

DISCUSSION:
THE EMPLOYMENT IMPACT OF A GREEN FISCAL PUSH
BY: PVMC

Gabriel Chodorow-Reich
Harvard University

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COMMENTS

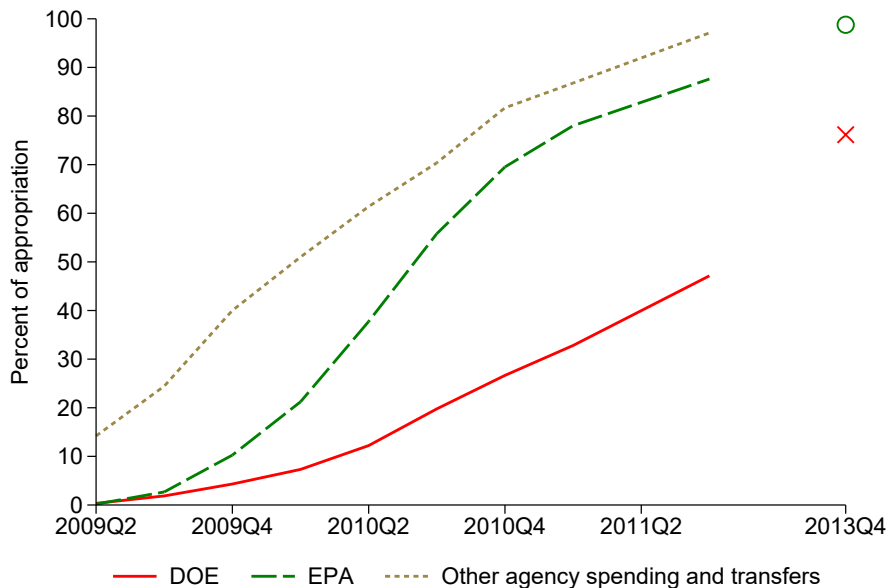
- ① Terminology.
- ② Econometric and measurement challenge.
- ③ Lessons from other structural transformations.

Terminology

TEMPORARY STIMULUS OR PERMANENT REALLOCATION?

- Temporary stimulus:
 - ▶ Opportunity: accelerate green investments when resources are idle.
 - ▶ Standard theory: temporarily increases total employment.
 - ▶ Path dependence: may permanently reallocate employment toward green sectors or toward particular geographic areas.
- Permanent transformation:
 - ▶ Problem: workers in dirty industries require permanent new jobs.
 - ▶ May require sustained support.
- ARRA case: clean energy spending very back-loaded — most spending (and jobs) after 2010 ⇒ not stimulus as initially intended, but *ex post* economy remained demand-constrained.

SHARE OF ARRA APPROPRIATION SPENT



Econometric and measurement challenge

LIST OF CONTROLS IN BASELINE

Notes: Regressions weighted by CZ population in 2008. Sample: 587 CZ with at least 25,000 residents in 2008. Year fixed effects and state (or census division) x period fixed effects included. Additional control variables (interacted with D2005_2007, D2009_2012 and D2013_2017 dummies): Vintiles of non-green ARRA per capita, Share of empl with GGS>p75 (2005), Population 2008 (log), Income per capita (2005), Import penetration (year 2005), Pre trend (2000-2007) empl manufacturing / pop, Pre trend (2000-2007) employment tot / pop, Pre trend (2000-2007) empl constr / pop, Pre trend (2000-2007) empl extractive / pop, Pre trend (2000-2007) empl public sect / pop, Pre trend (2000-2007) unempl / pop, Pre trend (2000-2007) empl edu health / pop, Empl manif (average 2006-2008) / pop, Empl constr (average 2006-2008) / pop, Empl extractive (average 2006-2008) / pop, Empl public sect (average 2006-2008) / pop, Unempl (average 2006-2008) / pop, Empl edu health (average 2006-2008) / pop, Shale gas extraction in CZ interacted with year dummies, Potential for wind energy interacted with year dummies, Potential for photovoltaic energy interacted with year dummies, Federal R&D lab, CZ hosts the state capital, Nonattainment CAA old standards, Nonattainment CAA new standards. Data on total employment and employment share by industry come from BLS-QCEW. Green and manual employment calculated by multiplying total employment (BLS-QCEW) by the share of workers in each category, taken from ACS. See Appendix A2 for details. Standard errors clustered by state in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

ECONOMETRIC CHALLENGE

- Want to estimate jobs effects of federal spending on Green programs.
- Federal spending on Green programs targeted toward areas with existing Green infrastructure.
- Generic concern: areas with existing Green infrastructure subject to other correlated shocks.
- Specific concern: economy is greening anyway, which allocates activity toward these areas even absent federal spending.
- Not necessarily diagnosed by pre-trends if overall greening more important post-2008.
- Different direction of bias from other ARRA research.

EXAMPLE: WIND AND SOLAR

- Large ARRA grants and tax credits for wind and solar.
- Obviously likely to benefit areas with lots of wind or sun.
- Physical geographic features \Rightarrow more \$ \Rightarrow great instrument?
- Not if wind and solar becoming more competitive anyway.
- Paper throws out (controls for) this variation.
- Same concern applies to shift-share design.
- More subtle in interaction specification (figure 5): concern if funds \Rightarrow areas expected to expand based on unobservables to econometrician (e.g. if main effect of Green suitability is measured with error).

ASSESSING EMPIRICAL STRATEGY

- Paper controls for a lot.
- Yet pre-trends remain.
- Hard to pinpoint what drives remaining variation in Green spending.
- Lots of subsequent environmental-friendly policies. Were these neutral w.r.t areas receiving Green ARRA funding?
- Surprising pre-trends more pronounced for total than Green employment.
- Suggestion: “case study” of areas with largest residualized spending.
- Suggestion: Rambacharan and Roth instead of “netting out” pre-trends.

MEASUREMENT CHALLENGE

- Measuring green jobs impact difficult even if perfect research design.
- Why? Green jobs are small share of the economy + data from survey.
- Diagnostic: 50 bootstrap samples of each PUMA in 2013 ACS aggregated up to CZ.

Population-weighted Median Green Share (GS)	3.05%
Bootstrap Weighted Median S.D.	0.16%
Weighted Median CV	5.24%

- Growth rate of green employment = Total QCEW emp. growth rate $\times GS_{t+h}/GS_t$.
- $GS_{t+h}/GS_t \sim N(1, \sqrt{2 \times 0.0524^2}) \approx N(1, 0.07)$.
- In words: sampling variability alone induces standard deviation of 7p.p. in growth rate of green jobs in typical CZ.

Lessons from other structural transformations

WHAT ELSE DO WE KNOW ABOUT TRANSITIONS?

- ① Is transition from brown to green different from other industry shifts?
- ② Useful lessons from structural shifts literature.
- ③ First part of paper provides important optimism regarding skill differences (although not necessary in GE for workers in brown jobs to transition to green jobs).

MANAGED DE-INDUSTRIALIZATION DIFFICULT

- Structural transformation is not new.
- Managing it is difficult.
- Accumulating evidence that displaced workers suffer long-term consequences.
- Job re-training more difficult for older, less educated workers.
- Some proposed investments are short term (e.g. plugging orphan oil wells, cleaning abandoned mines). These may provide stimulus, but they do not resolve the industrial transformation problem.

GOOD MACROECONOMIC ENVIRONMENT HELPFUL

Table E.1 – Recession Wage Compression in the Data

	Dep. var.: change in industry wage premium	
	NAICS 2	SIC 2/NAICS 3
	(1)	(2)
Right hand side variables:		
Share change growth rate $\left(\frac{12}{j} \frac{2\Delta s_{i,t}}{s_{i,t}+s_{i,t-T}}\right)$	0.39 ⁺ (0.19)	0.35* (0.15)
Recession X $\frac{12}{j} \frac{2\Delta s_{i,t}}{s_{i,t}+s_{i,t-T}}$	-0.43* (0.20)	-0.35* (0.17)
Employment share weighted	No	Yes
Industry clusters	17	143
Observations	102	492

Notes: The dependent variable is the change in the industry wage premium over the recession or expansion episode. The wage premium is a centered twelve month moving average of the industry fixed effect in a regression in the CPS ORG data of the log hourly wage on categorical variables for industry, race, 5 year age bin, gender, educational attainment, state, rural, and occupation. The variable $\frac{12}{j} \frac{2\Delta s_{i,t}}{s_{i,t}+s_{i,t-T}}$ is the annualized symmetric growth rate of the industry employment share during the expansion or the recession-recovery containing the recession in the QCEW data. Standard errors in parentheses and clustered by industry.

Source: Gabriel Chodorow Reich and Johannes Wieland. 2020. “Secular Labor Reallocation and Business Cycles.” *Journal of Political Economy* 128:6: 2245-2287.