



Figure 1
Zoo Attendance and Covariates by Ozone Forecast

While it is impossible to know whether the unobservables are identical across alert status, I examine how well the observable covariates balance across alert status. Figure 1 shows a plot of three likely influential covariates (temperature, humidity, and CO) against ozone forecast levels. All three covariates evolve smoothly throughout this plot, suggesting they are unaffected by smog alerts. Given the observed factors balance, then it is more reasonable to believe the unobserved factors do as well.

As preliminary evidence that people respond to alerts, average attendance at the Zoo is also plotted in Figure 1. Focusing on the observations near 0.20 ppm, attendance is generally increasing in forecasted ozone prior to 0.20 ppm. At 0.20 ppm, the point at which an alert is issued, attendance sharply drops. After that, attendance remains increasing in forecasted ozone, but is generally lower than attendance below 0.20 ppm. This jump in attendance at the alert threshold, which is larger than any other jump in attendance, provides the first piece of evidence that people respond to smog alerts.

Two additional assumptions necessary to obtain unbiased estimates of α_j is that (1) alert status is not updated once actual levels of ozone are realized and (2) there are no supply-side effects. Despite the temptation to continuously update alert status, officials at SCAQMD indicate this is highly unlikely because of flaws inherent in detecting and disseminating an alert as it occurs.²⁰ In terms of supply side effects, facilities do not lower their price to entice customers or keep animals inside to protect their health on alert days, suggesting this assumption is likely to be satisfied. It is possible, however, that a more crowded atmosphere provides less enjoyment because of longer waiting times, for example. If an alert reduces crowding so that unsusceptible people increase demand for these outdoor attractions, this will result in a downward bias in α_j .

20. For example, ozone typically peaks in the late afternoon, around 3:00 pm. The data are not received until an hour later, and if a violation is detected, they must be double-checked to ensure accuracy. At this point, which can be up to two hours after the violation first occurred, the media are first made aware. By the time this information is disseminated and received by the public, sunlight has decreased and ozone levels have typically fallen to safer levels.