ECO220Y1Y, Tests #1, #2, #3, and August 2019 Final Exam: DACM Questions

Summer 2019

In Summer 2019, in addition to DACM online quizzes, each term test and the final exam included some questions drawn from the DACM Handbook and DACM Tutorials.

(1) Recall Carlin et al. (2017) from DACM. They study people's ability to choose the best credit card (*dominant card*) among four credit card offers. They show a short video (*baseline)* to some participants and a longer video (*implemental*) to others. Additionally, they show the four credit card offers either with misleading ads (*superfluous taglines*) or without misleading ads (*no taglines*). Recall Table A.1 (below, left) showing the random assignment of participants. The PivotTable (below, right) uses all 1,603 observations in cred_card.xlsx. The variable **chosedom** equals 1 if the participant picked the dominant card and equals 0 otherwise.

Table A.1: Summary of Experimental Design:
Number of Respondents Receiving Each Treatment

	No tagline	Superfluous tagline	Total
Baseline video	407	394	801
Implemental video	397	405	802
Total	804	799	1,603

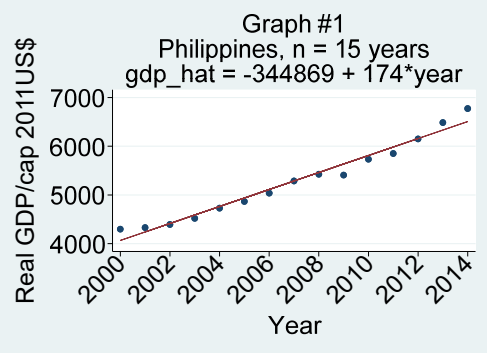
Row Labels	Average of chosedom
Baseline	**0.397003745**
No taglines	0.425061425
Superfluous taglines	0.368020305
Implemental	**0.579800499**
No taglines	0.649874055
Superfluous taglines	0.511111111
Grand Total	**0.488459139**

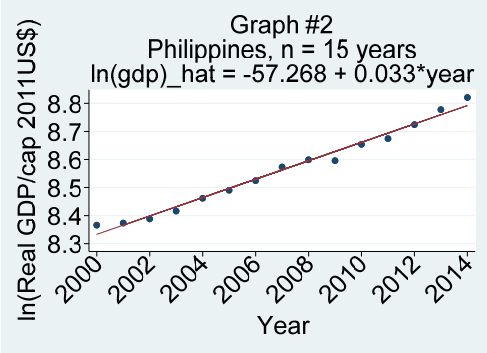
(a) [2 pts] *How many* of the 1,603 participants chose the best credit card? Answer with a number of participants (e.g. 1,000) and your work.

(b) [2 pts] *How many* participants that saw the baseline video and no taglines chose the best credit card? Answer with a number of participants (e.g. 1,000) and your work.

(c) [6 pts] What does the difference between 0.649874055 and 0.511111111 mean? Offer an *interpretation*. Answer with 2 sentences.

(2) Recall the Penn World Tables (PWT). The scatter plots below use PWT 9.0 (released June 9, 2016, DOI: 10.15141/S5J01T). For the Philippines and the most recent 15 years of data, they show real GDP per capita (at constant 2011 national prices in 2011 US dollars) and the natural logarithm of that value, respectively. The title of each includes the OLS results for the illustrated regression lines.





(a) [4 pts] For Graph #1, what do 174 and -344869 mean? *Interpret* those numbers with 2 sentences.

(b) [3 pts] For Graph #2, what does 0.033 mean? *Interpret* that number with 1 sentence.

(c) [3 pts] For Graph #1, the formula $s_e = \sqrt{\frac{\sum_{i=1}^{n} e_i^2}{n-2}}$ returns the number 138.79345. What does it measure? What are the units of measurement for that number in this case? Answer with 2 sentences.

(3) Recall Karlan and List (2007). In a section titled "Experimental Results" on page 1780, the authors explain: "Tables 2A and 2B present summary statistics and provide the core experimental results. In the tables we focus on two measures: (a) a binary variable equal to one if any charitable contribution is made within one month after the direct mail solicitation, and (b) a continuous variable for the amount given." A copy of Table 2B is below.

TABLE 2B—MEAN RESPONSES
(Mean and standard errors)

	Match							
	Threshold					Example amount		
	Control	$25,000	$50,000	$100,000	Unstated	Low	Medium	High
Implied price of $1 of public good:	1.00	0.36	0.36	0.36	0.36	0.36	0.36	0.36
Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Response rate	0.018	0.022	0.022	0.022	0.022	0.021	0.022	0.023
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Dollars given, unconditional	0.813	1.060	0.889	0.903	1.015	0.914	1.004	0.983
	(0.063)	(0.109)	(0.091)	(0.084)	(0.106)	(0.080)	(0.091)	(0.084)
Dollars given, conditional on giving	45.540	49.172	39.674	41.000	45.815	43.107	45.239	43.251
	(2.397)	(3.522)	(2.900)	(2.336)	(3.475)	(2.557)	(2.932)	(2.542)
Dollars raised per letter, not including match	0.81	1.06	0.89	0.90	1.01	0.91	1.00	0.98
Dollars raised per letter, including match	0.81	3.32	2.63	2.65	2.99	2.83	2.92	2.96
Observations	16,687	8,350	8,345	8,350	8,351	11,134	11,133	11,129
Panel B: Blue states								
Response rate	0.020	0.020	0.022	0.022	0.020	0.019	0.022	0.022
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Dollars given, unconditional	0.897	0.884	0.912	0.900	0.884	0.796	0.950	0.939
	(0.086)	(0.115)	(0.127)	(0.110)	(0.116)	(0.094)	(0.108)	(0.102)
Dollars given, conditional on giving	44.781	43.204	41.091	41.236	44.469	41.516	43.194	42.503
	(2.914)	(3.716)	(4.227)	(3.093)	(3.806)	(3.283)	(3.364)	(3.063)
Dollars raised per letter, not including match	0.90	0.88	0.91	0.90	0.88	0.80	0.95	0.94
Dollars raised per letter, including match	0.90	2.83	2.72	2.50	2.60	2.38	2.78	2.82
Observations	10,029	5,035	4,954	4,856	4,932	6,574	6,550	6,653
Panel C: Red states								
Response rate	0.015	0.023	0.023	0.022	0.025	0.024	0.022	0.024
	(0.001)	(0.003)	(0.003)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)
Dollars given, unconditional	0.687	1.330	0.856	0.874	1.206	1.086	1.082	1.023
	(0.093)	(0.212)	(0.127)	(0.124)	(0.199)	(0.141)	(0.158)	(0.141)
Dollars given, conditional on giving	47.113	57.156	37.649	39.584	47.330	44.929	48.097	43.519
	(4.232)	(6.485)	(3.643)	(3.462)	(6.039)	(4.005)	(5.234)	(4.318)
Dollars raised per letter, not including match	0.69	1.33	0.86	0.87	1.21	1.09	1.08	1.02
Dollars raised per letter, including match	0.69	4.08	2.51	2.80	3.57	3.48	3.11	3.11
Observations	6,648	3,309	3,385	3,487	3,413	4,549	4,579	4,466

Question (3) continues on next page >>>

Question (3) continued…

(a) [4 pts] In **Column (8)** of **Panel A** and in the row **Response rate**, find 0.023 with (0.001) immediately below it. Write the correct general formula used to compute that 0.001 and then plug the correct values into that formula. Next, explain in one sentence what 0.001 measures and why it is so tiny.

(b) [3 pts] In **Column (1)** of **Panel C** and in the row **Dollars given, conditional on giving**, find 47.113 with (4.232) immediately below it. What is the *standard deviation* of the amount given among those choosing to give, living in a Red state, and in the Control group? Answer with a quantitative analysis.

(c) [5 pts] In **Columns (1) and (6)** of **Panel B** and in the row **Response rate**, find 0.020 and 0.019, respectively. What does the difference between those two numbers mean? Answer with 1 – 2 sentences offering a valid *interpretation*.

(4) Recall the Ontario public sector salary disclosure for those making at least $100,000. Consider assessing *how much* salaries have risen from 2017 to 2018. Here are two different approaches:

- Analysis **A**: Open the 2017 database and draw 500 employees at random. Summarize the salary variable. Open the 2018 database and draw 500 employees at random. Summarize the salary variable. Make a formal inference about the size of the increase in salaries.
- Analysis **B**: Merge the 2017 and 2018 databases by employee and keep those employees who appear in both databases. Draw 500 employees at random from the merged data. Create a new variable that is the 2018 salary minus the 2017 salary. Summarize the new variable. Make a formal inference about the size of the increase in salaries.

(a) [2 pts] For Analysis **A**, which formula would you need to use? Answer by writing the correct formula either for the appropriate confidence interval estimator *OR* for the appropriate test statistic.

(b) [2 pts] For Analysis **B**, which formula would you need to use? Answer by writing the correct formula either for the appropriate confidence interval estimator *OR* for the appropriate test statistic.

(c) [4 pts] Comparing Analysis **A** with **B**, which approach is better? *Why*? Answer with 2 – 3 sentences.

(5) Recall Levinson (2016) "How Much Energy Do Building Energy Codes Save? Evidence from California Houses" (https://www.aeaweb.org/articles?id=10.1257/aer.20150102).

> **Abstract:** Regulations governing the energy efficiency of new buildings have become a cornerstone of US environmental policy. California enacted the first such codes in 1978 and has tightened them every few years since. I evaluate the resulting energy savings three ways: comparing energy used by houses constructed under different standards, controlling for building and occupant characteristics; examining how energy use varies with outdoor temperatures; and comparing energy used by houses of different vintages in California to that same difference in other states. All three approaches yield estimated energy savings significantly short of those projected when the regulations were enacted.

Levinson (2016) uses the 2003 and 2009 Residential Appliance Saturation Study (RASS) surveys of households. These data include many variables describing each house, its owners, the local climate, and the appliances in the house. The key dependent variables are annual household electricity use in MMBTUs and annual household natural gas use in MMBTUs (in either 2003 or 2009). A copy of Figure 3, which summarizes some key findings of the paper, is below.

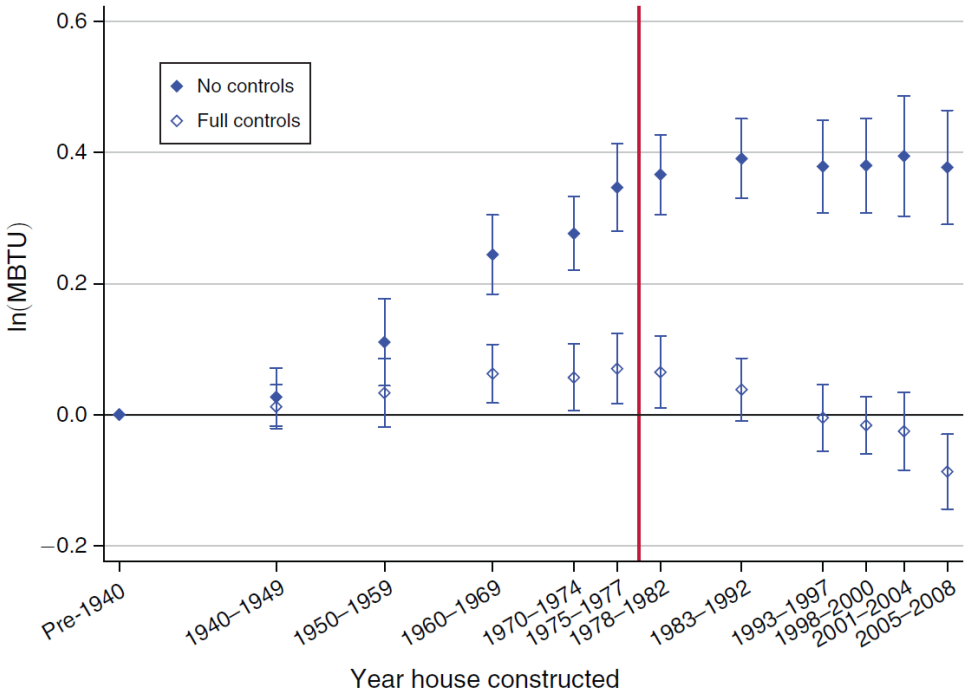


Figure 3: Residential ELECTRICITY Use in California, Controlling for Characteristics

Note: RASS 2003 and 2009, single-family detached California homes without electric heat or hot water.
Source: Levinson (2016), p. 2880 (including typo: ln(MBTU) should say ln(MMBTU)).

Question (5) continues on next page >>>

Question (5) continued…

(a) [5 pts] Two multiple regressions are run to produce Figure 3: one gives the solid-diamond results and the other gives the hollow-diamond results. What are those two regressions? Briefly state what the y-variable and the x-variables are for each of the two multiple regressions.

(b) [3 pts] If building codes had been more effective in causing the energy efficiency of California homes to improve, what is the key difference in how Figure 3 would look? Answer with 1 sentence.