

*Assumptions of Value-Added Models for Estimating School Effects*  
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Despite the obvious appeal of the idea of value added models, their precise specification and estimation is not straightforward. The assertion that one school produces more learning than does another is, in essence, a causal inference that can be subjected to scrutiny using methods of causal analysis applied more generally in the social sciences. Causal inferences inevitably entail assumptions, and to scrutinize a causal inference is to scrutinize those assumptions. The question is not simply whether key assumptions hold, but whether plausible departures from those assumptions would lead to substantially distorted inferences.

Our aim in this paper is therefore to explicate the assumptions that must be made to support value added inferences, to consider the plausibility of those assumptions in practice, and therefore to lay a strong foundation for evaluating how consequential the violations of those assumptions are likely to be in practical application.

We first describe a general counterfactual framework for defining school effects under value-added models. We next lay out six assumptions invoked for the estimation of value added models: 1) manipulability; 2) no interference between units; 3) homogeneity of school effects; 4) interval-scaling of the outcome metric; 5) strong ignorability; and 6) full common support/functional form. Although evidence suggests that assumptions 1, 2, and 5 may not be valid, we assume them for the sake of argument here, and focus our attention on a discussion of the homogeneity, common support, and metric assumptions. We describe the consequences of violations of these assumptions for value added estimates. In particular, we focus on the metric assumption, since violations of this assumption may be particularly consequential for the estimation of value-added school effects.