**Question 1 Policy Brief**

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**Data Challenge Question:**

How did the October 1, 2020 reinstatement of fares affect ridership on King County Metro? Did the reinstatement of fares by King County Metro have differential effects on ridership among different socio-economic groups?

**Key Results:**

* Fare reinstatement in King County caused a roughly 4.5% decline in ridership in the two weeks following the change.
* We find the largest decreases in ridership in the wealthiest, whitest, and oldest terciles of the data.

**Approach:**

* To ensure that we are comparing ridership for the same services before and after the fare reinstatement, we compare the number of boardings per trip for 5,354 unique trips that ran every weekday for the two weeks before and after the policy change. Because there is no control group (the fare reinstatement occurred for every route simultaneously), we take care to adjust for time-varying confounders like reported COVID-19 cases in King County, and weather data (specifically, daily precipitation and average temperature). To account for different treatment effects by socioeconomic characteristics, we merged our trip data with demographic information by Census tract. We divided the tracts into terciles based on race, median income, and median age, estimating average treatment effects for each tercile.
* There are important limitations of our approach. We could only estimate the short-run effects of reinstatement. In the long run, the policy could have different effects—if, for example, increased fare revenue yielded improvements in service. Additionally, fare reinstatement occurred during a pandemic—this is a unique and historically unusual event, and our results may not necessarily generalize to a non-pandemic context.

**Major Findings**

* Decreased ridership: We find that fare reinstatement had a significant effect on ridership. Both the OLS and Poisson estimates indicated that the treatment resulted in roughly 0.6 fewer boardings per trip. This is significant at the 99.9% level and is equivalent to a roughly 4.5% decrease in ridership over the two weeks following reinstatement.
* The largest decreases in ridership occurred in the wealthiest, whitest, and oldest Census tracts. Fare reinstatement resulted in a 0.425 decrease in boardings for the poorest third of Census tracts and a 0.701 decrease in the richest third. The least white Census tracts saw a 0.374 reduction in boardings, while the most white Census tracts saw a 0.629 reduction in boardings. Lastly, the youngest Census tracts saw a 0.265 decrease in boardings per trip, while the oldest Census tracts witnessed a 0.71 reduction in boardings.

**Implications & Recommendations**

* Imposing fares for Metro services may lead to a decrease in use. Privileged populations appear to see the greatest declines in ridership of the Metro. One explanation for this result is “mode substitution”—individuals with greater access to alternative modes of transport, like cars or ride-sharing services, may be more responsive to changes in the price of using the Metro. Younger and poorer populations, conversely, may not have easy access to alternatives and must use the Metro regardless of price. During the pandemic, working remotely from home may have also functioned as a substitute for the King County Metro. White-collar workers typically have greater access to work-from-home alternatives compared to lower-income workers. This is one reason why our results may not generalize well outside the pandemic context—as more white-collar workers return to working in the office, they may display less elasticity to price changes.
* Fare reintroduction was likely harmful for equity in King County, as less privileged populations bore the cost, while those able to easily switch to alternatives likely did so. However, before making definitive conclusions, we recommend studying the policy in non-pandemic contexts, as the dynamics may prove significantly different. We also recommend studying the effects for a longer time frame. We limited our analysis to the two weeks following the change, but in the long term, behavior may change.
* We also recommend that policymakers and researchers study what alternatives individuals turn to instead of using the Metro. Did road congestion increase following fare reinstatement? Did ride-sharing services report greater use?