

The Employment Impact of a Green Fiscal Push: Evidence from the ARRA

by Popp, Vona, Marin, and Chen

Discussion by Valerie A. Ramey

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BPEA September 9, 2021

Overview of Paper

- Impressive, expansive paper on the **employment effects of green fiscal policy**.
- **3 parts to the paper:**
 1. Survey of literature on the effects of environmental policies on employment with attention to heterogeneity in skills and geography.
 2. Comparison of the skill requirements of green jobs with the skill endowment of workers in brown industries.
 3. Analysis of the employment effects of the green spending in the ARRA.
- Very ambitious undertaking, but **many challenges** to obtaining definitive answers.

Outline of my Discussion

1. Putting the authors' estimates in context: spending delays and dynamic general equilibrium effects.
2. Comparison of the authors' green ARRA employment findings to effects of highway ARRA.
3. Green incentives not included in the authors' analysis: tax credits for rooftop solar.
4. The broader impacts of the green transition on fossil fuel communities.
 - The case of the mining communities in Asturias, Spain.
 - Lavender in Appalachia.

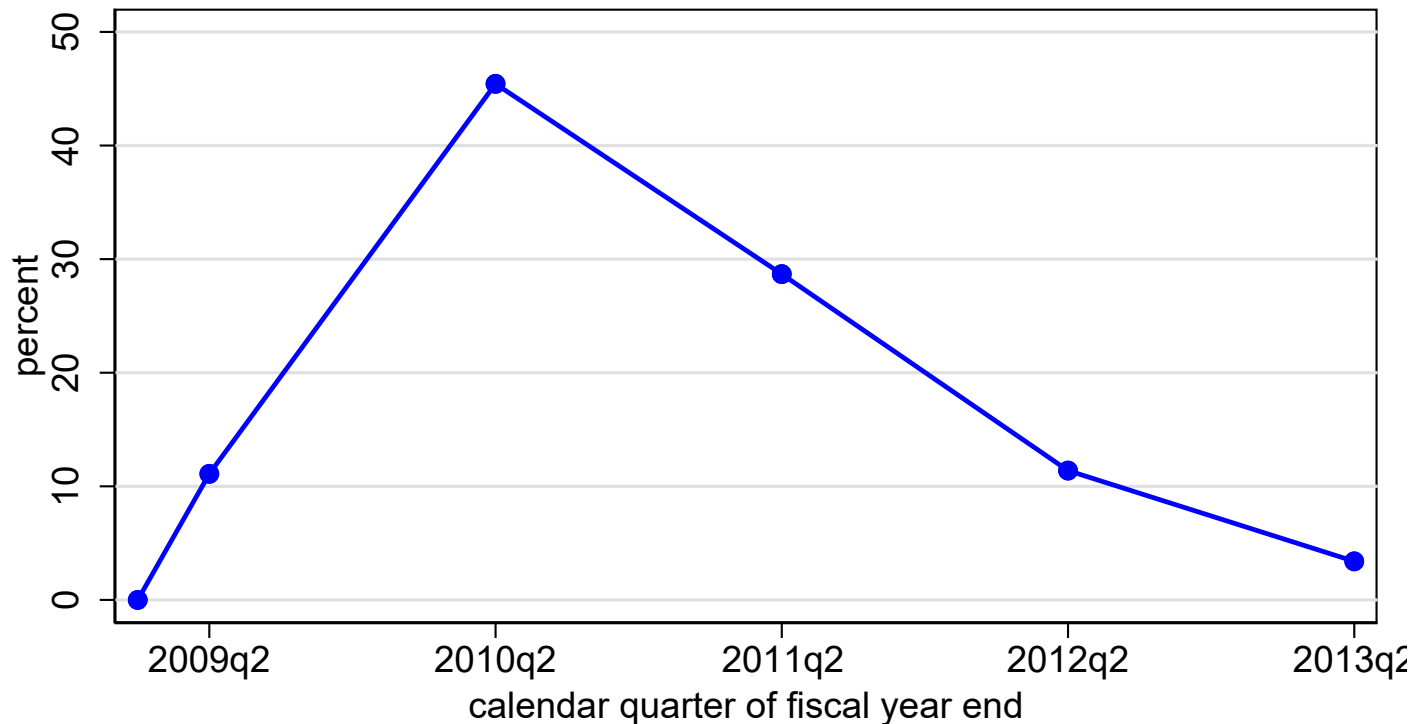
1. DGE Analysis: Putting the Authors' Estimates in Context

- Estimates of **local effects** \neq **aggregate effects**.
- It is important to account for the **intrinsic time-to-spend and time-to-build delays** involved in any infrastructure investment.
- **Dynamic general equilibrium** analysis also allows us distinguish short-run, transition, and long-run effects.
- Results from a medium-scale **New Keynesian model** (similar to Ramey (forthcoming))
 - rigged to give big multipliers for standard govt consumption using many NK features.
 - Compare govt consumption (without delays) to govt infrastructure (with delays)

Example of delays in infrastructure spending

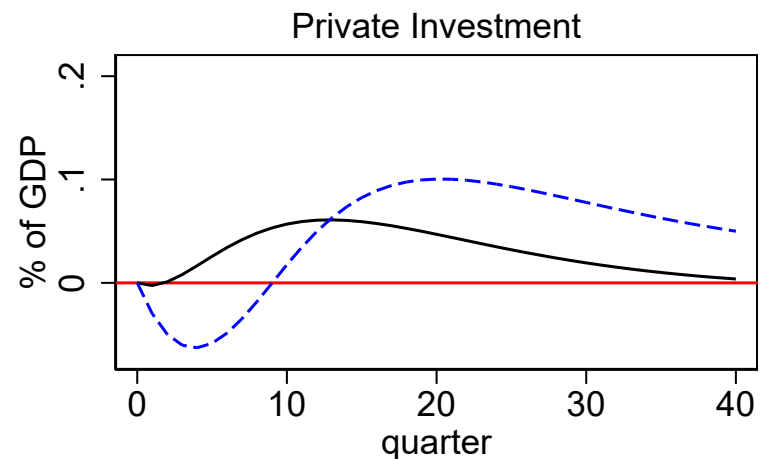
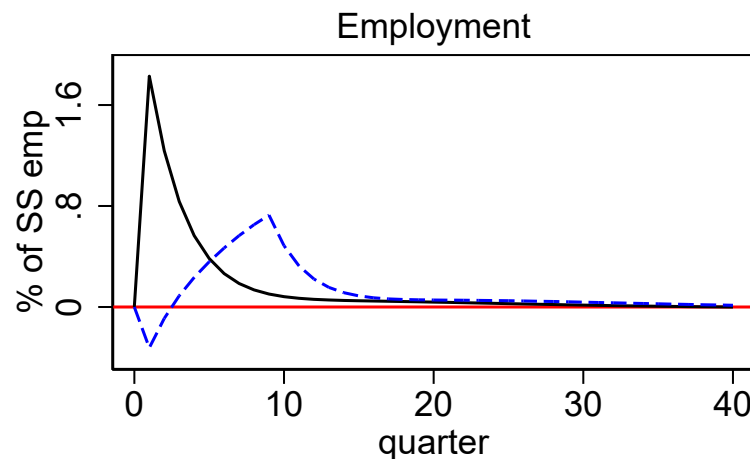
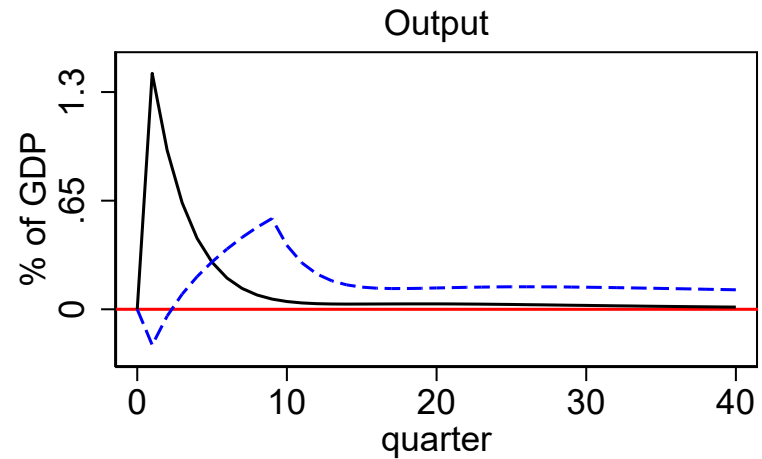
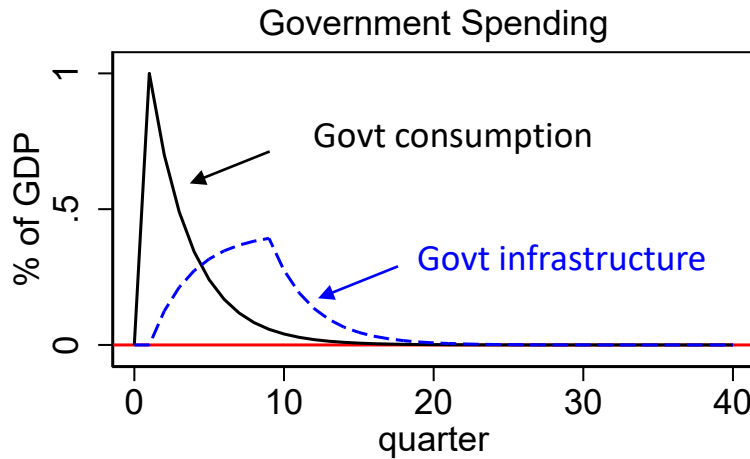
Federal Highway Administration Outlays from the ARRA

% of Total Appropriations



- Time-to-spend delays are significant for infrastructure.
- Gabe showed that green ARRA spending was slower than other spending.

Simulations from a New Keynesian Model



- **Delays** prevent govt investment from acting as a short-run stimulus.
- A temporary \uparrow in government infrastructure spending should have **no long-run effect on total employment**.

2. Comparison of Green ARRA Effects to Highway ARRA Effects

Effects of Highway ARRA Spending

Andrew Garin J. of Urban Economics 2019, Figures 3 and 4, based on commuting zone analysis.

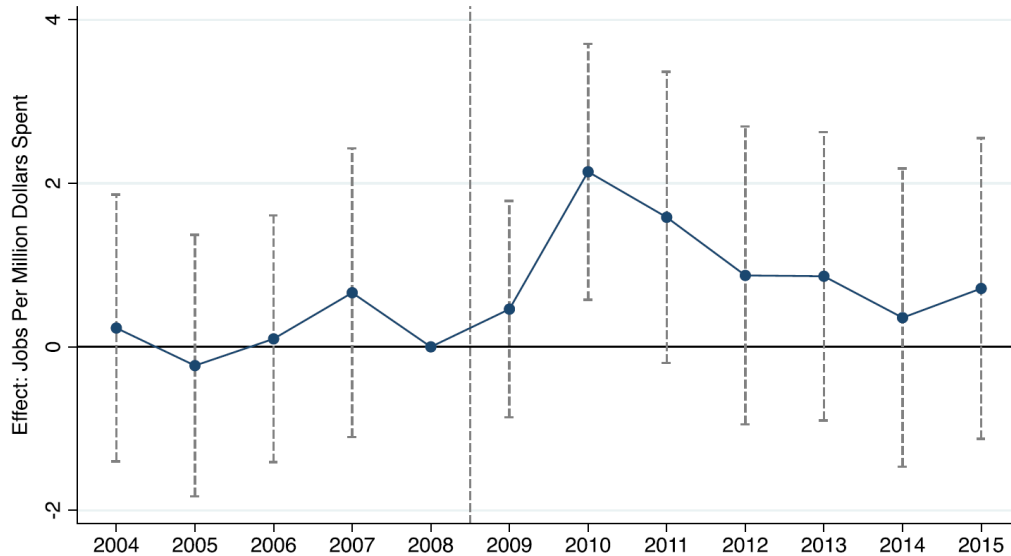


Fig. 3 Construction employment

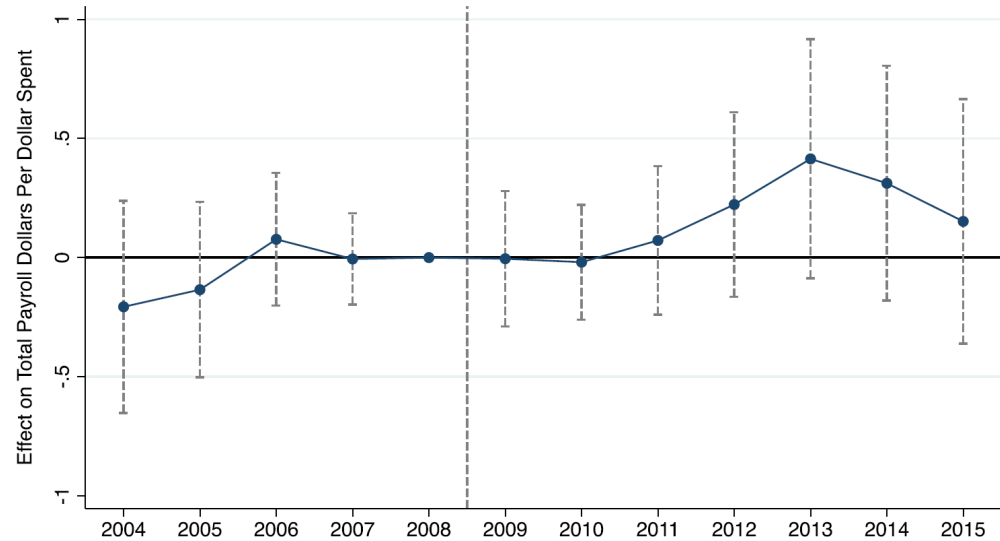
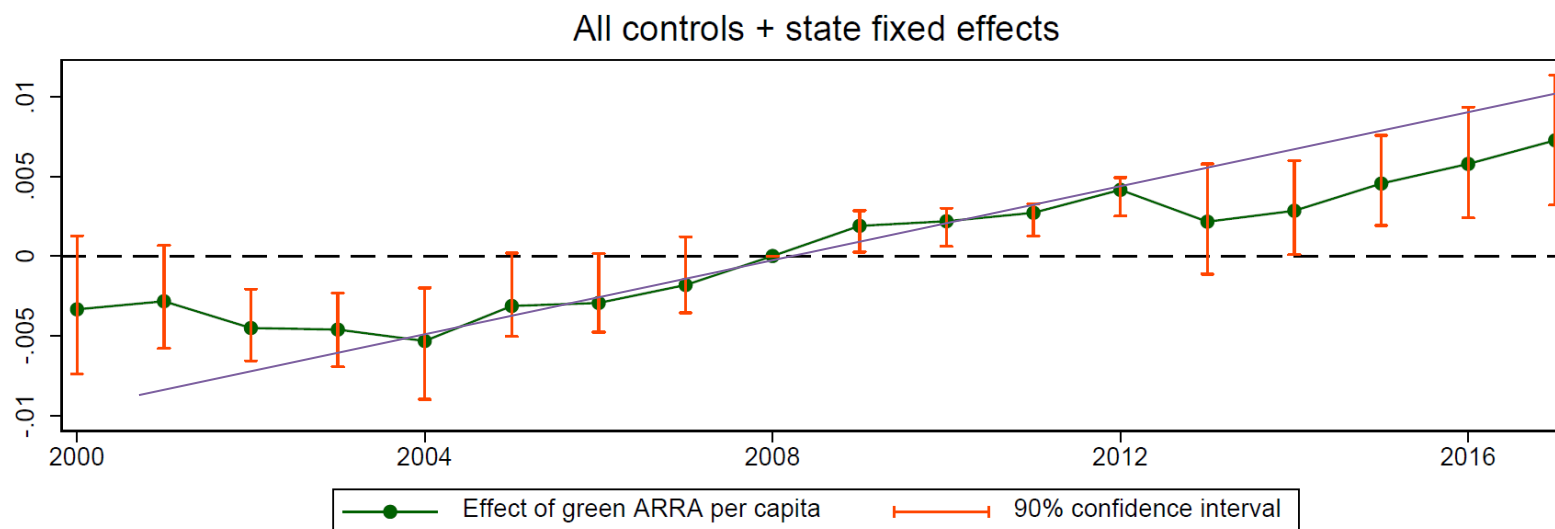


Fig. 4 Total employment

Appendix Figure B1. Effects on Total Employment



- The authors interpret these estimates as showing long-run effects of green ARRA.
- However, the evidence of pre-ARRA trends is troubling. (The authors worry about this too.)
- Suppose we draw a trend line from 2004 to 2008 – it looks like employment might be below the pre-2009 trend.

Popp et al. findings on subcategories of employment

- The authors and the discussants all have concerns about the total employment results.
- However, Popp et al. go on to conduct an important analysis of subcategories of jobs.
- They don't show year-by-year results, but their Table 4 shows two important results for manual occupations:
 - There don't seem to be any pre-2009 trends
 - Both the short-run and long-run employment effects are economically and statistically significant.
 - Increases in local employment in certain classes of jobs is not at odds with the dynamic general equilibrium model.

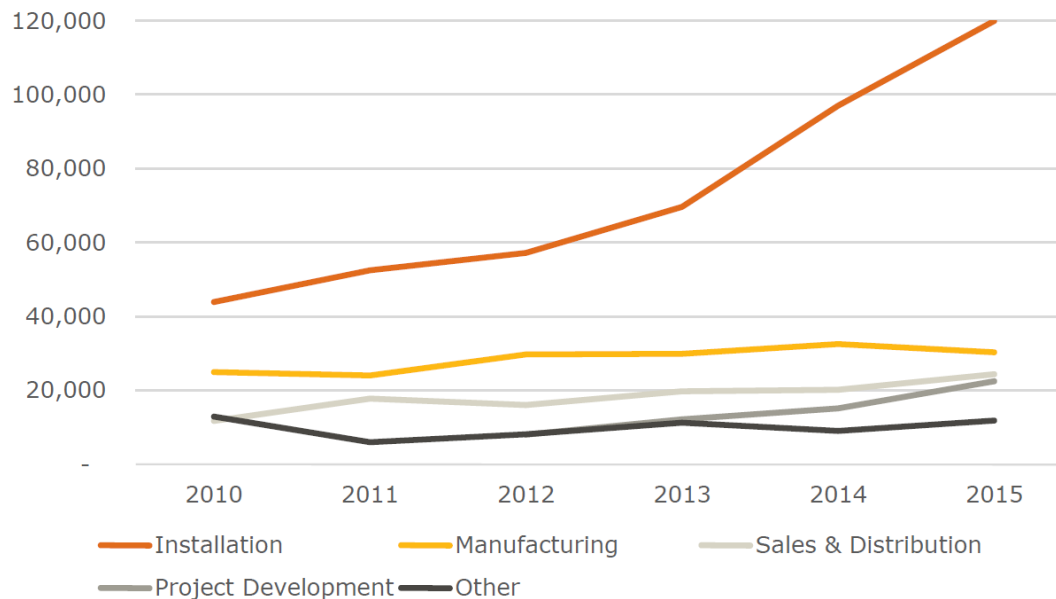
Side Comments on Methodology and Data

- Authors should **use local projections** and show **annual impulse responses**.
- The local projections should **include several lags of the employment variables as controls**.
- I still think (contrary to what the authors stated in response to my comments on the first draft) that they are not calculating **cumulative job years**.
- Since others have been able to **gather time series for actual ARRA spending by category**, the authors should be able to as well.

3. Tax Credits and Rooftop Solar

- The authors focus on direct government spending targeted at green industries and **exclude tax credits**.
- I think it would be useful to study the effects of the ARRA tax credits for rooftop solar as well. Why?

Figure 1: Solar Employment Growth by Sector, 2010-2015²¹



Based on data from

<https://irecusa.org>

The Effect of the Solar Tax Credits on my San Diego Neighborhood



More on Rooftop Solar

- Rooftop solar creates more jobs than solar farms do.

Table 8. Installation Market Segments, 2015

	Median Labor Hours for 5kW Residential PV	% Total Revenue Attributed to Solar	Average Solar Workers Hired per Firm in Last 12 Months
Overall	32	48.2%	8.85
Residential	40	67.4%	6.32
Commercial	36	63.0%	12.06
Utility- Scale	25	41.2%	50.91

- But why would we choose this less efficient (as measured by labor productivity) means of installing solar energy?

Because Appalachian coal miners aren't the only ones objecting to the current path of the green transition!

The San Diego Union-Tribune

January 21, 2021

“Two Biden priorities, climate and conservation, collide in the California desert”



4. Broader Impacts of Green Transition on Fossil Fuel Communities:

Lessons from Asturias and Appalachia

Mining Regions of Asturias, Spain

- The Spanish government has completely **phased out mining** in the Asturias region of Spain, which has been mining coal for hundreds of years.
- The government promised to bring in green jobs and retraining programs. It did not. Instead, **it started importing cheap coal** from China.
- The older coal miners were pensioned off, but there are no jobs for the younger people. As a result, the towns in the mining areas are being **depopulated** and mostly old people are left behind.
- According to health reports, **suicide rates and alcohol abuse** have risen relative to other areas of Asturias.

West Virginia

From the WSJ, Aug. 28, 2021 “West Virginia Creates Jobs **Farming Lavender at Former Coal Mines**”

- “Charles Bowman ’s hands used to be stained black with coal after work. Now, they smell like lavender.... He once made **\$37.50 an hour** as an electrician in an underground mine. Those jobs are mostly gone. Now he makes **\$11.50 an hour**. “
- The article also talks about **depopulation** and dramatic drops in tax revenue.
- Take-aways from Asturias and West Virginia examples:

Even if older fossil fuel workers are compensated for lost jobs, they are likely to be hurt because the replacement jobs may not be good enough to keep their communities intact.

Conclusions

- Fascinating paper that covers many aspects of the green transition with respect to jobs.
- The authors' efforts to tease out results from the ARRA are admirable, but the challenges to producing definitive results are formidable.
- The Green Transition is likely to face areas of significant opposition unless governments can figure out a way to develop **credible, community-preserving policies**.