

Trilogy

	BAE	CSE	DiD
Identifying assumption	$E(Y_{0t'} D = 1) = E(Y_{0t} D = 1)$ assumes that the outcome before treatment equals the outcome had they not received the treatment	$E(Y_{0t} D = 1) = E(Y_{0t} D = 0)$ assumes that the outcome of the treatment group had they not been treated (counterfactual) equals the outcome of the control group	$E(Y_{0t} - Y_{0t'} D = 1) = E(Y_{0t} - Y_{0t'} D = 0)$ assumes that biases are the same on average in different time periods in both groups
Data requirements	only data from treatment group needed data before and after treatment	data from treatment group and control group needed only data after treatment	data from treatment group and control group needed data before and after treatment
Estimator	$\Delta_{ATT}^{BAE} = E(Y_{1t} D = 1) - E(Y_{0t'} D = 1)$	$\Delta_{ATT}^{CSE} = E(Y_{1t} D = 1) - E(Y_{0t} D = 0)$	$\Delta_{DiD} = [E(Y_{1t} D = 1) - E(Y_{0t'} D = 1)] - [E(Y_{0t} D = 0) - E(Y_{0t'} D = 0)]$

Notation

t	after treatment
t'	before treatment
$D = 1$	treatment group
$D = 0$	control group
Y_{1t}	post-treatment outcome of a person who receives the treatment
$Y_{0t'}$	pre-treatment outcome of the person