Assignment #5

Question 1. Experiments on Amazon Mechanical Turk

Part a.
On MTurk, "Experimental survey about the Future of Voice Assistance" experiment interested me for two reasons. Firstly, it was amongst the top search results for keyword "experiment" in HIT (Human Intelligence Task) Groups. The other reason is that it had just one qualification requirement of HIT approval rate greater than 98% which I fulfilled automatically as MTurk, by itself, sets HIT approval rate to 100% for new workers.

Part b.
The experiment had a very simple payment structure, wherein the worker receives $0.08 for completing the given task in an allotted time of 15 minutes.

Part c.
There was only a single qualification requirement of HIT approval rate being greater than 98%. As I am a new worker on MTurk, my HIT approval rate is automatically initialised to 100%. The time allotted to complete the task was 15 minutes and there weren't any other requirements or restrictions mentioned against the task.

Part d.
Assuming, that the time allotted for this task equals the time required to complete the task, it takes 15 minutes to complete the job. The task pays $0.08 in 15 minutes which implies $0.32 in an hour. Hence, the implied hourly rate is $0.08.

Part e.
The job was created on 11/9/2018 (04:36 pm) and will expire on 11/16/2018 (04:36 pm). The task is available only for one week.

Part f.
If 1 million people participated in this experiment then it will cost at the most $80,000 to the HIT experiment creator. Here, to find the maximum cost of running the experiment, I am assuming that each participant completes the task only once and the experiment creator approves of everyone's work.

Question 2. Costa and Kahn (2013)[1]

Part a.
"What is the role of ideology in energy conservation "nudges"[2]?" is the research question of Costa and Kahn (2013) paper.

[1, 2] Costa, D. L., & Kahn, M. E. (2013). Energy conservation "nudges" and environmentalist ideology: Evidence from a randomized residential electricity field experiment. *Journal of the European Economic Association*, *11*(3), 680-702.

Part b.
Their primary data about residential billing for around two years (January, 2007 – October, 2009) comes from Opower (previously, Positive Energy). It had information on kilowatt hours purchased per billing cycle, the length of billing cycle in days. The data set also contained information if a house was electric heat or not, and if the household is purchasing energy from renewable sources through electric utility's program. The other dataset was the "treatment and control data" which had information if a house was receiving HER (Home Energy Report) and since when, if yes. The treatment and control data also contained information on the square footage and age of the house, and if the house was heated with electricity or natural gas. Another data set was purchased from a third-party[2] and had information about voter registration at an individual level (party affiliation and information if s/he donated to environmental organization) and also contained marketing data for March 2009.

Part c.
The treatment is receiving a Home Energy Report, a two page report which provides household information about their monthly electric usage and their usage statistics relative to their neighbours, along with some energy saving tips. The neighbourhood comprises of 100 similar-sized homes.

The treatment group was households who received HER (Home Energy Report) while the households which never received a HER formed the control group. The treatment group had approximately 35,000 households while there were around 49,000 households in the control group. Households in both the groups, the treatment and control, were from 85 census tracts which were dense with single-family homes. The other similarities between the two groups were that the households in both the groups required current account with the electric utility which had been active for atleast an year. Apartment buildings were not a part of any group and both the treatment and control group had houses had square footage between 250 and 99,998 square feet.

Part d.
Beyond the previous work of Schulz et al. (2007), the authors controlled for participant's heterogeneity in terms of their association with different ideologies. There was a group, say Conservative Households, of people who were registered conservative and lived in conservative neighbourhood. They also didn't pay for renewable energy or donate to any environmental group. The other group, say Liberal Households, had people who were registered as liberals and lived in liberal neighbourhood. They not only pay for renewable energy but donate to environmental groups also.

Part e.
Costa and Kahn's finding was that electricity conservation "nudge" in form of a HER was more effective with households which identified themselves as liberals as compared to households with conservatives ideology. The conservatives reacted negatively to the feedback reports while the liberals liked receiving the reports. Also, the percentage reduction in electricity usage by liberals was higher than conservatives.

[2] The data was bought from www.aristotle.com.

Question 3. Analytical Exercise.

Part a.

In the given experiment, the cost of applying the control and treatment are different. Consider choosing any clinic then we need to pay a fixed cost of $100 and then treatment costs us $1 while control is free. So, if we were to administer control and treatment to equal number of patients, then control would cost us $0 while treatment would cost $300. The difference between the two costs is significantly large. John A. List et al[3] have shown that, maximizing for the smallest effect size, there is an inverse relationship between cost and sample size of treatment and control groups. Hence, it is beneficial to keep the larger control group and smaller treatment group. Also, to control for spillovers (assumption of SUTVA, Stable Unit Treatment Value Assumption) we should keep the size of treatment group small and increase the number of clinics. The other assumption of SUTVA is no hidden treatments, for which we can control by keeping the size of treatment group larger by keeping the number of clinics small.

Part b.

The smallest effect size depends in addition to the cost of control group and treatment group (see above) is affected by the approach used to study the effect. Difference-in-difference approach has a smaller standard error and hence will yield smallest effect size in comparison to difference in means approach. This is based on the assumption that X_i is very predictive of Y_i.[4]

[3] List, J.A., Sadoff, S. & Wagner, M. Exp Econ (2011) 14: 439. https://doi.org/10.1007/s10683-011-9275-7

[4] Salganik, M. J. (2017). *Bit by bit: social research in the digital age*. Princeton University Press.