

APSR Review

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1 Summary

This paper starts from an observation that the existing literature on policy evaluation focuses on either a single policy (thereby lacking generalizability) or a set of policies as a whole, i.e., “policy regime” (thereby lacking interpretability). Instead, this paper proposes a new approach that sets the unit of analysis as a bundle of policies, or what the paper calls “policy portfolio”. Specifically, the paper proposes a two-step procedure, where the first step is to construct a high-dimensional data of policy portfolios based on their coding scheme of target and instrument axes, and the second step is to fit a linear model with a regularization based on a strong prior that the effect of the policy portfolio is sparse. Notwithstanding its clear motivation and contribution, the paper has several issues that need to be addressed.

2 Main Comments

Literature Review & Problem Statement

The paper will be more convincing if it provides a more comprehensive literature review on policy evaluation. For example, there is a growing literature on policy learning and evaluation using causal inference methods, which are only briefly mentioned in the paper for one strand of the literature that studies a single policy.

On a related note, bringing causal inference methods and framework more clearly into the paper will help readers better understand the main problem that the paper is trying to address. The current problem statement sounds too general; it can be applied to any study not particular to the policy evaluation, which can be improved by making more theoretical discussion. For instance, external validity in causal inference has been a long-standing issue (see Egami and Hartman, forthcoming in APSR), and the discussion on generalizability of policy evaluation can be stated more clearly borrowing this framework. Likewise, the discussion on the interpretability of policy evaluations with aggregate approach can be stated more clearly by borrowing the framework of causal mediation analysis and heterogeneous treatment effect estimation. Given previous works, the paper can make sharper arguments on the limitation of the existing literature: e.g., the issue with discrepancy between the target population and sample that is analyzed, heterogeneous mechanism of policy effects that differs across the time and geographic locations, bundled treatments and so on.

Details of the Method

In terms of the second step of the proposed method, the paper does not provide enough details on the model specification and estimation. For example, it is not clear why the specific regularization method based on a Student’s t-distribution is chosen, given other regularization methods such as LASSO, ridge, and other machine learning methods. Also, despite the fact that this is a Bayesian approach, the paper does not provide any details on the estimation procedure such as choice of priors for other parameters like explanatory variables and MCMC algorithm (or any other methods for MAP estimation such as EM algorithm) that is used for estimation.

There are some strengths of adopting a Bayesian approach that the paper can leverage but is not fully utilized. First of all, the paper can be more explicit about the data generating process of the model. Potentially, the paper can be specific about how the policy portfolios are generated (e.g., how the target and instrument are determined interdependently) and incorporate this information into the model (e.g., using a hierarchical model). Second, instead of suggesting a summary statistic using a naive average of association (point estimate of coefficients), the method can generate a more rigorous and flexible summary statistic using the posterior distribution of the parameters (e.g., using a joint posterior predictive distribution of the coefficients). This is particularly useful given the fact that the paper is highlighting the interdependence of policies, which is not captured by the suggested summary statistic. Lastly, the paper can be more explicit about the uncertainty of the estimation results in the main text.

Framing of the Contribution

One of the main contributions that is not fully highlighted in the paper is the data collection and coding of policy portfolios in its empirical analysis on “Porter Hypothesis”. In line with this, and the complexity of the coding scheme of the policy portfolios, it seems to be more promising to frame the paper around this specific empirical application rather than the general methodological contribution. The paper’s attempt for providing a guideline on how to code policy portfolios in the first step is helpful. However, given the fact that policy itself is a complex concept that is not easily defined and measured, the concern with measurement error is not fully addressed in the paper. Furthermore, there are remaining issues with measurement, such as whether the two axes of target and instrument are orthogonal (i.e., some target may be more likely to be used with some instrument) so that it does not posit an issue with feasibility, and the fact that a single policy with two different targets and instruments is coded same as two different policies can be problematic given their different level of dependency. On this note, the generalizability of the proposed method is still questionable, and thus emphasizing it hampers the paper’s contribution on this specific empirical application with environmental policies.

3 Confidential comments to the editor

The topic and the motivation of the paper is interesting and timely, given the growing interest in policy evaluation and the accessibility of the data. However, the depth of discussion and the rigor of the method remain questionable, as noted in my comments to the authors. This

is the main reason why I recommend a rejection of the paper, but I see the potential of the paper and find the paper to be a better fit in other journals.