

# **Public's Tax Preferences & Self-interest**

*Methods and Initial Results*

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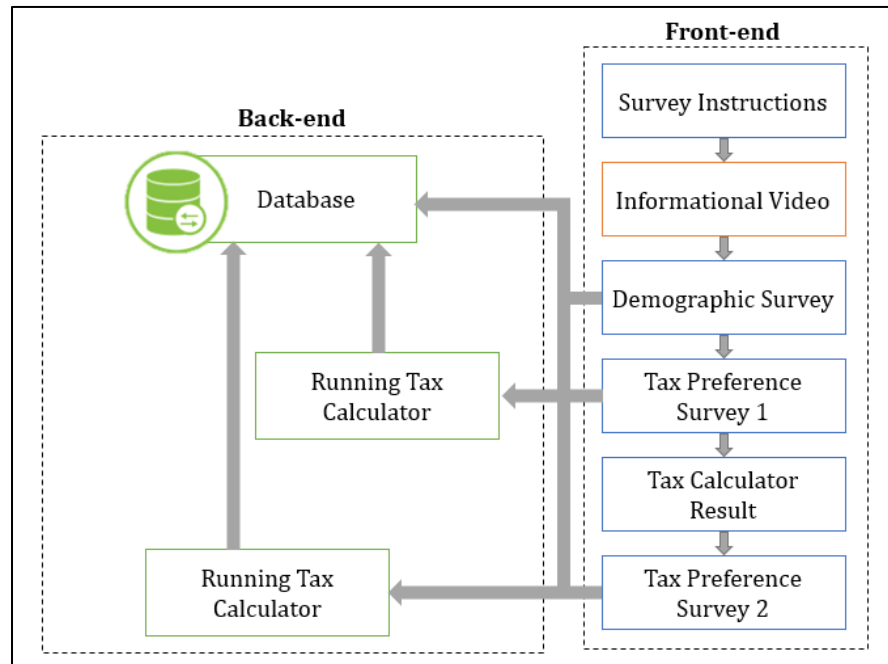
## **ABSTRACT**

The two key research questions that this study is aiming to answer are: (1) do people favor tax structures that are better for them financially? And (2) do they change their preferences when 'nudged' about the importance of government spending? To answer these questions, this study plans to administer a large-scale survey to gather data from a representative sample of the population. This 'Methods and Initial Results' report of the study highlights the two important computational aspects of the project: (1) development of the digital platform for conducting the survey, and (2) methodology layout for data analysis post survey on a simulated response sample.

## METHOD

### Survey Design

The following diagram shows how the survey is structured:



All participants fill out three separate surveys: one for their demographic information and two for their tax preferences. After finishing the first tax-preference survey, the respondents are shown the change in revenue between the existing tax policy and their preferred tax policy. They are also shown the tax-cut (negative or positive) for different income groups as per the new tax structure. These calculations are performed by linking the survey data to the open source calculator (static model) hosted by the Open Source Policy Center [1].

Now that the respondents are informed about the effect of implementing their tax preference, they are given a chance to modify their tax selection through the second tax preference survey. The hypothesis is that the revenue calculation

and subsequent alerting of the respondent about the state of the tax revenue would act as a 'nudge' to foster pro-tax behavior. Literature survey has previously shown that the public values government services and do not consider government spending when supporting tax-cuts (Citrin, 1979 <sup>[2]</sup>, Beck et al, 1987 <sup>[3]</sup>). It was also found that on an average people perceived that they pay more than a fair share of tax (Beck et al, 1987 <sup>[3]</sup>; Ballard-Rosa et al, 2017 <sup>[7]</sup>). The difference in tax preference in the first and second survey would shed important information about the pro-tax preference change in respondents when presented with information about the overall economic effect of their tax policy.

A second experiment that will be conducted is to understand the variation in tax preference when the respondents are knowledgeable about how the tax structure works. This is rooted in the hypothesis explored in the literature survey that the common knowledge about how taxes work is generally poor (Robert et al. 1994 <sup>[4]</sup>). So, a control group will be shown an informational video prior to the start of the survey. The difference in the tax preferences between the two groups can be used to measure the variation due to misinformation.

The front-end of the tax survey and the back-end storage and linking to the tax calculator is developed using HTML, JavaScript and CSS. Screenshots of some of the survey layout and the open source tax calculator is shown below:

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## Demographic Questions

**Gender:**

☒ Female  
☐ Male  
☐ Other

**Age:**

**Political Inclination:**

☒ Republican  
☐ Democrat  
☐ Independent  
☐ Other

**Race:**

☐ White  
☐ American Indian or Alaska Native  
☐ Black or African American  
☐ Hispanic or Latino  
☐ Asian

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## Tax Preference Survey 1

In this section, you need to respond with your most preferred values for each of the tax variables. You can either tick the 'no change' box if you like the existing policy numbers or you can move the slider bars to indicate your preferred values.

1. Maximum taxable earnings for Social Security (current = \$127,200):

Don't change: ☐ New value:

2. Long-term capital gains and qualified dividends tax rates

\$0 to \$37,950 bracket (current = 0%):

Don't change: ☐ New value:

\$37,950 to \$418,400 bracket (current = 15%):

Don't change: ☐ New value:

\$418,400+ bracket (current = 20%):

Don't change: ☐ New value:

3. Regular personal income (non-AMT, non-pass-through)

\$0 to \$9,700 bracket (current = 10%):

Don't change: ☐ New value:

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Start Year: 2017

Principal Data Source: PUF

Reset Parameters

Get Started

Parameter Indexing

Payroll Taxes

Social Security Taxability

Above The Line Deductions

Personal Exemptions

Standard Deduction

Refundable Credits

Nonrefundable Credits

Itemized Deductions

Capital Gains And Dividends

Personal Income

Other Taxes

Surtaxes

Universal Basic Income

## Capital Gains And Dividends

### Regular - Long Term Capital Gains And Qualified Dividends

Long term capital gain and qualified dividends [regular/non-AMT] rate 1

Top of long-term capital gains and qualified dividends [regular/non-AMT] tax bracket 1 ☒

Single	Married filing jointly	Married filing separately	Head of Household
<input type="text" value="37950.0"/>	<input type="text" value="75900.0"/>	<input type="text" value="37950.0"/>	<input type="text" value="50800.0"/>

Long term capital gain and qualified dividends [regular/non-AMT] rate 2

Top of long-term capital gains and qualified dividends [regular/non-AMT] tax bracket 2 ☒

Single	Married filing jointly	Married filing separately	Head of Household
<input type="text" value="418400.0"/>	<input type="text" value="470700.0"/>	<input type="text" value="235350.0"/>	<input type="text" value="444550.0"/>

Long term capital gain and qualified dividends [regular/non-AMT] rate 3

Top of long-term capital gains and qualified dividend tax [regular/non-AMT] bracket 3 ☒

Single	Married filing jointly	Married filing separately	Head of Household
<input type="text" value="9e+99"/>	<input type="text" value="9e+99"/>	<input type="text" value="9e+99"/>	<input type="text" value="9e+99"/>

Long term capital gain and qualified dividends [regular/non-AMT] rate 4

The following table summarizes all the variables included in the survey design:

<b>Demographic Variables</b>	
<u>Variable</u>	<u>Values</u>
Gender	(Male/Female/Other)
Age	(Number in \$)
Political Inclination	(Democrat/Republican/Independent/Other)
Race	(6 different options given/Other/Don't know)
Annual Household Income	(Number in \$)
Marital Status	(Married/Unmarried)
Number of Children	(0/1/2/3+)

<b>Tax Preference</b>		
<u>Variable</u>	<u>Current Value</u>	<u>New Value</u>
Max table earnings for social security	\$127,200	(in \$)
Long-term capital gains and qualified dividends tax rates		
<i>Brackets:</i>		
\$0 to \$37,950	0%	0-100%
\$37,950 to \$418,400	15%	0-100%
\$418,400+	20%	0-100%
Regular personal income (non-AMT, non-pass-through):		
<i>Brackets:</i>		
\$0 to \$9,700	10%	0-100%
\$9,701 to \$39,475	12%	0-100%
\$39,476 to \$84,200	22%	0-100%
\$84,201 to \$160,725	24%	0-100%
\$160,726 to \$204,100	32%	0-100%
\$204,101 to \$510,300	35%	0-100%
\$510,300+	37%	0-100%

We store the information on tax preference, corresponding revenue model results, the demographic data, along with an indicator variable showing whether an informational video was shown or not in a database. The demographic information is then used to understand the tax behavior among different categories of the population (previous literature has also shown that demographics is a strong predictor of tax behavior, Citrin, 1979 [2]; McGee et al 2019 [6]; Ballard-Rosa et al, 2017 [5]).

## RESULTS

This section gives the layout of all the proposed analysis that will be performed once the final data has been captured. For now, the analysis is done using 30 simulated survey responses. (Note: future analysis once the survey has been completed may not match with the current analysis because the current analysis is performed on simulated dummy data).

Descriptive statistics for the data:

	sno	age	income	children	video
<b>count</b>	30.000000	30.000000	30.000000	30.000000	30.000000
<b>mean</b>	15.500000	41.800000	106500.000000	1.400000	0.500000
<b>std</b>	8.803408	16.655537	72172.566189	1.328728	0.508548
<b>min</b>	1.000000	23.000000	40000.000000	0.000000	0.000000
<b>25%</b>	8.250000	30.000000	55000.000000	0.000000	0.000000
<b>50%</b>	15.500000	35.000000	82500.000000	1.000000	0.500000
<b>75%</b>	22.750000	60.000000	120000.000000	2.000000	1.000000
<b>max</b>	30.000000	70.000000	250000.000000	4.000000	1.000000

Gender		Race	
Female	12	Asian	5
Male	12	Black	10
Other	6	Latino	4
Martial Status		White	11
M	18	Political Party	
UM	12	D	15
Info Video		R	13
No	15	Other	2
Yes	15		

Some proposed statistical tests on the survey results:

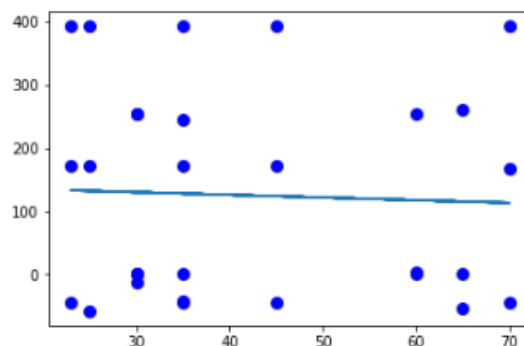
1. Performing several 2-sample t-test <sup>[7]</sup> to observe the effect of variables with only 2 categories on the total revenue generated, change in revenue after the 'nudge', and % change in income for the respondent's income group. Example of the effect of political party on the revenue raised:

```
stats.ttest_ind(d["del_revenue1"], r["del_revenue1"])
```

```
Ttest_indResult(statistic=0.24987453963990836, pvalue=0.804508570378043)
```

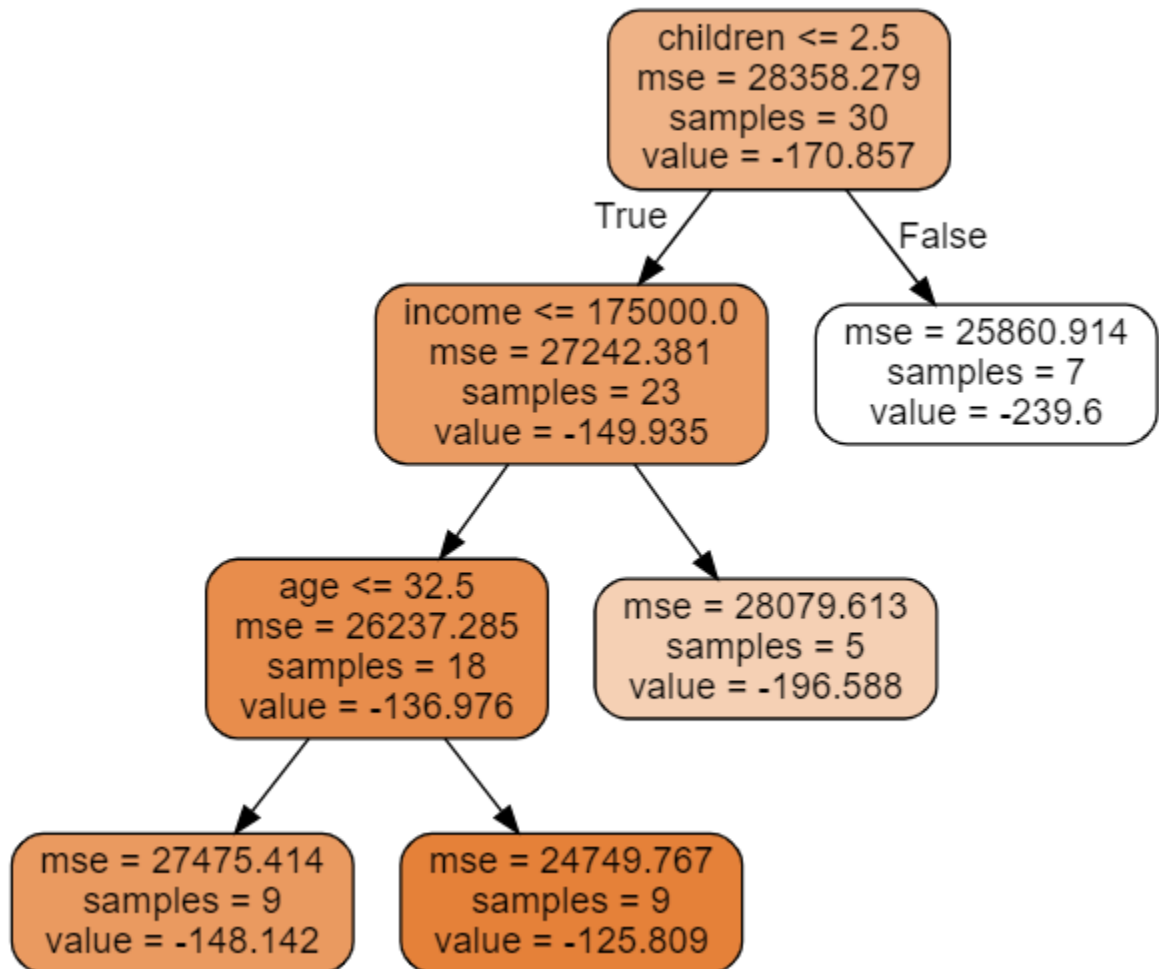
2. Performing regression to see the effect of continuous variables like age and household income on the revenue results.

Example of the correlation of change in revenue before and after the nudge with the household income:



R square value:  
0.001803530423498123  
Regression coefficient:  
[-0.42012977]  
Regression intercept:  
142.73809118933974

3. Using machine learning to predict the revenue variables using the demographic variables (example shown below is from decision trees <sup>[8]</sup>). Example of using a sample decision tree using gender, race, and marital status to predict total change in tax revenue:



In the coming few weeks, the full-fledged survey will be hosted on Amazon Mechanical Turk to gather the full data. Once the data is gathered a more exhaustive statistical study will be conducted and a few more machine learning models will be used for revenue prediction.



## References

1. <http://apps.ospc.org/taxbrain/>
2. Citrin, "[Do people want something for nothing: Public opinion on taxes and government spending](#)", National Tax Journal, (June 1979)
3. Beck, Rainey, Nicholls, Traut, "[Citizen views of taxes and services: a tale of three cities](#)", Social Science Quarterly (1987)
4. Roberts, Hite, Bradley, "[Understanding Attitudes Toward Progressive Taxation](#)", Public Opinion Quarterly, pages 165-190 (Jan, 1994).
5. Ballard-Rosa, Martin, Scheve, "[The Structure of American Income Tax Policy Preferences](#)", Journal of Politics, (Jan, 2017).
6. Mcgee, Benk, Yuzbasi, "[Should Governments Tax the Rich and Subsidize the Poor? A Comparative Study of Muslim and Christian Respondents](#)", Religions (2019).
7. McCrum-Gardner, Evie. "Which is the correct statistical test to use?." *British Journal of Oral and Maxillofacial Surgery* 46, no. 1 (2008): 38-41.
8. Quinlan, J.R., 1986. Induction of decision trees. *Machine learning*, 1(1), pp.81-106.