

Flat Versus Graduated Tax Regimes: Economics-Based vs. Psychology-Based Explanations for Individual Preferences

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This study examines preference for a method of taxation under two competing theories; standard economic theory and optimism bias. Specifically, we focus on the contradiction between the tax rate structure taxpayers claim to favor when their decision does not involve self-interest, and the tax rate structure they actually choose when the decision does involve self-interest. We find that participants favor a flat tax rate over graduated tax rates in significantly higher proportions when the choice involves self-interest as opposed to a setting without self-interest.

Keywords: Flat Tax, Graduated Tax, Economic Theory, Optimism Bias

JEL Classification: M4

I. Introduction

Taxpayer preference for a method of taxation likely involves at least two related factors - the effect of the method of taxation on society and the economy (public interest) and the effect of the method of taxation on the individual (self-interest). Recent polling data captures the complexity of preferences related to a method of taxation. A 2013 Gallup poll finds “The majority of Americans believe that money and wealth in the U.S. should be more evenly distributed, and a slight majority support the idea of the government helping to achieve that goal by ‘heavy’ taxes on the rich.” However, many other polls indicate strong public support for a flat tax (Reason-Rupe Poll, 2014; Rasmussen Reports, 2012), which prior studies have shown would result in *lower* marginal tax rates on high-income individuals (Slemrod, 2006; Piotrowski and Guyette, 2011). If the public generally believes that the U.S. should have a more even income redistribution, support for a flat tax rate is puzzling.

In this study, we conduct an experiment in which participants choose whether to have income taxed using a flat tax rate structure or a graduated tax rate structure. In the control group, the participants *recommend* a revenue-neutral method of taxation (either a flat tax rate or graduated tax rates) for a specific type of high variance taxable income that individuals within their geographical area may receive (there is little or no self-interest involved in the decision). In the control group, the after-tax monetary payment for the participants is constant regardless of the participants’ recommendation for tax structure.

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The test condition introduces self-interest, as the participant is informed that they have received a specific type of high variance taxable income and must *choose* which tax rate structure to apply to their income. The participants' after-tax monetary payment depends both on chance and on their choice of tax rate structure (either a flat tax rate or graduated tax rates). The after-tax expected value for participants under either tax structure - flat or graduated - is equal (see footnote 8). However, the variance of the after-tax income depends on the choice of tax structure and, as we demonstrate, the variance is higher under the flat tax regime.

We develop predictions to explain taxpayer preferences for a method of taxation. According to standard economic theory, all else being equal, people should prefer less risk and lower variance in outcomes (Markowitz, 1952).¹ A flat tax will produce after-tax outcomes with a higher variance than a graduated tax with the same expected value. This is because graduated tax rates reduce variance by increasing after-tax returns when outcomes are below average, and decreasing after-tax returns when outcomes are above average. Therefore, under economic theory, it is logical to predict taxpayers will select the method of taxation with lower risk.

However, standard economic theory fails if people do not understand variance. March and Shapira (1987) find that managers exhibit risk preferences that do not align with conventional decision theory. Further, certain psychological biases support taxpayer preferences for a flat tax regime when their self-interest is at stake. For example, Helweg-Larsen and Shepperd (2001) define optimism bias as the belief that you are less likely to experience a bad event and more likely to experience a good event than other people. Under this bias, people may *overemphasize* the probability of receiving a *high* level of income and *underemphasize* the probability of receiving a *low* level of income. Graduated tax rates will decrease after-tax income when income levels are above average, shifting preferences toward a flat tax. In other words, people may prefer a flat tax - where high levels of income are *not* taxed at a higher rate - because people believe they will likely receive high levels of income and want to maximize their after-tax returns.

We find the percentage of participants choosing a flat tax rate structure within the test group - when participants are choosing a method of taxation for themselves - is significantly higher than the percentage of participants choosing a flat tax structure within the control group - when participants are choosing a method of taxation for individuals within their state. Our results support the idea that people display optimism bias and choose the method of taxation that will result in the lowest tax liability when choosing a method of taxation for themselves.

The rest of the paper is organized as follows. Section II reviews the methods of taxation, and our predictions. Section III describes our experiment and results. Sections IV and V provide our discussion, conclusion, limitations and suggestions for future research.

II. Literature Review and Hypothesis

A. Flat Tax Rates and the Calculation of Taxable Income

Economists and politicians have been promoting flat rate income tax proposals for decades, and recently, prominent political figures have advocated variations of a flat tax as desirable public policy.² A flat tax is a single tax rate applied to a taxpayer's taxable income. A "pure" flat tax is

¹ In this paper, we use the terms risk, variance in outcomes, and variance in returns interchangeably.

² Steve Forbes, Arlen Specter, Rand Paul, Rick Perry, Rick Santorum, Ben Carson, Ted Cruz, Herman Cain, Newt Gingrich, and David Camp have all supported flat tax proposals.

straightforward. There are no deductions, no exemptions, and no credits; the taxpayer multiplies his or her gross income by the tax rate to calculate the tax liability.

However, the large majority of flat tax proposals from economists and politicians do not describe a “pure” flat tax, but rather a “modified” flat tax, which includes changes to the tax rate structure, the definition of taxable income, and the allowable tax deductions. For example, a flat tax proposal may specify an income level beneath which no taxes are paid, and a small number of allowable deductions (e.g., charitable contributions and home mortgage deductions are common), and different rules (or different rates) for calculating business income. These proposals are actually two-rate systems (0% and the flat rate) rather than a pure single rate flat tax.

Flat tax proposals typically lack detail, making it difficult to determine whether taxpayer support for a flat tax is related to the simplified tax rate structure (one tax rate applied to taxable income instead of several tax rates), or to the elimination of many deductions and credits that can be used in sophisticated tax planning, or to a combination of these factors. In this experiment, we focus on tax rates, highlighting the simplified tax rate structure in a flat tax and excluding other variations in flat tax proposals such as the elimination of deductions and credits.

B. Graduated Tax Rates and the Calculation of Taxable Income

The U.S. currently uses graduated tax rates for individuals, which are applied to taxable income using tax brackets. Taxable income is divided into ranges, and each range is taxed at a higher rate than the range below. For example, the 2017 U.S. individual income tax brackets were 10%, 15%, 25%, 28%, 33%, 35%, and 39.6%.³ As a taxpayer's taxable income enters a higher tax bracket, only the portion of income that falls into that bracket is taxed at the higher rate, with the remaining amount taxed according to the lower tax bracket(s). Taxable income is defined in the Internal Revenue Code and tax regulations issued by the Department of Treasury and the Internal Revenue Service. The U.S. tax code provides numerous exemptions, deductions, and credits, many of which have limits.

Slemrod (2006) argues that graduated tax rates are often misunderstood, and that misconceptions surrounding graduated tax rates are likely to play a large role in public support for a flat tax structure. In this experiment, we isolate the concept of tax rate structure – a flat tax rate vs. graduated tax rates – from the definition of taxable income. In the control group, the participants recommend that either a flat tax or graduated tax rates be applied to a specific amount of taxable income (either \$1 or \$3) individuals in their state may receive. In the test group, the participants are told they will receive a specific amount of taxable income (either \$1 or \$3), and then must choose whether to have that income taxed using a flat tax rate or graduated tax rates before the amount of taxable income is known. In both the test group and the control group, we define taxable income for the participants and ask for their tax rate structure preference.

Although we isolate the effect of tax rates from other factors, we acknowledge that some of our participants may have difficulty separating the general concept of calculating taxable income – which they may believe is fair or unfair, or in their self-interest or not – from the single concept of tax rate structure. We also acknowledge that some of our participants may perceive that a flat tax rate system would make it less costly to calculate taxes due, potentially saving time (and therefore money). We attempt to minimize this effect by including only three tax rates in our graduated tax rate regime.

³ The Tax Cuts and Jobs Act of 2017 maintained a similar graduated-rate structure for individual taxpayers into 2018 and beyond. The 2018 rates are 10%, 12%, 22%, 24%, 32%, 35%, and 37%.

C. Polling Data and the Importance of Framing

In the U.S., public support for a flat tax has significant variation across studies. Several studies find that a majority of the public favor a flat tax. For example, Slemrod (2006) finds that 53% of survey respondents favor a flat tax, and Piotrowski and Guyette (2011) find that 53% of undergraduate and masters level business students in their sample favor a flat tax.⁴ However, Brady and Frisby (2011) from the Hoover Institution at Stanford find a lower level of public support, as only 28% of their respondents express a preference for a flat tax. Keene (1983) reviews three tax polls conducted by major survey organizations that reveal widely divergent support for the flat tax, ranging from 27% - 62%. Keene concludes that the differences are attributable to variations in the phrasing of each question.

Roberts *et al.* (1994) examine how framing of the question – either as an abstract question or a concrete question – influences the participant’s perception of fairness. Roberts *et al.* (1994) ask undergraduate students to indicate their opinion on the fairness between two different methods of taxation (progressive tax rates compared with a flat tax rate, progressive tax rates compared with regressive tax rates, and flat tax rates compared with regressive tax rates), and students choose either “much less fair”, “a little less fair”, “both the same”, “a little more fair”, or “much more fair”. In this abstract context, Roberts *et al.* (1994) find the majority of students believe progressive tax rates are more fair than both flat and regressive tax rates. Roberts *et al.* (1994) also ask undergraduate students to indicate, in terms of fairness, how much more income tax a taxpayer should pay compared to another taxpayer in different scenarios. Students select either “the same”, “twice as much”, “three times”, “four times”, or “five times”. They find that a majority of students assign a tax burden consistent with (i) a flat tax (e.g., a taxpayer with taxable income of \$40,000 should pay “twice as much” as a taxpayer with taxable income of \$20,000), or (ii) a regressive tax (e.g., when the students’ hypothetical taxable income tripled, the students indicated they should pay less than three times as much as another taxpayer) in this context.

D. Standard Economic Theory and Risk

Almost all theories on choice make two assumptions; first, that people prefer larger expected returns to smaller expected returns, and second, that people prefer smaller risks to larger risks, provided all other factors are constant (Lindley, 1971; Arrow, 1965). Applying these assumptions to taxpayer preference for a method of taxation, suggests that taxpayers will prefer a method that results in the largest expected return and the lowest after-tax variance – and that this preference is magnified when it affects them personally. Below, we explain the difference in the variance of a graduated tax and a flat tax.

Actual returns on any investment or investment portfolio are variable and can be expected to follow a distribution around an expected value. A revenue neutral flat tax will have the same expected value as the graduated tax rates:

$$EV_X = EV_{X_{\text{Graduated Tax}}} = EV_{X_{\text{Flat Tax}}} \quad (1)$$

⁴ It may be rational for business students to prefer a flat tax regime if they are focusing on their self-interest. Students may believe the flat rate they will face in the future will be less than the graduated rate at their expected level of income.

With equal expected values in after-tax profits, most taxpayers should prefer a graduated tax structure because there is less variance in outcomes and thus less overall risk. All other things being equal, after-tax returns within a flat tax rate structure have a wider distribution pattern than under a graduated tax rate structure. This is evident by reviewing the variance calculation:

$$\text{Variance} = \frac{1}{n} \sum (x_i - EVx)^2, \quad (2)$$

where x_i represents the actual after-tax profit for an investment (under either the graduated tax rate system or the flat tax rate system).

Under the graduated tax rate system, tax will be higher at the high end of the distribution, causing after-tax profits (x_i) at the high end of the distribution curve to be lower than they would be under a revenue neutral flat tax. This will shrink the value of $(x_i - EVx)^2$ for observations at the high end of the distribution within a graduated tax rate structure, thus lowering the overall variance in after-tax returns.

Also, under the graduated tax rate system, tax will be lower at the low end of the distribution, causing after-tax profits (x_i) at the low end of the distribution curve to be higher than they would be under a revenue neutral flat tax. This will also shrink the value of $(x_i - EVx)^2$ for observations at the low end of the graduated tax rate structure, also lowering the overall variance. Since lower variance is associated with lower risk (Markowitz, 1952), taxpayers should generally prefer the lower variance graduated tax rate structure.

E. Understanding Variance and Optimism Bias

Prior research suggests, however, that people may not understand variance and may not act according to standard economic theory, particularly when it pertains to them personally (Rabin and Thaler, 2001; Thaler and Johnson, 1990). March and Shapira (1987) find that the majority of managers do not consider risk to be a measure of the distribution of possible outcomes; rather, a “risky choice” is one that may result in a bad outcome. March and Shapira (1987) also find that managers tend to focus on the amount at risk (\$1,000 vs. \$1) and not the probability of a loss. Further, they find that managers have little desire to quantify the risk of various alternatives into a single construct for comparative purposes.

When taxpayers ignore risk, or do not fully understand risk, they are unlikely to act according to standard economic theory, and instead may be prone to certain psychological biases such as the optimism bias. Helweg-Larsen and Shepperd (2001) define optimism bias as the belief that you are less likely to experience a bad event and are more likely to experience a good event than other people in the same circumstances. For example, texting while driving is okay for you because you are less likely than others to get into an accident. Similarly, you should buy a lottery ticket because you are lucky but everyone else that buys a lottery ticket is wasting money.

Under this bias, people *overemphasize* the probability that *they* will receive a *high* level of income (a good event) and *underemphasize* the probability that *they* will receive a *low* level of income (a bad event). Thus, people that display optimism bias are likely to prefer flat tax rates over graduated tax rates because graduated tax rates will result in lower after-tax income when income levels are above average. In other words, people prefer a flat tax for themselves - where high levels of income are *not* taxed at a higher rate - because they believe they will receive high levels of income and they prefer larger after-tax returns.

In summary, we predict that taxpayers will choose a tax rate structure consistent with the optimism bias (a flat tax) when the tax rates affect them personally, as opposed to when it does not. And when it does not, rational economic theory - which predicts a preference for less risk - will be more predictive (graduated tax rates). This effect may explain the differences in polling data regarding taxpayer preferences toward flat tax proposals. If polling questions are framed to impart a feeling of self-interest, taxpayer response to polling questions may be influenced in a different direction than if no self-interest is implied by the question.

III. Data and Methodology

A. Experiment

We test our hypothesis using a 1 x 2 behavioral experiment.⁵ We recruit anonymous participants (n=272) from two sources, 121 participants from Amazon mTurk and 151 participants from Qualtrics. We require that each mTurk participant is a U.S. citizen, 18 years or older. We use US census data to gather a sample of Qualtrics participants representative of the US population in terms of income, age, education, and gender.

Table 1 contains demographics and political preferences for our participants and presents the sample demographics within the test group and the control group.

Table 1: Participant Political Preference, Gender, Age, Education, and Income

		Group		Totals
		Test Group	Control Group	
Political Preference	Strongly favor Democrats	29	28	57
	Somewhat favor Democrats	36	30	66
	Neutral toward both parties	30	34	64
	Somewhat favor Republicans	25	21	46
	Strongly favor Republicans	16	23	39
Gender	Male	60	73	133
	Female	75	63	138
	Prefer not to answer	1	0	1

⁵ Institutional Research Board approval was granted by the universities for the use of human subjects.

**Table 1: Participant Political Preference, Gender, Age, Education, and Income:
Continues**

		Group		Totals
		Test Group	Control Group	
Age ⁶	18 to 29	40	35	75
	30 to 44	49	50	99
	45 to 64	27	36	63
	65 and above	19	14	33
	Prefer not to answer	1	0	1
Income*	\$0 - \$50,000	34	32	66
	\$50,001 – \$100,000	19	25	44
	\$100,001 - \$150,000	13	9	22
	\$150,001 – \$200,000	5	6	11
	\$200,000 and above	3	5	8
Education*	No high school degree	5	11	16
	High school graduate	28	17	45
	Some college or AA degree	19	21	40
	Bachelor's degree	16	17	33
	Master's degree or higher	6	11	17

* Information on participant Income and Education was gathered from the Qualtrics participants only.

Participants are paid \$2 each for approximately five minutes of participation. Participants in the test group (but not the control group) earn an additional payment that ranges from \$0.65 to \$1.95. Participants are randomly assigned to the control group or the test group. In the control group, participants read a hypothetical scenario where the state government provides lottery tickets to people in exchange for recyclable bottles. The lottery tickets have a 50% probability of returning \$1.00 and a 50% probability of returning \$3.00. The participant is asked to recommend a tax rate structure, either a flat tax or a graduated tax, to policy makers that will apply to the taxable income from the lottery tickets. The participant is told that the two tax rate structures are revenue neutral. Participants' compensation for completing the experiment (\$2.00) is not affected by their recommendation (see Appendix A for the full case).⁷

⁶ One participant did not enter a categorical answer, leaving the sample with only 271 responses for age.

⁷ In the control group, participants are informed that the government will generate approximately \$500 million of revenue from the lottery ticket program. Members of the control group may, to a limited extent, consider the impact of the method of taxation they recommend on their personal gains as well, since they too are members of the population.

In the test group, participants read a scenario in which the participant has received a lottery ticket and must choose the tax structure to apply to his or her winnings (similar to variable returns on an investment). The lottery tickets have the same payout structure - a 50% probability of returning \$1.00 and a 50% probability of returning \$3.00, and the participants do not know their taxable income at the time of the tax rate structure choice. The participant is asked to choose between a flat tax of 35% or a graduated tax schedule (a 20% tax on \$0.01 - \$1.00, a 40% tax on \$1.01 - \$2.00, and a 60% tax on \$2.01 - \$3.00). The participant will keep the after-tax income in addition to the \$2.00 show-up fee. In the test group, total participant compensation is affected by the tax rate structure choice (See Appendix B for the full case).⁸

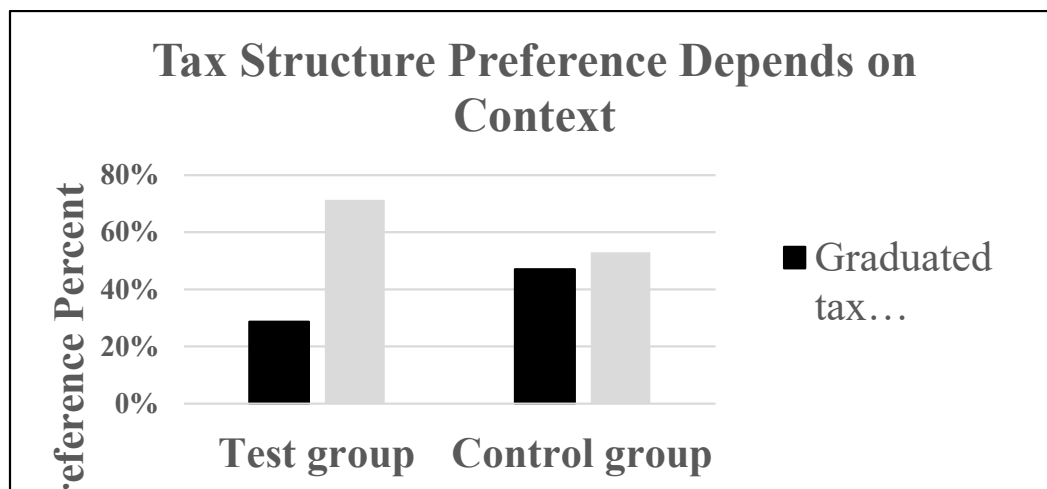
Our independent variable is the condition (personal risk or no personal risk) in which participants indicate their discrete preference for tax structure. Our dependent variable is the choice of tax structure - either graduated tax rates or a revenue neutral flat tax. We also include a variable that measures whether participants understand how to calculate a tax liability using graduated tax rates.

IV. Results and Discussion

A. Results

We use a non-parametric test (Chi Squared test of two proportions) to compare participants' preference between a flat tax and a graduated tax structure within the test group and the control group. Two hundred seventy-two participants were randomly assigned to either the control group (136) or the test group (136). Each participant indicated a preference for either a flat tax or graduated tax rates. Figure 1 graphically represents the results of our experiment.

Figure 1: Tax Structure Preference



⁸ In the test group, the choice between graduated rates and a flat tax is revenue neutral in that the expected value of after-tax profits for both tax structures is \$1.30, (the $E(X)$ of before-tax revenue is \$2.00, while $E(X)$ of tax expense is \$0.70). Variance of after-tax profit calculated as $\sigma^2 = \sum [x-E(X)]^2 p(x)$, is \$0.25 for the graduated tax choice and \$0.4225 for the flat tax choice (creating a riskier environment for the flat tax choice).

Seventy-two participants (52.9%) chose the flat tax in the control group and ninety-seven participants (71.3%) chose the flat tax in the test group, a statistically significant difference in proportions of 0.184, $p = .001$. Figure 1 graphically represents the results. Table 2 presents the test of two proportions.⁹

Table 2: Test of Two Proportions

			Group		Totals Within Groups
			Test Group	Control Group	
Choice Group	Flat tax choice	Count	97	72	169
		Expected count	84.5	84.5	169
		Percentage of the flat tax choosers that are within the test or control group	57.4%	42.6%	100.0%
		Percentage of the test or control group choosing a flat tax	71.3%	52.9%	
	Graduated tax rate choice	Count	39	64	103
		Expected count	51.5	51.5	103
		Percentage of graduated tax rate choosers that are within the text or control group	37.9%	62.1%	100.0%
		Percentage of the test or control group choosing graduated tax rates	28.7%	47.1%	
Totals Within Groups		Count	136	136	272
		Expected count	136.0	136.0	272.0
		Percentage within groups	100.0%	100.0%	100.0%
There is a statistically significant difference in proportions of 0.184, $p = .001$, Fisher's Exact Test					

Table 2: Chi Squared test comparing participants' preference between a flat tax and a graduated tax structure within the test group and the control group. Two hundred seventy-two participants were randomly assigned to either the control group (136) or the test group (136). Seventy-two (52.9%) chose the flat tax in the control group and ninety-seven participants (71.3%) chose the flat tax in the test group, a statistically significant difference in proportions of 0.184, $p = .001$.

⁹ We tested the data from each of the sources independently. We found a statistically significant difference in proportions of 0.235, $p = .008$ in the mTurk sample and a statistically significant difference in proportions of 0.145, $p = .046$ in the Qualtrics sample. As these results are qualitatively similar, we have combined the observations and reported results for the combined sample.

B. Discussion

These results support our hypothesis that taxpayers will tend to choose a flat tax regime when they perceive that tax rates affect them personally and tend to choose graduated tax rates when they do not. This effect may be due to an optimism bias when they choose a method of taxation for themselves as opposed to choosing a method that primarily affects others. Participants in the test condition may believe they are more likely than others to receive high levels of income and therefore a majority of these participants select a flat tax – the method of taxation that will yield a lower tax liability with high levels of income. The proportion of participants choosing a flat tax is significantly greater in the test group, where the participants' compensation is affected by their choice of method of taxation and chance, than in the control group, where the participants' compensation is not affected by their choice.¹⁰

After completion of the experiment we collected demographic information from the participant and asked participants to calculate the tax liability when given an amount of taxable income and graduated tax brackets. We included this calculation to check for active involvement from the participants and to determine whether our participants understood and could apply the concept of graduated tax rates. We find that 63% of our participants correctly calculated a tax liability using graduated tax rates.¹¹

V. Summary

A. Conclusions

In a behavioral experiment, we examine preference for tax rate structure; either a flat tax or graduated tax rates. Our results support prior research, indicating that the context of the decision significantly affects taxpayer preference for a particular tax structure. We find that given a specific amount of high variance taxable income, participants indicate a significantly higher preference for flat tax rates when choosing a method of taxation for themselves than when participants choose a method of taxation for others.

Our results may help explain why public support for a flat tax increases in some situations and decreases in others. We find that participants in our setting do not follow the predictions of standard economic theory as we do not find evidence that taxpayers chose a method of taxation that will minimize risk. Our research also supports prior studies suggesting that taxpayers do not (fully) understand variance.

¹⁰ There are some differences in demographics between the test group and the control group as seen in Table 1. To examine whether our demographic variables have a significant influence on tax regime choice, we performed a logit analysis using "Choice" as the dependent variable and the Group, plus the demographic variables as independent variables. As in the test of two proportions, Group is a significant influence on Choice. However, none of the demographic variables were significant in the choice of tax regime. Because the test of two proportions results appear to be robust, and because demographics do not appear to affect the results, we believe the test of two proportions is the more appropriate method in this context for testing our hypothesis.

¹¹ We repeated the Chi Squared test using only the 172 participants (63%) who answered the test question correctly. Our inferences do not change when dropping the 100 participants who did not answer the question correctly. Forty-one participants (52.6%) chose the flat tax in the control group and 66 participants (70.2%) chose the flat tax in the test group, a statistically significant difference in proportions of 0.176, $p = .018$.

Tax structure is an important feature of our economic and political landscape. The Tax Cuts and Jobs Act recently became law.¹² The results of this study should be of interest to polling organizations, policy makers, and the public as they discuss support for the tax law changes imposed by the Act. We believe it is important to be aware of the extent to which individual preferences can be altered by the context of a question. Compliance with the tax system of the United States is largely voluntary; therefore, public support is crucial for effective revenue collection. Public opinion polls should reflect “real” public opinion, and increase the ability of policy makers to legislate tax systems that will foster public support.

B. Limitations

The study is limited in that the results may not generalize to the U.S. population. For example, our sample contained more Democrats than polls indicate are contained in the general population. However, the large sample size and significant results for both self-identified Republicans and Democrats mitigates this limitation. Although there is no apparent correlation between our demographic variables and choice of tax regime in this experiment, we cannot rule out the possibility that the correlations exist in the general population.

The results are limited in that they only examine the effect of tax rates on the preference between our current tax structure and recent flat tax proposals. They do not examine the effect of other flat tax proposal features such as larger standard deductions and changes to personal exemptions. Further, our results may be affected because a limited amount of money was at risk, and our results may not generalize to circumstances when the economic consequences are greater.

C. Future Research

Additional research is needed to examine the effect of other flat tax proposal attributes on tax structure preference, including the effect of modifications to the standard deductions and personal exemptions. These features, as well as a simplified tax rate structure, could factor into a comprehensive explanation of why individuals prefer one tax rate structure over another.

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¹² The Tax Cuts and Jobs Act of 2017 modified the corporate tax structure from a graduated structure to a flat tax – the tax on corporate profits is now a flat 21%. Prior to the Tax Cuts and Jobs Act, Corporations had income tax brackets ranging from 15%-38%.

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Appendices

Appendix A

No-Risk Condition Provided to Participants (Control Group)

Assume that your state legislature is creating an incentive program to encourage more people to recycle plastic bottles, and at the same time help fund public education.

To accomplish this goal, the state will give a lottery ticket to each person that brings in a predetermined number of used plastic bottles. The number of plastic bottles required for each lottery ticket will be set so that the program is economically competitive with the cash redemption value received from existing commercial recycling companies. In effect, the state will enter the recycling industry, but will use the lottery ticket as a novel way of providing compensation in exchange for recyclable bottles. The legislature hopes that using the lottery ticket format for payment will attract people who would not otherwise bother to recycle plastic bottles.

Each lottery ticket has a 50% chance of paying \$1.00 and a 50% chance of paying \$3.00. The state will finance the payouts by selling the recycled plastic to commercial enterprises. The payments are exempt from existing federal and state income tax, **and are instead subject to a special income tax.**

The special income tax on lottery ticket profits will fund essential educational programs throughout the state. Two alternative tax structures are under consideration, **each generating approximately \$500 million each year:**

1. A **flat tax** (all lottery ticket payouts would be taxed at the same tax rate), or
2. A **graduated tax** rate structure (lower lottery ticket payouts would be taxed at a lower tax rate, higher lottery ticket payouts would be taxed at a higher tax rate).

Please make a recommendation to the state legislature regarding the type of income tax that should be applied to the lottery ticket winnings:

1. **Flat tax, or**
2. **Graduated tax**

*Appendix B***Outcome Risk Condition Provided to Participants
(Test Group)**

Assume that your state legislature has created an incentive program to encourage more people to recycle plastic bottles. By turning in the required number of recyclable plastic bottles, you have received a lottery ticket as compensation. Each lottery ticket has a 50% chance of paying \$1.00 and a 50% chance of paying \$3.00. The payments are exempt from existing federal and state income tax, and are instead subject to a special income tax. However, you can choose the type of tax as described below.

Please make the choice described below.

You have:

- (1) A 50% chance of making \$1.00, and
- (2) A 50% chance of making \$3.00

A tax will be subtracted from whichever amount you win. However, you can choose the form of the tax.

It can be either:

- (1) A flat rate tax, 35% of your winnings,

or

- (2) A graduated tax determined by the following schedule:
 - (a) 20% of the first dollar (\$0.00 to \$1.00)
 - (b) 40% of the next dollar (\$1.01 through \$2.00)
 - (c) 60% of the next dollar (\$2.01 through \$3.00)

Please choose one of these two tax structures:

1. **Flat tax, or**
2. **Graduated tax**