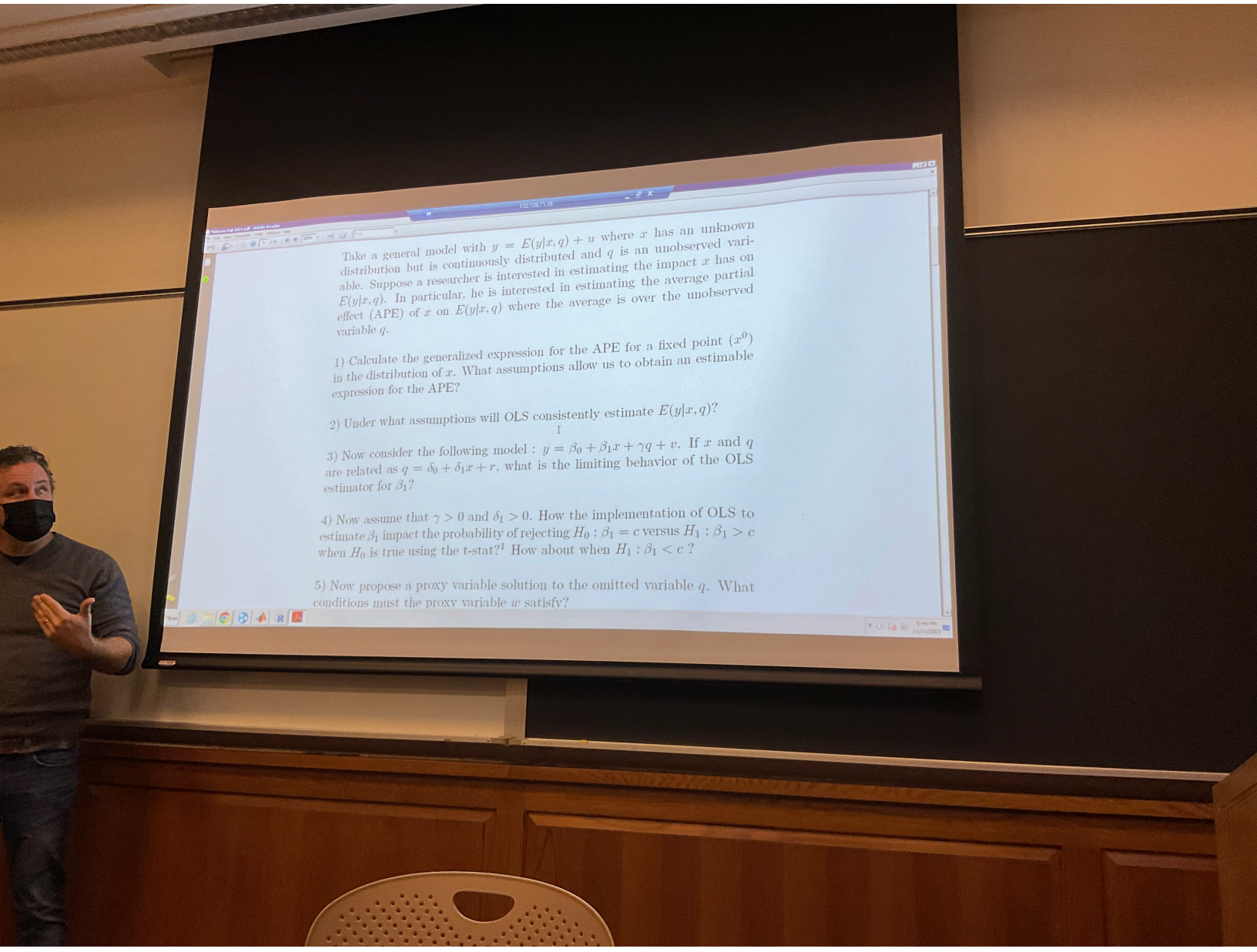
Take a general model with $y = E(y|x,q) + u$ where x has an unknown distribution but is continuously distributed and q is an unobserved variable. Suppose a researcher is interested in estimating the impact x has on $E(y|x,q)$. In particular, he is interested in estimating the average partial effect (APE) of x on $E(y|x,q)$ where the average is over the unobserved variable q.
1) Calculate the generalized expression for the APE for a fixed point (x^0) in the distribution of x. What assumptions allow us to obtain an estimable expression for the APE?
2) Under what assumptions will OLS consistently estimate $E(y|x,q)$?
3) Now consider the following model : $y = \beta_0 + \beta_1 x + \gamma q + v$. If x and q are related as $q = \delta_0 + \delta_1 x + r$, what is the limiting behavior of the OLS estimator for β_1?
4) Now assume that $\gamma > 0$ and $\delta_1 > 0$. How the implementation of OLS to estimate β_1 impact the probability of rejecting $H_0 : \beta_1 = c$ versus $H_1 : \beta_1 > c$ when H_0 is true using the t-stat?[1] How about when $H_1 : \beta_1 < c$?
5) Now propose a proxy variable solution to the omitted variable q. What conditions must the proxy variable w satisfy?