NB} = \$2billion$ $F_{adj} = 4.5$ $\hat{OF} = 40,000 \text{ new jobs}$ $dBL = (1\%, 29\%, 70\%) \text{ if income } \in [0,1PL,6PL,+)$ $F_{subs} = 1$			



Fully specified model

OPA -Minimum Wage

Employmen Wages Income

Model	Policy estimate			
	(per quintile)			
Predicted household income with and	Average gain in per			
without min wage increase.	capita income due			
Depends on: $\widehat{N_{final}^g}$, $P_{\widehat{w} \leq MW^1 g}$, $\overline{\%\Delta w^g}$, α_1^g ,	to net wage			
$dF_w, dF_{nw}, N_h, \hat{w}, \hat{h}, MW_t^s, \hat{g_N}, \hat{g_w}, \hat{g_{nw}},$	increase.			
	$(\overline{WG_q})$			
$\eta_{teen}^{lit}, R_{lb}, R_{ub}, R_{l}, F_{ex}, F_{adj}, \hat{OF}$,			
Predicted household income with and	Average loss in per			
without min wage increase.	capita income due			
Depends on: $\widehat{N_{\mathit{final}}^g}, P_{\widehat{w} \leq MW^1 g}, \overline{\% \Delta w^g}, \alpha_1^g,$	to net wage			
$dF_w, dF_{nw}, N_h, \hat{w}, \hat{h}, MW_t^s, \hat{g_N}, \hat{g_w}, \hat{g_{nw}},$	decrease. $(\overline{WL_a})$			
$\eta_{teen}^{lit}, F_{ex}, F_{adj}, \hat{OF}$	(VVLq)			
Distribution of balance loses	Average loss in per			
Depends on: $\overline{WG_q}(\cdot), \overline{WL_q}(\cdot), \hat{NB},$	capita income to			
F_{subs}, dBL	balance wage			
	gains.			
	$(\overline{BL_q})$			
Equations; Back				



Comparing the Trade-offs: A Toy Example

OPA -Minimum Wage

Employmen Wages Model for the normative comparison made by a policy maker (welfare function):

$$W(\rho) = \sum_{i \in N} \left(\omega_{wg} wg_i + \omega_{wl} wl_i + \omega_{bl} bl_i \right) \omega_i^{d}(Q_i, \rho)$$

with:

$$\omega_i^{\textit{d}}(\textit{Q}_i, \rho) = \frac{(1 - \rho(\textit{Q}_i - \textit{Q}_{\textit{median}}))}{\sum_i \omega_i^{\textit{d}}(\textit{Q}_i)} \textit{Q}_{\textit{max}} \quad \text{for } \rho \in \left(-\frac{1}{2}, \frac{1}{2}\right)$$

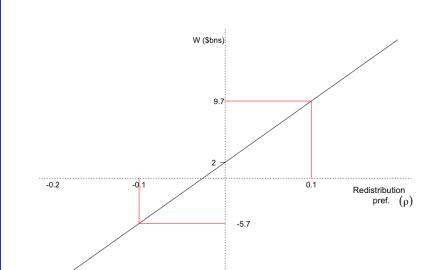
ho>0 represents positive valuation of progressive redistribution. ho<0 represents positive valuation of regressive redistribution.



Redistribiutional Preferences Toy Example ($\omega_{WG} = \omega_{WL} = \omega_{BL} = 1$)

OPA -Minimum Wage

Employmer Wages





Motivation 2: An Academic Concern in 2013

OPA -Minimum Wage

Employment Wages

> "I worry that someday sooner or later the existing social contract to take CBO scores at face value will break down. Conventional Certitudes that lack foundation cannot last indefinitely."

> > — Charles Manski Public Policy in an Uncertain World, 2013

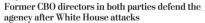


Motivation 2: A Reality In 2017



Employmer Wages Income





Former CBO Leaders Ask
Lawmakers to Stop Bad-Mouthing

the Agency

THE WALL STREET JOURNAL.

POLITICS

Former CBO Directors Defend Agency Against Republican Attacks

White House has questioned analyses of health-care bills; 'it's over the line,' says Douglas Holtz-Eakin





Challenges And Suggestions

OPA -Minimum Wage

Employment Wages

Challenges:

- Policymakers may not want analyses to be open.
- Analysts may wish to keep policy analyses "closed".
- For policy analysis contracted out to third parties:
 Opening methods will prevent them form reselling extensions.
- Initially reproducibility represents an additional layer of work.
- Limits to sharing sensitivity of information, requires resources for adequate de-identification if open data is expected