

Psychological Non-Equivalence of Tax Bases: An Experimental Investigation

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1. Introduction

Tax base equivalencies are a traditional workhorse of public finance research and used extensively in discussions of tax reform. For example, Atkinson and Stiglitz (1980) begin their discussion of the analysis of taxation and intertemporal choice with a discussion of the equivalence of a proportional wage tax and consumption tax. Auerbach and Kotlikoff (1987) have also made extensive use of tax base equivalencies in their dynamic analyses of tax reform. These equivalencies can play a useful role in understanding the complexities of tax reform and how seemingly different policies could have the same effects. For example, depending on its design, a “flat tax” could be a consumption tax in disguise.

From a purely rational choice point of view, these equivalencies are non-controversial—they follow directly from a demonstration that the choice sets and objective functions of seemingly different tax policies are identical for economic agents. With the same objective functions and equivalent choice sets, the outcomes chosen by rational agents will be the same. Thus, tax equivalencies can be used to clarify the nature of reform proposals to assist in their evaluations.

But what if the framing of a tax reform proposal has its own distinct effects? From the work of Tversky and Kahneman (1981), we know that frames do affect actual decisions and individuals will choose differently depending on the specific frame of the decision problem. Behavioral tax theory has taken these insights into account and there is now an extensive body of research that suggests that the framing of taxes matters for economic outcomes in public finance. Congdon et al. (2011) provide an extensive review of the literature. As an example, value-added taxes—embodied in sale prices—differ in their effects from equivalent sales taxes—which are added at the sales register.

It is challenging to determine whether major structural changes in the system of taxes that would accompany a tax reform would be subject to the behavioral biases identified in the literature, and whether these biases would persist over time. It is one thing to say that introducing an unfamiliar tax might initially produce some unexpected behavioral results, but it is another issue altogether how individuals would eventually adjust to a major structural change in taxes. For example, would we expect the long-run average and marginal propensities to consume to differ under value-added versus sales tax regimes? Or, with regard to the issue addressed in this paper: would a proportional wage tax have different long run effects on labor supply and consumption behavior as compared to a consumption tax?

In an interesting recent paper, Blumkin et al. (2012) turn to a controlled economic laboratory setting to explore the within-period equivalence of proportional wage and consumption taxes. In their experiment, subjects are asked to solve multiplication problems for rewards that produce certain types of consumption goods (falafel sandwiches or pizza) or cease work and receive a voucher for a bottled soft drink (their leisure good). The authors find that participants in the experiment supply less effort under a wage tax than a rate-equivalent consumption tax.

Our approach in this paper is to address a similar question in settings which would appear to subjects to be more realistic, correspond more closely to their everyday experiences, and also have an intertemporal setting. Specifically, we utilize a web-based survey approach to ask respondents their choices in two different situations: (1) responding to an offer of a second job with a significant increase in wage income, and (2) deciding when to retire in the face of the prospects of increased taxation. We use these surveys not only to catalogue hypothetical

behavioral responses, but also to explore both initial preferences for different taxes and the evolution of these preferences in response to decision making and information.

Both laboratory and survey methods have their virtues for exploring the non-equivalence of tax bases. Laboratory settings can carefully control for extraneous influences, but typically at the expense of realism and familiarity in choices. Laboratory settings can also explore decision-making in contexts in which participants receive rewards directly tied to their performance. Our web-based approach, on the other hand, places individuals in more familiar contexts, such as employment and retirement decisions. Additionally, our approach incorporates preexisting sentiments towards work and retirement—factors which may be crucial in understanding how individuals will respond in actual settings. For example, decisions about retirement or secondary employment may be associated with feelings of self-worth and self-image. While field experiments are not possible for major changes in tax bases, web-based surveys can provide an alternative approach to behavioral taxation which incorporates important social context. Our web-based approach also allows us to explore the interactions of choices and expressed preferences. The main limitation is that, although we pay participants for taking the survey, they naturally do not “live” the consequences of their reported decisions.

Even if our survey methods fail to uncover the actual responses that would occur to a change in the tax base, they may be useful in understanding the politics surrounding discussions of changes in the tax base. Our methods do convey the sentiment the public currently holds towards taxes on different bases; the politics of tax reform will also certainly depend on these sentiments.

To preview our results, we find that wage taxes, as compared to equivalent consumption taxes, are more likely to deter the willingness to take a second job. The reduced willingness to

take a second job under a wage tax persists even when the equivalence of wage and consumption taxation is explained to respondents through a simple within-period example. Retirements are more likely to be postponed when respondents face a wage tax as opposed to an equivalent consumption tax. In the retirement module, additional taxation would also mean reduced retirement consumption, unless individuals chose to extend their work life to fully compensate for the reduction of after-tax income. For those individuals who do not extend their work life to this full extent, this reduction of after-tax income imposes a tradeoff between consumption in the present and in the future. We found that the time pattern of consumption changes differed depending on whether a wage tax or spending tax was in place. Finally, in both studies, wage taxes decreased in popularity as respondents reflected on their preferred system of taxation.

The next section describes our experimental design and methods. The following two sections describe our findings for the second job and retirement modules respectively. The final section pulls together the disparate findings from our studies and explores the psychological bases of our results.

2. Survey Methods and Design

Our two surveys were conducted on Amazon's Mechanical Turk website using the Qualtrics software. Mechanical Turk is a site created to facilitate transactions between "requesters" and "workers." We required that participants had an approval rate on previous surveys of 95 percent or above, had completed 50 tasks or more, lived in the United States, and were at least 18 years of age. For each of our two surveys, we recruited 150-200 participants. With the exception of demographic questions, participants were required to complete each question before moving on to the next question. Completion required, on average, ten minutes per survey; participants were paid \$0.50 per survey, an amount in line with other surveys.

Paolacci et. al. (2010) discuss how participants in Amazon Mechanical Turk differ from other subject pools.

In both modules, we make use of the economic equivalence of a proportional labor tax and a flat consumption tax. Specifically, if t_s is the consumption tax rate and t_w is the wage tax rate, then from the intertemporal budget constraint, a proportional wage tax is equivalent to a flat consumption tax if: $1/(1-t_w) = 1+t_s$ or $t_s = t_w/(1-t_w)$. Note that income taxes and wage taxes are not equivalent because interest income is taxed under an income tax.

The demographic patterns in our two surveys were similar and reflected a range of ages and income levels. Of the 173 participants in the second job module, fifty percent of the respondents were female, fifty-eight percent were less than 35 years of age, and fifty-four percent had self-reported combined household incomes below \$50,000. For the retirement module, of the 146 participants, forty-three percent were female, fifty-five percent were less than 35 years of age, and fifty-five percent also had incomes below \$50,000.

2.1 Design of the Second Job Module

In the second job module, we study the willingness to accept a second job depending on whether a wage or spending tax is imposed. In order to achieve two tax structures that impose the same economic burden, we chose a 25 percent tax on spending and 20 percent tax on wages. For every \$10 one earns, a 20 percent wage tax leaves \$8 for spending on goods. Meanwhile a 25 percent spending tax lets one retain \$10, but the price of \$1 worth of goods is now \$1.25, and one can afford \$8 worth of goods.

Participants were first presented with a hypothetical situation in which the government was deciding between two tax proposals – a 20 percent wage tax or a 25 percent spending tax – and were asked to state their preferences and to rank the fairness of each tax. To explore

behavioral responses, participants were then presented with one of two randomized question blocks, each with a job offer for 30 percent of their current wage income. The only difference was that one block imposed a 20 percent wage tax, while the other imposed a 25 percent spending tax. Those who accepted the job offer were asked if they would accept a job offer for a lesser payoff—25 percent, 20 percent, and then 15 percent – under the same tax. Those who declined were asked how high the offer would have to be to entice them to accept— 35 percent, 40 percent, 45 percent, and up to 50 percent.

Preferences over the two types of taxes may vary over time once individuals face the choice of deciding whether to accept a second job under either the wage or consumption tax. After making their decisions, we asked participants whether they would prefer to stay with the proposed tax or to change to the other tax. In addition, all participants were then asked to evaluate the fairness of each tax by income group and for their own situation.

Until this point in the survey, we simply explore if there are psychological biases in preferences and expressed behavior. However, we would also like to know how strong and persistent these biases might be. To explore this, we provided participants with a simple debiasing explanation of the economic equivalence of the two taxes, similar to our example above with \$10 in earnings and a 20 percent wage tax and 25 percent spending tax. We then asked respondents for their preferences and responses for a second job offer for 30 percent increased wages under each tax.

2.2 Design of the Retirement Module

In the second module, we explored how retirement decisions would be affected when the government found it necessary to raise additional funds through taxation. There were two

scenarios: one required an increase in wage taxation, while the other required an increase in consumption taxation.

Initially, subjects were told they faced a base tax structure consisting of a 17.5 percent spending tax and a 15 percent wage tax. Then they are told that in order to fund additional spending, the government must decide between increases in one of the two taxes: either a 7.5 percentage point increase in the spending tax or a 5 percentage point increase in the wage tax. Thus, the resulting tax structures would be either: 1) a 15 percent wage tax and a 25 percent spending tax or 2) a 17.5 percent spending tax with a 20 percent wage tax. These alternative rate increases were designed result in economically equivalent tax structures.

In our survey, respondents read a prompt in which the government was deciding between two tax proposals: maintaining the wage tax at 15 percent but increasing the spending tax from 17.5 percent to 25 percent or maintaining the spending tax at 17.5 percent but increasing the wage tax from 15 percent to 20 percent. They were then asked to state their preferences and to rank the fairness of each tax in general, by income group, and for their own personal situation. This paper does not discuss the fairness results from the survey. In general, we found remarkably small differences in perceived fairness of spending versus wage taxes.

To explore the behavioral impact, participants were shown one of two randomized blocks—one for each tax proposal—and asked how the increased tax impacted their retirement plans, assuming they initially planned to retire at age 65. Would they retire earlier, reflecting the lower value of wages? Would they continue to retire at 65, cutting spending to make up for lost purchasing power? Or would they decide to retire later, increasing their work in order to counteract, in part or in full, the tax-induced decrease in their consumption?

Participants who decided to retire later were given the option of delaying retirement until they had earned enough income to *fully* compensate for the purchasing power lost to the increased tax or delaying retirement until just *partially* compensating this loss. If participants chose to compensate fully for the increased tax burden, they would not have to adjust consumption, and the survey led them to a demographic block and a final disclosure statement.




For all other survey participants, the increased tax would force them to alter spending patterns. We asked how they would respond to the tradeoff in reduced spending between today and during retirement. Would they cut spending equally between today and during retirement or would they care more about the future and spend even less today so as to maintain spending during retirement? Or would they maintain spending today, even though it meant spending less during retirement? After answering these questions, respondents were directed to the demographic and disclosure blocks of the survey.

3. The Second Job Module: To Work or Not to Work?

The second job module begins by asking respondents their preferences over “a 25% tax on what they spend” or a “20% tax on the wages they earn.” They are also offered the opportunity to say that the options are “equal to me.”

Respondents expressed a clear preference for the wage tax over the spending tax. Figure 1 below depicts the responses. Statistical tests reveal that the preference for the wage tax over the spending tax was moderately significant (a p-value of 0.13) while non-neutral preferences (prefer spending or wage tax) were extremely significant against the neutral “equal to me” option (p-values less than .0001).

Figure 1: Initial Preferences

| Base Opinion | | Count | % |
|--|--|-------|-----|
| Taxpayers face a 25% tax on what they spend. |  | 65 | 38% |
| Taxpayers face a 20% tax on the wages they earn. |  | 79 | 46% |
| These options are equal to me. |  | 29 | 17% |

These results clearly indicate that respondents treat these taxes differently. If respondents understood the economic equivalence of the taxes, they should be indifferent between the wage tax and the spending tax proposed as they impose the same burden; yet in our sample, 83.2 percent responded with a preference for one tax over the other. Further, the hypothesis tests for difference in proportion between non-neutral and neutral are extremely statistically significant. As we will see, however, preferences for the wage and spending tax will evolve over time in our module.

We then posed the following question to respondents facing the wage tax [the spending tax]:

Suppose you are currently working a full time job but have some time for leisure and your personal activities. You are now offered an opportunity to work an additional job that would increase your wages by 30% but would cut substantially into your leisure time. You would also pay a 20% tax on the additional earnings, but no tax on whatever you spend from your additional earnings. [You would pay no tax on your additional wages but there would be a 25% tax on whatever you spend from your additional wages.] What would you do?

- *I would accept the second job*
- *I would decline the second job*

In both cases, if they declined the offer, they would then be offered higher wages while if they accepted the offer, they would then be offered lowered wages. Through this method, we determined the minimum acceptable offer to take a second job under both types of taxes.

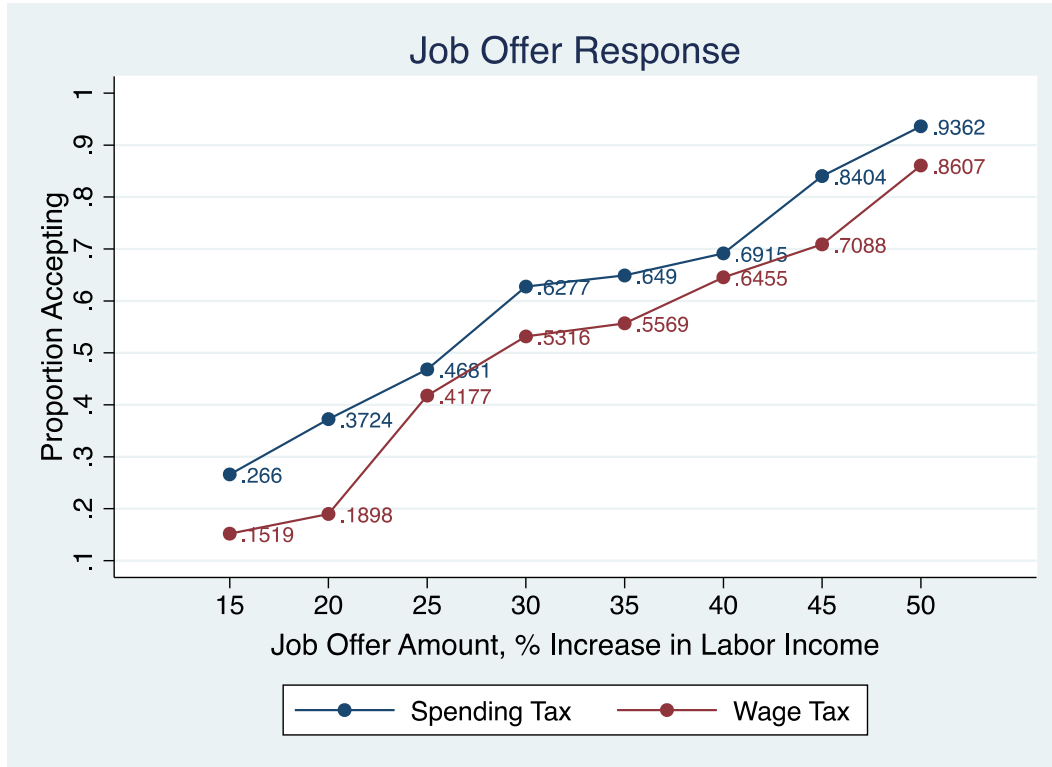
There are a number of alternative ways to present the results. All show that the willingness to accept a second job under the wage tax is lower than under a spending tax. Table 1 presents job acceptance rates for each tax by job offer level, and results for hypothesis tests for differences in proportions at each level. Figure 2 plots the cumulative distribution of acceptance rates against the job offers at the different rates.

Table 1: Hypothesis Test for Job Offer Response under each Tax

| | p_s | n_s | p_w | n_w | <i>Difference</i> | <i>Pooled Estimator</i> | <i>Standard Error</i> | <i>Test Stat</i> | <i>P-value</i> |
|-----|--------|-------|--------|-------|-------------------|-------------------------|-----------------------|------------------|----------------|
| 15% | 0.2660 | 94 | 0.1519 | 79 | 0.1141 | 0.2139 | 0.0626 | 1.8228 | 0.0683 |
| 20% | 0.3724 | 94 | 0.1898 | 79 | 0.1825 | 0.2890 | 0.0692 | 2.6380 | 0.0083 |
| 25% | 0.4681 | 94 | 0.4177 | 79 | 0.0505 | 0.4451 | 0.0759 | 0.6652 | 0.5059 |
| 30% | 0.6277 | 94 | 0.5316 | 79 | 0.0961 | 0.5838 | 0.0752 | 1.2773 | 0.2015 |
| 35% | 0.6490 | 94 | 0.5569 | 79 | 0.0920 | 0.6069 | 0.0746 | 1.2343 | 0.2171 |
| 40% | 0.6915 | 94 | 0.6455 | 79 | 0.0460 | 0.6705 | 0.0717 | 0.6412 | 0.5214 |
| 45% | 0.8404 | 94 | 0.7088 | 79 | 0.1316 | 0.7803 | 0.0632 | 2.0824 | 0.0373 |
| 50% | 0.9362 | 94 | 0.8607 | 79 | 0.0754 | 0.9017 | 0.0454 | 1.6605 | 0.0968 |

The label p_s is the proportion accepting the second job under the spending tax and p_w is proportion that accept under the wage tax. The labels n_s and n_w give the sample sizes that responded to the job offer under the spending tax and the wage tax, respectively. Given the sample size, the point estimator of the difference between the two population proportions, $p_s - p_w$, can be approximated by a normal distribution. The null hypothesis is that the difference is zero against the two-sided alternative that it is nonzero.

Figure 2: Behavioral Distributions under Spending tax and Wage tax



For each wage level, the percentage acceptance under the spending tax is greater than that under the wage tax. Taken individually by wage level, not all the differences are statistically significant at conventional levels. However, tests for the difference in overall distributions indicate they are distinct. A non-parametric Kolmogorov-Smirnoff test for the difference in the distributions has a p-value of 0.102. In addition, a Wilcoxon signed-rank test on the difference in distributions was significant at the one percent level.

We further explored the experimental results by estimating a linear probability model on the cumulative acceptance frequencies. Specifically, we ran, at all the wage intervals from 15 to 50 percent, a linear probability model of the overall acceptance probabilities on a dummy variable for the spending tax (using the wage tax as the base) and controls for gender and income categories. As expected, the dummy variable for the spending tax was positive at all wage

levels and significant at the 10 percent level at the wage levels of 15, 20, and 45 percent, and significant at the 15 percent level at the 30, 35, and 50 percent wage levels. Thus, similar to Table 1, only at the 25 and 40 percent level were responses statistically indistinguishable.

We found other economically and statistically significant results as well. Females were less likely to accept second jobs, with differences between job acceptance rates of men and women ranging from 13 to 23 percentage points across regressions. The results for the effects of income categories were quite interesting and relatively uniform across the regressions. Individuals with income levels exceeding \$75,000 and those below \$30,000 were more likely to accept a second job as compared to those in the middle ranges. While we do not have a definitive explanation for this phenomenon, there may be motivational differences across the groups, with the high income group having the greatest work ethic and lower income individuals valuing additional money income more on the margin.

Our next step was to explore if the observed differences in preferences and responses we observed were potentially due to the complexity of the questions and lack of knowledge about the equivalence between a wage and spending tax. We presented respondents with a “de-biasing” example, which explained how the two taxes would lead to exactly the same buying power within a single period, as described above. Interestingly, after reading the de-biasing explanation preferences generally flattened out: respondents were almost evenly split into thirds expressing preference for each option (wage tax, spending tax, and neutral). Nonetheless, after reading the de-biasing explanation, their reported behavioral responses to each tax differed even more strongly in magnitude and statistical significance.

First, the preference for the wage tax over the spending tax disappeared after the de-biasing explanation. Indeed, spending taxes were now preferred over wage taxes, although the

differences were not statistically significant. Table 2 presents the data and tests for changes in preferences after de-biasing. Essentially, some of the prior supporters of wage taxation become indifferent between the two taxes, while supporters of the spending tax remained at the same percentage.

Table 2: Hypothesis Test for Change in Preferences after De-biasing

| | <i>Initial</i> | n_1 | <i>De-biasing</i> | n_2 | <i>Difference</i> | <i>Pooled Estimator</i> | <i>Standard Error</i> | <i>Test Stat</i> | <i>P-Value</i> |
|---------------------|----------------|-------|-------------------|-------|-------------------|-------------------------|-----------------------|------------------|----------------|
| <i>Prefer wage</i> | 0.4566 | 173 | 0.2984 | 173 | 0.1582 | 0.3775 | 0.0521 | 3.0352 | 0.0024 |
| <i>Prefer spend</i> | 0.3757 | 173 | 0.3584 | 173 | 0.0173 | 0.3671 | 0.0518 | 0.3338 | 0.7385 |
| <i>Neutral</i> | 0.1676 | 173 | 0.3468 | 173 | -0.1792 | 0.2572 | 0.0470 | -3.8131 | 0.0001 |

The label *Initial* is the proportion preferring the respective tax in the initial preferences and *De-biasing* is proportion preferring the same tax after the de-biasing manipulation.

Second, the behavioral differences between the wage tax and the spending tax at the 30 percent wage level were stronger after the de-biasing explanation. Table 3 depicts the percentage acceptance rates and statistical tests for differences in responses. Prior to de-biasing, the acceptance rate was higher under the spending tax at the 30 percent wage level but not statistically significant; after de-biasing, the percentage acceptance rates were 59 for the spending tax and only 42 for the wage tax. This difference was highly significant. We defer our preferred explanations of these differences until after we have reviewed the results of the retirement module.

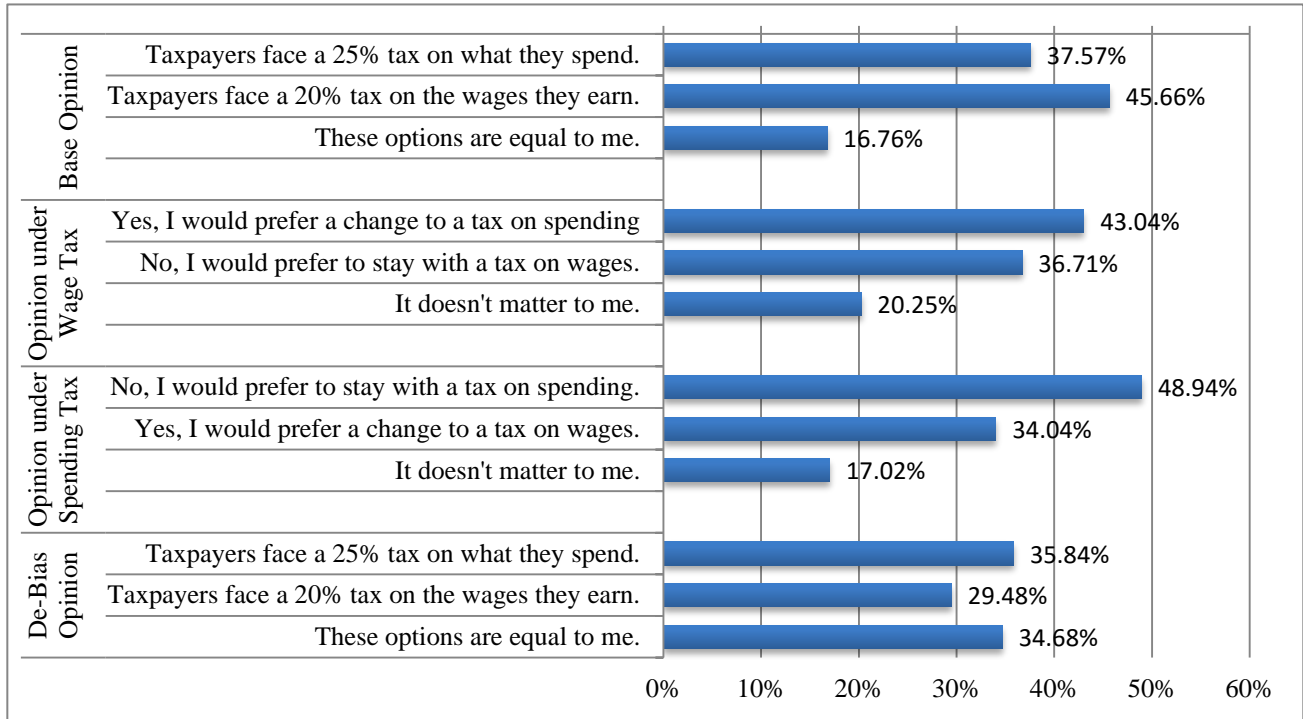
Table 3: Hypothesis Tests for De-biased Behavior Initial and “De-biased” Response to 30% Job Offer

| | p_S | n_S | p_W | n_W | <i>Difference</i> | <i>Pooled Estimator</i> | <i>Standard Error</i> | <i>Test Stat</i> | <i>P-value</i> |
|-------------------|--------|-------|--------|-------|-------------------|-------------------------|-----------------------|------------------|----------------|
| <i>Initial</i> | 0.6277 | 94 | 0.5316 | 79 | 0.0961 | 0.5838 | 0.0752 | 1.2773 | 0.2015 |
| <i>De-biasing</i> | 0.5896 | 173 | 0.4220 | 173 | 0.1676 | 0.5058 | 0.0538 | 3.1177 | 0.0018 |

The label p_S is the proportion accepting the second job under the spending tax and p_W is proportion that accept under the wage tax.

Finally, we explored the evolution of preferences for wage versus spending taxes as respondents made choices over whether to work under either a wage or spending tax and after the de-biasing explanation. If respondents faced a wage tax, we asked whether they preferred to face a spending tax or to remain with the wage tax, and vice versa. Figure 3 depicts how the pattern of preferences evolved over the course of the survey. One clear pattern does emerge. The wage tax becomes less popular as the survey progresses. While initially the wage tax was preferred over the spending tax, after either facing the wage or spending tax or receiving the de-biasing explanation, the spending tax exceeds the wage tax in popularity. The reduction in the preference for the wage tax is highly statistically significant for those facing the spending tax and for all respondents after the de-biasing explanations.

Figure 3: The progression of preferences throughout the survey



In summary, we find that the wage tax has a stronger negative impact on the willingness to work more as respondents are less likely to say they will accept a second job at various wage levels when facing the wage tax. These differences actually increase when the equivalence of wage and spending taxes are explained. Finally, while there is a modest initial preference for the wage tax over the spending tax, this preference reverses itself after employment choices are made and after a de-biasing explanation.

4. The Retirement Module: When to Retire?

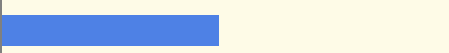

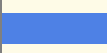
In the retirement module, respondents first faced this question asking about their preferences:

Suppose that the government is expanding its programs and must raise taxes. Currently, there is a 17.5% tax on spending and a tax on wages of 15%. The government must decide between increasing one of these taxes. Which of these two tax proposals would you prefer?

- Keep the tax on wages at 15%, but increase the tax on spending from 17.5% to 25%.
- Keep the tax on spending at 17.5%, but increase the tax on wages from 15% to 20%.
- These options are equal to me.

In this case, there was a clear preference for increasing the tax on spending as shown in Figure 4. Forty-nine percent preferred the spending tax increase as compared to only twenty-seven percent for the wage tax increase. Moreover, the preference for the spending tax increase over the wage tax increase was statistically significant at the 1 percent level.

Figure 4: Initial Preferences

| Base Opinion | | Count | % |
|---|--|-------|------|
| Keep the tax on wages at 15%, but increase the tax on spending from 17.5% to 25%. |  | 71 | 49% |
| Keep the tax on spending at 17.5%, but increase the tax on wages from 15% to 20%. |  | 40 | 27% |
| These options are equal to me. |  | 35 | 24% |
| Total | | 146 | 100% |

We then asked how their retirement decisions would be affected by the increase in taxes. We made it clear that the higher taxes would reduce the income available for spending and saving. Specifically, we posed the question as follows:

Suppose you are currently working a full time job which provides you with income that you divide between spending and saving. You plan on retiring at age 65 at which time you would

live on your savings and your Social Security. However, the government announces that taxes on wages [spending] will be increased from 15% to 20% [17.5% to 25%]. This additional tax reduces the income you have for spending and saving. What would you do?

- *I would continue to retire at 65.*
- *I would retire a year or two earlier.*
- *I would retire a year or two later.*

Only six of our 146 participants stated that they would retire earlier. The remainder either continued to retire at 65 or later. As shown in Table 4, under the spending tax, sixty-two percent retired later, while seventy-six percent retired later under the wage tax. These differences were significant at the seven percent level.

In the second job experiment, the willingness to take on additional employment was deterred more by the wage tax than the spending tax. In this case, the willingness to extend employment (by delaying retirement) is greater under the wage tax increase, as a higher percentage of respondents chose to retire later in the face of the wage tax. We defer to the final section a discussion of the situational framing of the wage tax that leads to a negative association with the willingness to accept a second job, but a positive association with the willingness to continue working and delay retirement.

Table 4: Hypothesis Tests for Retirement Decisions under each Tax Proposal

| <i>Retirement Decision</i> | p_S | n_S | p_W | n_W | <i>Difference</i> | <i>Pooled Estimator</i> | <i>Standard Error</i> | <i>Test Stat</i> | <i>P-value</i> |
|----------------------------|--------|-------|--------|-------|-------------------|-------------------------|-----------------------|------------------|----------------|
| <i>Earlier</i> | 0.0395 | 76 | 0.0429 | 70 | -0.0034 | 0.0411 | 0.0329 | -0.1033 | 0.9177 |
| <i>Same</i> | 0.3421 | 76 | 0.2000 | 70 | 0.1421 | 0.2740 | 0.0739 | 1.9233 | 0.0544 |
| <i>Later</i> | 0.6184 | 76 | 0.7571 | 70 | -0.1387 | 0.6849 | 0.0770 | -1.8023 | 0.0715 |

The label p_S is proportion that makes the retirement decision in respective row facing the increased spending tax, and p_W is proportion making this same decision facing the increased wage tax.

After making their choices, we explored how consumption patterns would change in the face of additional taxes. For those who stated they would retire later, we asked them if they would work to fully or only partially compensate for the reduction in income lost to taxes. For respondents who stated they would only partially compensate for lost earnings—and those who stated they would retire earlier or at the same time—we then asked them if they would reduce their consumption evenly, more in the present, or more during their retirement.

We found extremely large differences between behavior under an increased spending tax and an increased wage tax; full statistics are presented in Table 5. In general, under the spending tax, respondents were much more likely to reduce spending evenly between today and retirement. The difference in percentage points across the tax regimes for reducing consumption equally between now and retirement is economically large, at 31.61 percentage points, and statistically significant, with a p-value of 0.0037. Respondents facing the wage tax were more likely to reduce current spending relative to respondents facing the consumption tax. The difference in the proportion to spend even less today stands at 21.58 percentage points, with a p-value of 0.0358.

Table 5: Hypothesis Tests for Consumption Decisions under each Tax Proposal

| <i>Spending Decision</i> | p_s | n_s | p_w | n_w | <i>Difference</i> | <i>Pooled Estimator</i> | <i>Standard Error</i> | <i>Test Stat</i> | <i>P-value</i> |
|--------------------------|--------|-------|--------|-------|-------------------|-------------------------|-----------------------|------------------|----------------|
| <i>Evenly</i> | 0.7447 | 47 | 0.4286 | 35 | 0.3161 | 0.6098 | 0.1089 | 2.9024 | 0.0037 |
| <i>Less Today</i> | 0.2128 | 47 | 0.4286 | 35 | -0.2158 | 0.3049 | 0.1028 | -2.0995 | 0.0358 |
| <i>Less Tomorrow</i> | 0.0426 | 47 | 0.1429 | 35 | -0.1003 | 0.0854 | 0.0624 | -1.6073 | 0.1080 |

The label p_s is proportion that makes the consumption decision in respective row facing the increased spending tax, and p_w is proportion making this same decision facing the increased wage tax.

In the face of additional taxes, both a delay in the retirement date and a reduction in consumption today are means to protect retirement consumption. To gain further insight into their choices, we used our full sample to explore the array of choices under each tax regime. The breakdown is in Table 6. As a very high percentage of respondents under both regimes delayed retirement, it is clear that respondents were focused on the impacts of taxes on their retirement consumption. Moreover, of the two basic strategies to protect retirement consumption, postponing retirement was more frequently chosen than reduced present consumption, indicating that our participants tended to choose consumption over leisure.

Table 6: Response to Tax Increase

| | Facing increased wage tax | Facing increased spending tax |
|------------------------------------|---------------------------|-------------------------------|
| Do nothing | 10.00 % | 25% |
| Retire later | 75.71% | 61.84% |
| <i>Retire later only</i> | 68.57% | 61.84% |
| Spend less | 21.43% | 13.16% |
| <i>Spend less only</i> | 14.29% | 13.16% |
| <i>Retire later and spend less</i> | 7.14% | 0% |

Under the increased spending tax, twenty-five of our participants opt to do nothing in response to the increased tax burden while 75 percent opt to respond in some form – either

retiring later, spending less, or both. Under the increased wage tax, only ten percent opt to do nothing while ninety percent respond – either by retiring later, spending less, or both. This difference is statistically significant at the 2 percent level with a p-value of 0.0179. Furthermore, the proportion of respondents who respond along both dimensions – both retiring later and spending less – is 7.14 percent facing the increased wage tax while no one facing the increased spending tax takes this strategy. This difference is also statistically significant with a p-value of 0.0177. Complete test statistics are included in Table 7.

Table 7: Hypothesis Tests for Response for each Tax Proposal

| <i>Response</i> | p_S | n_S | p_W | n_W | <i>Difference</i> | <i>Pooled Estimator</i> | <i>Standard Error</i> | <i>Test Stat</i> | <i>P-value</i> |
|------------------------------------|--------|-------|--------|-------|-------------------|-------------------------|-----------------------|------------------|----------------|
| <i>Do nothing</i> | 0.2500 | 76 | 0.1000 | 70 | 0.1500 | 0.1781 | 0.0634 | 2.3667 | 0.0179 |
| <i>Retire later</i> | 0.6184 | 76 | 0.7571 | 70 | -0.1387 | 0.6849 | 0.0770 | -1.8026 | 0.0715 |
| <i>Retire later only</i> | 0.6184 | 76 | 0.6857 | 70 | -0.0673 | 0.6507 | 0.0790 | -0.8520 | 0.3942 |
| <i>Spend less</i> | 0.1316 | 76 | 0.2143 | 70 | -0.0827 | 0.1712 | 0.0624 | -1.3253 | 0.1851 |
| <i>Spend less only</i> | 0.1316 | 76 | 0.1429 | 70 | -0.0113 | 0.1370 | 0.0570 | -0.1980 | 0.8430 |
| <i>Retire later and spend less</i> | 0 | 76 | 0.0714 | 70 | -0.0714 | 0.0342 | 0.0301 | -2.3709 | 0.0177 |

The label p_S is proportion that makes the response decision in respective row facing the increased spending tax, and p_W is proportion making this same decision facing the increased wage tax.

In summary, in the retirement module, respondents expressed a preference for the spending tax. They were more likely to report they would delay their retirement date facing a wage tax than a spending tax. When reminded that any tax would reduce their potential consumption, a higher percentage of those facing the spending tax chose to make no adjustments, while a higher percentage of respondents facing the wage tax chose to retire later and reduce

consumption today to preserve their retirement incomes. Not only were participants facing the increased wage tax more likely to respond to in some mechanism to protect retirement consumption by retiring later or spending less; they were also more likely to respond dramatically, by retiring later *and* spending less.

5. Psychological Interpretations

In this section, we explore the possible psychological mechanisms that produce the findings from the surveys. Although the tax treatments in our study were designed to be equivalent, we found consistent differences in behavioral responses and preferences. Ideally, we would like to find unified explanations that can explain the results from both modules. As described in detail in Sheffrin (2013), there is abundant evidence that every day or “folk” ideas about taxation differ from those of tax experts. But how do they manifest here?

The initial place to start is with heightened *salience* of the wage tax over the spending tax. In the second job module, the willingness to accept an offer for a second job was less for the wage tax than the spending tax. Since the question being posed to the respondents was whether to accept a second job in return for increased wage income, it seems natural that a tax on wages would seem psychologically closer to the decision at hand and have a greater impact on behavior. That is precisely what we found. A related perspective is that a wage tax would normally be withheld from paychecks so the wage tax might also be seen to have a more immediate effect than an equivalent spending tax. This is the mechanism suggested in Blumkin et al. (2012).

A similar argument can be made in the retirement module. Here the first decision node was whether to change a planned retirement date in response to increased tax burden. Since this is also a decision about work effort, it is plausible to believe that a wage tax (a direct tax on

work) would be more salient for retirement decisions than an equivalent spending tax. In addition, the wage tax also can be seen as a direct reduction in the amount available for retirement savings, perhaps more so than the consumption tax.

Heightened salience of the wage tax and the situational framing combined can explain why, when compared to the spending tax, the wage tax is associated with a lower willingness to work more (by accepting a second job) in the second job module, but a higher willingness to work more (by delaying retirement) in the retirement module. In the second job module, respondents face an *opportunity*—an offer for a second job with increased wage income—and the wage tax has a psychologically closer effect on the purchasing power of a potential wage increase. In contrast, in the retirement module, respondents face a *burden*—the need to save for retirement with reduced after-tax income—and the wage tax again has a psychologically closer impact on the amount of money available for spending and saving. Applying such situational framing—that is, a contrast between an opportunity and a burden, is entirely consistent with our psychological explanations that the heightened salience of the wage tax leads to increased willingness to work more in the retirement module but decreased willingness to work more in the second job module.

While the increased salience of a wage tax for employment-related decisions is the natural beginning point for understanding psychological non-equivalence, it does not explain all the results that we found. First, there were differences in preferences for the two taxes: in general, respondents eventually preferred spending taxes over wage taxes, despite the fact that headline tax rates were lower for the wage tax than the consumption tax. In the second job module, these preferences transpired after respondents made choices under different tax regimes and when they received de-biased explanations. In the retirement module, there initially was a

clear preference for a spending tax over a wage tax. Second, in the retirement module, respondents facing a wage tax were more likely to reduce their consumption today to maintain consumption levels in the future. Can we find a unified explanation for all these findings?

We conjecture the sense of *control* is an important element for understanding our results. In the Appendix, we provide unedited responses from survey participants emphasizing the importance of control to them. We also provide a brief account of the psychological literature on control that is relevant to our work.

Control can help explain both changes in the time patterns of consumption and the evolution of overall preferences toward the spending tax. With respect to the former, consider individuals in the retirement module facing an increased wage tax. As the wage tax applied to current work, it was essentially unavoidable to them and, as we have suggested, had high salience. However, as both spending taxes and the wage taxes were in place, they could reduce the increased tax burden in the current period by reducing consumption. Essentially, they had control of their current tax payments through their consumption behavior.

In the increased consumption tax scenario, there would also be additional taxes; however, these taxes were not directly associated with work and occur both today and in the future. Respondents perhaps were more likely simply to split the additional tax burden equally between the current period and retirement and not change the timing of consumption. The lower salience of the consumption tax may also be a factor in mitigating respondents' willingness to alter consumption patterns. As compared to the increased wage tax, the increased spending tax has less psychological association with the income available for retirement savings, and so it is less likely to motivate respondents to protect retirement consumption by consuming less today.

In principle, the idea of control can also explain the expressed preferences for spending taxes over wage taxes. The tax burden in any period can be controlled under a spending tax through the timing of consumption decisions. Individuals may believe that consumption decisions are more malleable and easier to adjust on the margin than employment decisions.

But as Thompson et. al. (1998) describe, there may also be another important effect based on the psychological notion of “illusion of control”—a false belief that one can control events that affect one personally. Recall that presenting respondents with a de-biasing explanation of the within-period equivalence of wage and spending taxes did not make them seem equivalent to them. Perhaps the most straightforward explanation for this finding is that individuals did not believe they had to spend all the funds they earned; perhaps by cutting back on consumption, they could postpone taxes far into the future and eventually *reduce* them. An illusion of control over the eventual tax burden may be guiding these findings.

McCaffery and Hines (2010) address similar issues in their discussion of the virtues of progressive consumption taxation. First, they echo our view of the primary salience of wage taxation for employment decisions: “We also suspect, and have found some confirmation in the literature, that the activity being taxed has salience.” And, similarly a tax on consumption is more likely to affect the “marginal decisions to spend or save rather than to work or not, although, rationally, there can be no spending without work.” (McCaffery and Hines (2010, p.64))

Second, the notion of control may be so strong that it may even lead to perceptions that a tax can disappear. McCaffery and Hines (2010, p. 64) also note that “persistent myopia, combined with self-serving optimism, may lead many people to highly and perhaps completely discount *any* tax on their savings. This possibly obtains today: on a casual survey of friends and

colleagues, almost all give some indication of the amounts in their retirement accounts *without discounting for the inchoate tax liability*” (italics in original). This would be a striking example of the illusion of control.

McCaffery and Hines call for more behavioral research on the effects of consumption versus income (wage) taxes for tax policy. The current research provides an example of the type of research that can illuminate tax debates. Our work reinforced the relevance of salience of taxation, but also suggested that the notion of perceived control over tax liability may also play a distinctive behavioral role in understanding preferences and behavior under differing tax regimes.

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APPENDIX: The Psychology of Control and Taxation

In support of our hypothesis that individuals prefer the spending tax due to feelings of control, we first present the following responses from the participants in our study who submitted reasons for their choices and preferences. These unedited responses clearly indicate the importance of control to our respondents.

“I would keep the taxes on spending and spend less and live with less stuff (rather) than have than have the money taken from all I earn.”

“People have some control in terms of what they can/need to spend. This is why I felt that (the) spending tax is slightly more fair than a tax from wages. Taxes on wages you have no control.”

“I feel that any spending taxes that are raised can be limited in the long run by spending less but a wage tax cannot be avoided.”

“My responses are based on the fact that I have little control over my income, but I have COMPLETE control over how much I spend.”

“I would take the job if I was not going to spend the money with a spending tax because then I could save it all tax free.”

“I would prefer to pay a tax on what I spend, because I have the option of not spending or using cost-cutting measures, but don't have that option with the wage tax.”

“The big difference between the taxes is the fact that one can control what he/she spends.

In essence a tax on spending gives one some control over their taxes.”

“Taxes on spending are fair because the consumer decides what and when to pay.”

“At least I have some control over my spending.”

“Taxes on spending I think is better because you can control your spending but would like to leave wages alone.”

The hypothesis that control plays an integral part in how individuals perceive and react to negative stimuli—in this case, taxes—is supported by extensive research in the psychology of control. Thompson (1981, p.89) defines control as “the belief that one has at one’s disposal a response that can influence the aversiveness of an event. This definition... recognizes that the control does not need to be exercised for it to be effective and that it does not even need to be real, just perceived, for it to have effects.”

Perceived control over tax liability can be considered a form of *self-administration*—a subcategory of behavioral control—defined by Averill (1973, p.287) as the ability “to control such things as who administers the stimulus and how and when the stimulus will be encountered.” Facing a spending tax, the individual consumer is able to decide both the time pattern of tax payments (when to purchase an item) and the contextual setting of tax payments (which purchases are worth paying the tax). In contrast, facing a wage tax, the subject typically has only limited ability to control when and how taxes must be paid, as wages and working hours—and thus pre-tax wage income—are typically given by contract or other relatively fixed

arrangements. Thus, once a wage tax is imposed, the tax burden faced today is largely determined.

A consumption tax provides an individual consumer the freedom to determine how and when the spending tax is paid. Our first explanation for the relative popularity of the consumption tax is that it provides a sense of control and resulting self-empowerment—not necessarily an actual ability to avoid the tax.

This hypothesis is supported by the abundant empirical evidence in the psychology literature that control of self-administration reduces stress levels in negative experiences. Averill (1973, p.289) reviews the literature and concludes that “most persons prefer to have control over a potentially noxious stimulus even when that control has no instrumental value in altering the objective nature of the threat.”

For example, Lefcourt (1973, p.419) discusses an experiment in which subjects solved puzzles with or without the ability to terminate a noxious noise; those with the control to terminate the noise performed significantly higher than the subjects without this control, and further, “these differences were obtained despite the fact that subjects who had potential control did not actually exercise it-- the mere knowledge that one can exert control serves to mitigate the debilitating effects of aversive stimuli.” Similarly, Thompson (1981, p.91) cites numerous studies in support of the hypothesis that “a belief that one will have behavioral control” is associated with lower stress levels when anticipating negative stimuli, such as taxes. Furthermore, “in almost every study that examined tolerance (i.e., the willingness to endure more of the noxious stimulus), behavioral control was found to increase tolerance” (Thompson, 1981, p. 92). The tolerance-increasing impact of control may explain why our survey participants expressed preference for the spending tax despite higher headline tax rates.

But control may be real or illusory. As noted by Thompson et al. (1998, p.152), “the benefits of perceived control may be realized even if the perception is illusory.” Similarly, Lefcourt (1973, p. 419) also argues for the real impact of illusory control: “the sense of control, the illusion that one can exercise personal choice, has a definite and positive role in sustaining life.”

This leads to our second hypothesis that individuals prefer the spending tax over the wage tax because they have the illusion that the former allows them to reduce their total lifetime tax burden. If individuals eventually spend what they save but believe otherwise, we have the illusion of control: the belief that control over tax payments in the current period leads to reduced tax payments for all periods. This is precisely the phenomenon of “persistent myopia” discussed by McCaffery and Hines (2010). One of our respondents even reflected on his own potential myopia:

“I find I’d simply prefer spending to be taxed over wages, since I tend to save a lot. I might just be short-sighted, though.”

Further refinements in the theory illusory control can even help explain the puzzling result we found in the second job module of a *narrowing* of the preference gap between wage and spending taxation, but a *widening* of the behavioral gap in response to the de-biasing explanation. Why are individuals able to accept a theory of economic equivalence as it applies to others and still maintain an illusion of their own control that they can reduce their own taxes? Thompson et al. (1998, p. 152) develop the idea of a “control heuristic” that is used in judgments of individual control but not in the assessment of objective estimates of probabilities. This heuristic leads individuals to misperceive their own situation despite being able to accurately

perceive the situation of others: “almost all of the bias in judging connection and control is found when participants are asked to interpret their situation” but “when participants are asked to estimate the actual contingencies operating in the situation, they are often accurate... Accuracy, not misperception is the norm when the focus is not on personal influence.” Even with the de-biasing explanation, respondents may believe that the equivalencies apply to others and not to themselves.

Temporal control of taxation may have other psychological significance in real world settings that may not be captured directly in our simple economic model. Averill (1973, p. 291) suggest the potential importance of temporal control in his description of a laboratory study: “it is reasonable to assume that subjects who had control took their rest periods at psychologically propitious moments, that is, when they were especially fatigued, tense, etc. Subjects in the yoked condition, on the other hand, had time-outs imposed upon them regardless of their momentary state.” In the context of tax payments, the power to shift tax payments across time periods with a consumption tax may be advantageous in “propitious” moments—for example, temporary movements in the marginal costs of funds. As Thompson (1981, p.97) notes, there may be precautionary elements as well: “having control in a situation indicates one will be able to minimize maximum future danger... With both behavioral and cognitive control, individuals believe that the situation will not exceed the limits of what they can endure.”

Lastly, individuals may, consciously or unconsciously, prefer the spending tax for non-economic reasons, specifically the positive impact of personal control on self-image (Thompson, 1981, p. 97). Despite the ultimate inevitability of the economic equivalence of taxes, the psychological research seems to support the notion that individuals might well prefer the spending tax for the control and self-empowerment that it allows.