Rebuttal

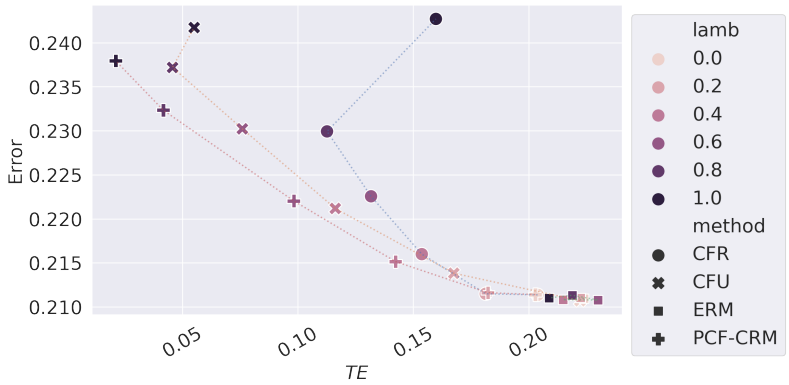

Figure 1: In response to Reviewer **pyBD**'s comment. **Results on Sim-Adult with estimated counterfatuals**. Following the setup in [Zuo+ 23], we choose {Age, Race, Native Country, Workclass, Education, Marital Status, Occupation, Relationship, Hours per Week} as X. Here to investigate more complex causal models, we train a DCEVAE to generate Sim-Adult and another DCEVAE to estimate counterfactuls. The remaining setup is similar to that of Sim-Adult. The predictor is a MLP regressor. We test the convex combination of each algorithm and ERM. For example, PCF-CRM with λ means $\hat{y} = \lambda\hat{y}_{\text{PCF-CRM}} + (1-\lambda)\hat{y}_{\text{ERM}}$. The result suggests that **PCF-CRM can achieve lower Error given the same TE and lower TE given the same Error**.

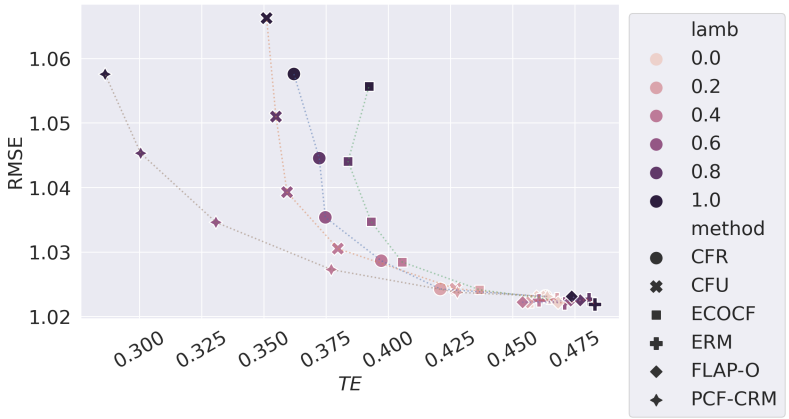

Figure 2: In response to Reviewer **e7ax**'s comment. **Results on Sim-Law with ECOCF and FLAP-O, two additional baselines**. The predictor is a MLP classifer. We test the convex combination of each algorithm and ERM. For example, PCF-CRM with λ means $\hat{y} = \lambda\hat{y}_{\text{PCF-CRM}} + (1-\lambda)\hat{y}_{\text{ERM}}$. ECOCF represnts the method proposed in [Wang+ 23]. Specially, $y_{\text{ECOCF}} = p(a)[p(a)\phi(x,a) + p(1-a)\phi(x,1-a)] + p(1-a)[p(1-a)\phi(x_{1-a},1-a) + p(a)\phi(x_{1-a},a)]$ where ϕ is the pretrained predictor via ERM. FLAP-O first pre-process X with the orthogonization procedure in [Chen+ 23], then train a predictor via ERM. **We observe that our method outperform both methods.**

Preprint. Under review.