RESEARCH ARTICLE

Efforts to tax carbon in Washington State

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Abstract

This paper explores the determinants of carbon taxation by focusing on recent efforts to tax carbon in Washington State. The paper identifies citizen demand, energy interests, and tax structure as possible factors in the emergence of carbon taxation. Washington has relatively high demand for climate action, and is unique with respect to its high reliance on indirect taxation and its low level of local fossil fuel interests. I argue this context, especially the high reliance on indirect taxation, makes taxation more appealing than other carbon pricing alternatives. I then test whether local tax structure shapes preferences for carbon taxation using county level opinion data. I find evidence that support for carbon taxation is higher in states with higher gasoline taxes, but no effect from sales and sin taxes. I conclude summarizing various accounts of each initiative's failure, and highlight a few lessons from the efforts to tax carbon in Washington state.

Introduction

Carbon taxation continues to be an elusive policy in the United States (U.S.). Predictions of the effects of climate change continue to increase in severity and the U.S. still lacks a national-level carbon pricing policy, either in the form of cap and trade (emission trading systems) or carbon taxation. These policies cannot solve the problem on their own, but they are needed as part of a large-scale effort to reduce carbon emissions. Carbon pricing incentivizes low cost emission reductions and across the world climate pricing policies have begun to proliferate at the subnational level [1]. In the U.S., several states utilize emission trading systems—as in California and New England's Regional Greenhouse Gas Initiative—but there is no state in the U.S. with a carbon tax.

In recent years, a variety of actors have worked to implement a carbon tax in the state of Washington. While policy makers introduced bills in the state legislature, the most notable of these efforts are the ballot initiatives of 2016 [2,3] and 2018 [4,5]. Had either of them passed, Washington would have been the first state to explicitly tax carbon. However, the 2016 Ballot Initiative 732 only received 40.75% of the vote, and the 2018 Ballot Initiative 1631 was defeated with a slightly greater 43.44% (details on each policy can be found in S1 Table). This paper investigates two questions. First, why was Washington the first state to put a carbon tax in front of voters, and by doing so arguably become the closest state to adopt a carbon tax? Second, since Washington State stands out in terms of tax policy, what influence does tax structure play in support for carbon taxation?

The paper begins with a description of previous work on the determinants of carbon taxation and other related policies. The discussion sets up a hypothesis that tax structure—particularly the use of certain indirect taxes—shapes preferences for carbon taxation. The hypothesis is used to guide a comparative descriptive analysis of state-level measures of citizen demand, energy interest groups, and indirect tax policies. A second statistical analysis is then presented using multilevel linear models to explore the relationship between support for carbon taxation and certain indirect taxes at the state level, while controlling for citizen demand and other county level contextual factors (demographics, industrial employment, education, and a few others). The paper concludes by discussing various explanations for why the two Washington State initiatives failed to pass and the implications for future efforts to tax carbon in the United States.

Background and theory

Studies on the determinants of carbon taxation are quite limited. The few publications addressing the issue, employing primarily case-based methods, suggest proportional representation and left party power are associated with national-level carbon tax adoptions [6,7]. Others focus on how the particular design of carbon tax policy shapes support. Since tax attitudes are shaped by taxpayer perceptions of who benefits from generated revenues [8], then the use of revenues from a carbon tax should also shape support. Polling suggests support for carbon tax may increase when a policy is revenue neutral [9], and experimental work finds revenue devoted to mitigation efforts (public transit or renewable energy) increases support relative to revenue neutrality, investment in adaptation, or compensation to affected workers [10].

In the aftermath of the Washington State ballot initiatives several post-mortem studies emerged. At the Census tract level, car commuting, median household income, and the share of the population over the age of 40 were negatively associated with support, and electoral support for Democratic (and Green Party) candidates and the share of people with bachelor's degrees (or higher) were positively associated with support [11]. A different study found ideology—operationalized as a latent ideological index created with measures of support for other ballot initiatives (related to policing, gun control, campaign finance, and other taxes)—was a strong predictor of votes for the WA carbon taxes [12].

Scholars have also investigated the determinants of 'implicit' carbon taxes; policies not explicitly designed to reduce GHG emissions but likely have that effect. Implicit carbon taxes include taxes on fuel, energy, and vehicles. In general, fossil fuel production is negatively linked to policies that would reduce production or demand (Batstrand), but more specifically the size of the trucking industry [13] and per capita fuel consumption [14] have both been linked to lower fuel tax rates. This body of scholarship identifies important factors linked to citizen demand (political ideology, partisanship, and other individual level or contextual characteristics) and groups with interests at stake should a carbon tax be implemented (fossil fuel production and consumption). The role of interest groups is well-established in scholarship. Interest group theories describe how groups compete within the political system for influence on policy decisions in hopes to shape policy according to their specific interests [15,16]. Different groups are affected to varying degrees and some will have more to gain or lose than others. The size and strength of these groups, which vary across states, influence the amount of support or resistance that can be devoted to supporting or opposing a policy.

In addition to citizen demand and interest group factors, I propose tax structure should also be considered. Building on research in fiscal sociology, I posit a state's tax structure can influence carbon pricing preferences of political actors and the public. One way this can happen is through administrative capacity—the administrative or bureaucratic knowledge and infrastructure allowing a policy to be effectively put into practice. It is advantageous for a government to have the

relevant administrative capacity when adopting a carbon tax policy. Building carbon taxes upon existing excise taxes, especially those on fuel and energy, can lead to significant savings [17], especially in compliance and monitoring [18]; when tax officials have experience dealing with the activities being taxed, environmental taxes are often more successful [19]. Denmark, Finland, the Netherlands, Sweden, and the United Kingdom all built their carbon taxes upon pre-existing fuel and energy taxes [20]. Establishing administrative capacity for carbon tax adoption also relates to the aspect of path dependent theories concerning startup costs. Once initial startup costs are incurred it is relatively more expensive to switch to alternative institutions, sometimes leading to a self-reinforcing process that maintains an institutional path [21,22].

Beyond initial startup costs it is unlikely administrative capacity increases proportional to higher rates or greater revenues, but the degree to which certain types of consumption is taxed may still be important. In order for consumption tax policies to generate high revenues or tax activities at high rates, the policies themselves must be viewed as legitimate, normal, or the best available option among policy actors, and also seen as a legitimate means of revenue generation among taxpayers. Scholars of historical institutionalism point out the importance of institutional context in constraining political actors and shaping views on which other policies are feasible and which policies are preferred [23]. Indeed, tax policies have "shaped what policy makers and interest group activists understood to be possible and desirable" [24]. "It follows that the explanation for any particular fiscal policy itself may lie in a previous configuration of public finances, rather than in any other contemporary circumstances" [25]. Similar claims have been made more generally about environmental policy. Institutional context is important when considering environmental policy adoptions since it cannot be assumed what is effective in one institutional context is effective in others [26].

The motivation of tax policies may also be important. Most taxes are viewed as generating revenue for specific projects (earmarking) or for contributions to a general fund. But some taxes are designed to shape consumption behavior, and the presence of such taxes represents a specific type of institutionalization important for carbon taxation. General sales taxes are not implemented because consumption is viewed as bad, but taxes on alcohol, tobacco, and sugary beverages are often supported for their effect of reducing the consumption of these goods. This type of taxation is justified to correct failures in human rationality [27], forcing consumers to pay a price that at least partially accounts for the external costs incurred to society and costs incurred by the individual in the future. Since carbon taxes attempt to shape behavior in a similar fashion, the normalization of taxation as a regulatory tool may shift preferences of political actors and the public in favor of carbon taxation.

The manner in which a state taxes consumption determines the administrative capacity and institutionalization relevant for carbon taxation. In the presence of demand for climate action, carbon taxation might first emerge in states with the necessary administrative capacity and relatively high levels of institutionalization of consumption and sin taxes. In this framework, carbon taxation represents a continuation along the institutional path of consumption taxation, and political actors in states with relatively high levels of it may prefer carbon taxation over other carbon mitigation policies. I test this hypothesis with a comparative analysis of descriptive state-level statistics and an analysis of public opinion on a revenue neutral carbon tax aggregated at the county level.

Materials and methods

Materials

The data used in the two analyses come from a variety of sources. Public opinion data for 2016 and 2018 are from the Yale Program on Climate Change Communication (YPCCC) [28,29].

The analyses use YPCCC surveys questions on the belief that climate change is happening, on support for regulating CO2, and on support for a revenue neutral carbon tax on fossil fuel producers (the first two are used in both the state-level and county level analyses, the last is only used at the county level). Data on state-level tax rates in 2016 and 2018 are from the Tax Foundation [30–32]. The Tax Foundation provides tax rates for distilled liquor, beer, wine, and cigarettes, and created an additive index for "sin" taxation. Gas tax rates and a combined measure of state sales tax and the average local sales tax rate are also provided. State-level energy and electricity statistics for 2016 and 2018 are from the United States Energy Information Administration [33], including state-level measures for the share of non-CO2-emitting electricity share, fossil fuel production (in BTUs), and non-CO2-emitting energy production (in BTUs). Average state-level gasoline prices are estimated by the American Automobile Association [34]. State- and county-level 2016 presidential election results come from the Harvard Dataverse [35,36].

For the second analysis, the multilevel model, I add a series of county-level contextual measures from the United States Census [37,38]. These include median income, average number of rooms per household, population, average travel time to work, median age, the county-level composition of eight racial groups (White, African American, Hispanic/Latinx, Asian, Native Hawaiian/Pacific Islander, American Indian, multiple races, and other race), education characteristics (percent of population with less than high school, high school, associates, bachelors, and advanced degrees), and the percent employment in various industries (construction, agriculture, manufacturing, transportation, trade, and professional/managerial).

A table with summary statistics of all variables at the state and county level is presented in S1 Text.

Methods

The first analysis offers comparative descriptive statistics to assess whether Washington State is unique with respect to political and environmental attitudes, the magnitude of three indirect tax measures (sales taxes, gasoline taxes, and sin taxes), and measures related to fossil fuels energy production, energy production of non-CO2-emitting sources, and the non-CO2-emitting share of electricity production. Comparing Washington to other states reveals the relative strength/presence of factors theoretically linked to climate policies.

The second analysis is a multilevel linear model determining the association between various state- and county-level factors (with random intercepts included at the state level) county-level support for a revenue neutral carbon tax on fossil fuel companies. The multilevel modeling approach takes into account the nested nature of the data generation process [39–41], in this case where counties are nested within states, and allows for estimation of effects from variables at the upper unit level (the state-level measures), whereas "fixed effects" models do not allow for this.

Results

Comparative descriptive analysis

Since a carbon tax has yet to pass in any U.S. state, very little can be said about determinants of successful carbon tax adoption at this level. However, it is possible to employ certain theories to help explain why Washington came the closest. Inferential statistics will suggest the determinants getting close to carbon tax adoption are simply the characteristics of Washington state, whatever they might be. Instead I use descriptive statistics to explore the comparative presence of citizen demand, major interest groups, and indirect tax policies. State-level characteristics are summarized in Fig 1.
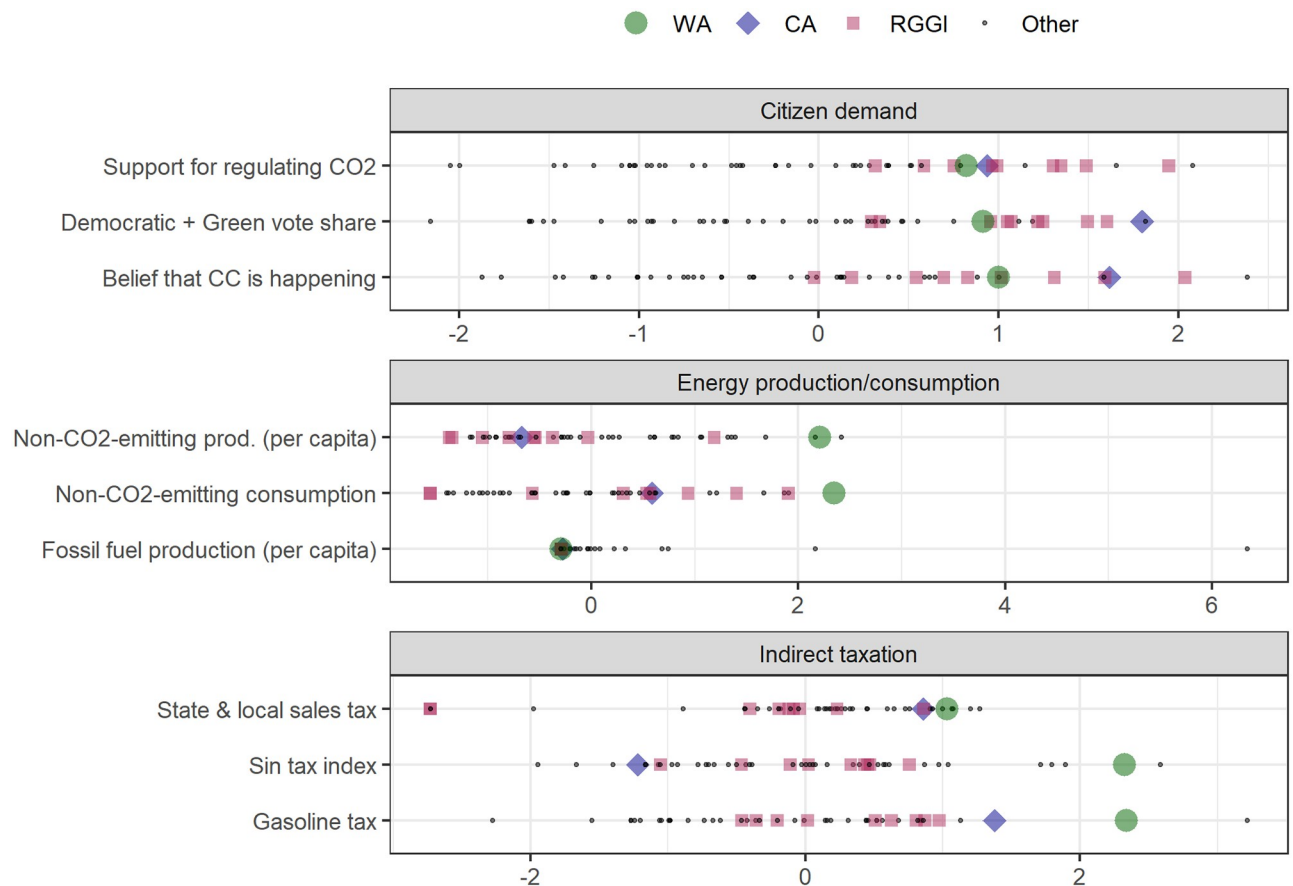
Fig 1. State-level measures of citizen demand, energy interests, and indirect tax policies. Fig 1 shows nine different measures (all standardized) grouped into three categories. Symbols and colors are used to identify (a) participants in RGGI in 2016 (red squares), (b) California (blue diamonds), (c) Washington State (green circles), and (d) all other states (black dots).

The first set of measures shows state-level support for regulating carbon emissions, the combined Democratic and Green party vote shares from the 2016 election, and the estimated percentage of citizens within each state reporting to believe climate change is happening and report supporting regulating CO_2 as a pollutant. Washington state scores relatively high, but not the highest, on all three measures. Taken together, the citizen demand measures show an association between citizen demand and actual climate pricing policies: with only one exception (one RGGI state with a below average belief that climate change is happening), all states with carbon pricing policies fall above the mean on three measures. Even though it does not have a carbon pricing policy, Washington State falls within the range of values with other states that do on all measures. This is not evidence of a causal relationship between preferences and policy; the survey data used here was collected well after RGGI and California's cap-and-trade were put into effect. However, of the ten states with the highest ranks across the three measures, six had cap-and-trade policies in 2016, and New Jersey, an original RGGI member that left in 2012 (and rejoined in 2018) is also in the top 10. In short, Washington's measures are relatively high and on par with other states that have implemented carbon pricing policies.

The second set of measures relate to energy production and consumption. The first two show the levels of non-CO_2-emitting energy production (per capita) and the non-CO_2-emitting consumption (share of total electricity consumption from solar, wind, geothermal,
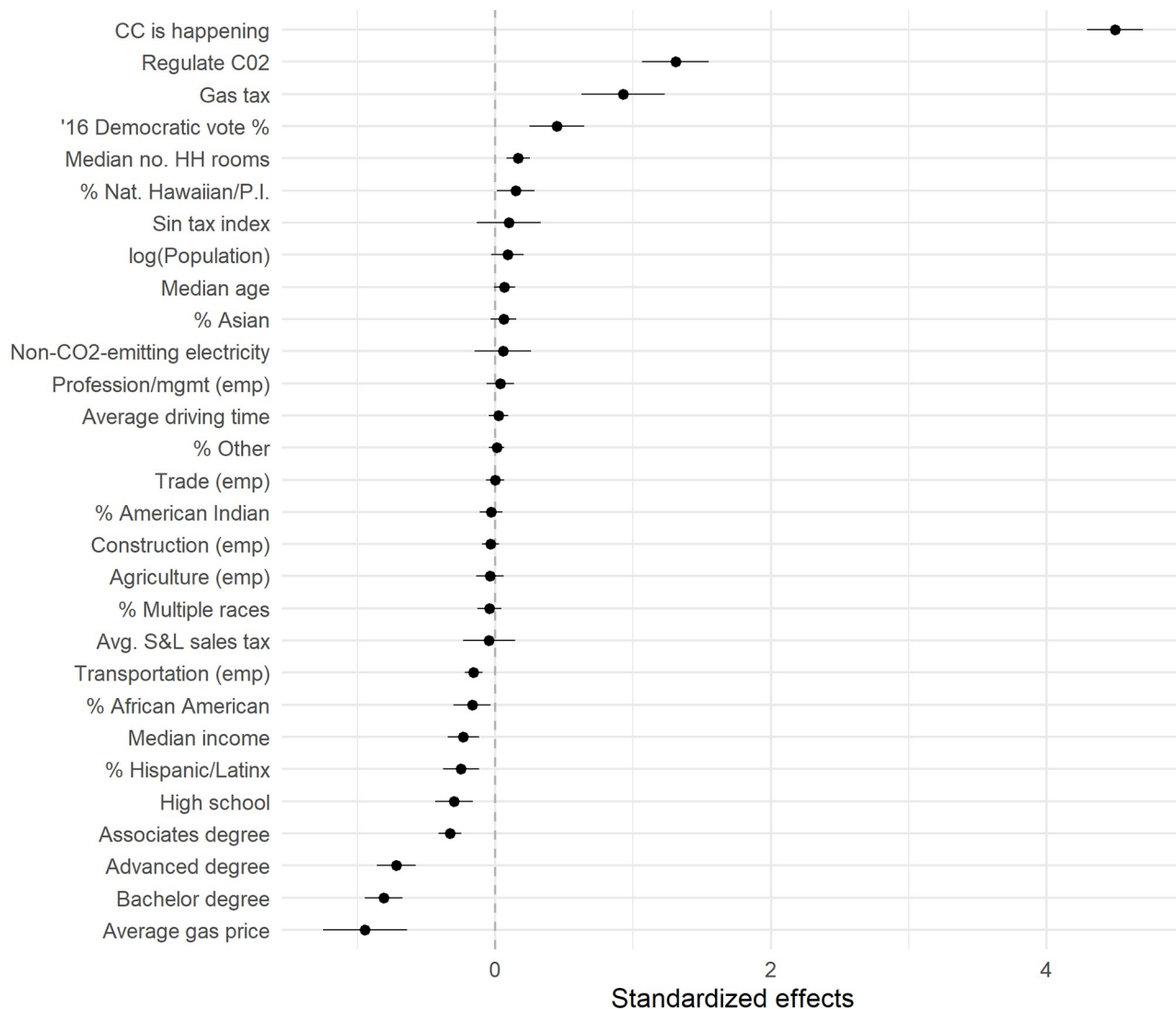
Fig 2. Estimates from the multilevel linear model. The dependent variable is support for a revenue neutral carbon tax on fossil fuel companies. All variables are standardized making the effects interpretable as changes in the percentage point support for the carbon tax that correspond to a standard deviation increase in each variable.

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hydroelectric, and nuclear). Washington State has the second highest per capita non-CO_2-emitting energy production (after North Dakota) and the highest share of non-CO_2-emitting electricity. Further, Washington is among the group of states with zero fossil fuel production. The energy production that would experience the largest negative consequences from a carbon tax—fossil fuel producers—are nonexistent in Washington State, and the production of energy that would be least affected (non-CO_2-emitting) is relatively high. Further, if all states passed a carbon tax at the same level, Washington households would, on average, would feel the consequences of a carbon tax the least among all U.S. states.

The last set of measures speaks to the present study's novel theoretical contribution; three measures of indirect tax policies. Washington ranks among the highest in combined state and local sales tax rates. Sales and other indirect tax policies are generally regressive (where the share of income paid into them decreases with income) compared to direct taxes on income

and property [42] and Washington has one of the most regressive tax structures in the U.S. [43]. Washington has the second highest sin tax index, and much more than any state with other carbon price policies. The same is true of gasoline taxes; Washington has the second highest rate and a rate significantly higher than any of the other states with carbon price policies.

Washington state represents a unique combination of measures of citizen demand, energy interests, and indirect tax policy. Compared to the average state in the U.S., survey data suggests Washingtonians are more likely to believe in the existence of climate change and support regulating carbon. The type of energy produced in the state—none from fossil fuels and the majority from renewable sources—means production interest groups likely harmed by a carbon tax are absent, and electricity consumers in Washington State rely on the highest share of renewable-sourced electricity in the country; if a uniform carbon tax on electricity were passed in all states, residents in Washington would experience the smallest increase in electricity costs in the entire country.

Washington is also distinct with respect to tax structure. Washington is known for having one of the most regressive tax structures in the country and this is due to its high reliance on sales, excise taxes, and the absence of a state income tax. As carbon taxes are themselves indirect taxes, Washington State policy actors and taxpayers operate in a context where this type of tax is normalized. In particular, Washington has relatively high gasoline taxes (an "implicit" carbon tax) and sin taxes (taxes on alcohol and tobacco). In other words, Washington has some of the highest rates for the taxes that (a) most resemble carbon taxes (fuel taxes) and (b) are used to shape consumption behavior, which is the ultimate goal of a carbon tax.

Multilevel linear models

The second analysis tests whether the central hypothesis—that tax structure influences support for carbon taxation—is supported with opinion data at the county level. Individual level opinion would be more ideal, but non-aggregated public opinion data is not available with county-level indicators. The statistical test presented here shows effects from measures at the county and state level—contextual effects—and cannot speak for associations between support for the carbon tax and individual level characteristics. The multilevel model is the best approach given the data availability.

The model includes the "citizen demand" variables measured at the county level (support for regulation, belief that climate change is happening, and Democratic vote share from the 2016 presidential election). In addition to measuring demand for climate action, support for regulation allows the model to separate out support for regulation ("Regulate carbon dioxide (the primary greenhouse gas) as a pollutant") from specific tax for carbon taxation. The model includes three measures of indirect taxation at the state level, average state-level gasoline price, the non-CO2-emitting share of electricity consumption at the state level, and a includes a series of demographic and contextual characteristics at the county level, including race, ethnicity, home size (in number of rooms), average age, median income, average commute time (in minutes), education characteristics, and employment in various industries.

Fig 2 displays coefficients and 95% confidence intervals for the non-random components of the multilevel model (full model results are presented in S2 Table). The dependent variable is county-level support for a revenue neutral carbon tax on fossil fuel producers. An "ST" in parenthesis marks the variables measured at the state level. All others represent county-level measures. Variables indicating the composition of racial and ethnic groups are marked with a prefix "R%", employment with "Emp%", and education with "Ed%". The categories for White race and percent with a high school diploma (or equivalent) as the highest education are

excluded (these are the reference categories). Fig 2 sorts predictor variables according to the effect size and direction. All predictor variables are standardized (mean-centered and in standard deviation units), making the effects comparable. Each effect can be interpreted as the percentage point change in support for the carbon tax that corresponds to an increase of one standard deviation in each predictor variable.

The two predictors with the largest effects in the model are the belief that climate change is happening (a one standard deviation increase corresponds to a 4.5 pp increase in support for the carbon tax) and support for regulating CO_2 as a pollutant (one standard deviation increase corresponds with 1.31 pp increase). The combined Democratic and Green party vote share from the 2016 presidential election is also significantly and positively associated with support for the carbon tax, meaning all three of the citizen demand variables are positively associated with support for the carbon tax.

The tax measures offer mixed support for the hypothesis. Only the state-level gas tax rate is positively and significantly associated with support for the carbon tax. Neither the sin tax index nor the average combined state and local sales tax rates are significantly associated with support for the carbon tax (although the sin tax index is positively and significantly associated in a model without the contextual demographic measures). When controlling for the state-wide average price of gasoline—which is negatively associated with support for the carbon tax—the model suggests an independent effect of gasoline tax rates on support for carbon taxes.

The fitted model reveals a few other significant relationships. The share of a county's population (over the age of 25) with less than a high school education is positively associated with support for the carbon tax (a coefficient of 0.26), while the share of associates degree (-0.22), advanced degree (-0.54), and bachelors degree (-0.58) holders are all negatively associated with support. The proportion of Native Hawaiian and Pacific Islanders is positively associated with support (0.15), while African and American (-0.17) and Hispanic and Latinx (-0.25) are both negatively associated with support. The median number of rooms per household (0.17) is positively associated with support, and median household income is negatively associated (-0.23). Finally, the share of employment within the transportation industry is negatively associated (-0.16) with support for the carbon tax.

Discussion

The analyses presented above sheds light on why Washington has arguably come the closest state in the U.S. to passing a carbon tax and the role that indirect tax policies play in support for carbon taxation. Washington State represents an ideal combination of citizen support for climate policy, minimal energy/electricity interest groups that would be harmed by a carbon tax, and a tax structure that taxes consumption of sales, gasoline, and alcohol and tobacco (via "sin" taxes). Institutional theories from fiscal sociology suggest the use of these policies shapes the way in which policy actors and citizens would view carbon tax adoption.

I find evidence suggesting citizen views toward carbon taxation are shaped in part by tax policy. Gasoline tax rates are positively associated with support for carbon taxes; taxing gasoline is a component of many existing carbon taxes. However, the results do not support the hypothesis that other forms of indirect taxation increase support for carbon taxation, at least among the public.

While I argue the context offered in Washington State should increase support for a carbon tax, neither the 2016 Initiative I-732 nor 2018's I-1631 passed. Another study of the Washington ballot initiatives asked whether the carbon tax initiatives in Washington could have passed in any other U.S. state [12]. Fitted models with demographic and political information were used to estimate the level of support in other states, assuming the associations would hold in

other, out of sample contexts. The authors suggest 2016's I-732 would not pass in any state, and only in Vermont would 2018's I-1631 pass (although Vermont lacks the institution of direct democracy). The authors note the large majorities supporting carbon taxation both nationally and within many states (including Washington) does translate directly to votes for carbon taxation. It is possible the voters in each election were not representative of the polls (especially in the 2018 midterm with relatively lower turnout).

Other post-mortem accounts highlight additional reasons for the failure of the initiatives. Conflict emerged among the interest groups, organizations, and activists in support of the ballot initiative in 2016. In 2016, the dominant story was the opposition to I-732 from the left [44]. The most detailed depiction of this comes from David Roberts [45]. In short, progressive leaders expected to support a carbon tax, or any climate policy, either came out in opposition or explicitly did not support I-732. Leaders and activists in various progressive organizations were unhappy with I-732 because revenues were not earmarked for green investment or spending on other issues important to their movement. Further, leadership in certain progressive organizations felt the key players of I-732 were unwilling to coordinate to design a policy to better suit their goals. Conversely, the I-732 camp felt progressives were unwilling to move quickly enough to propose a concrete alternative. Perhaps the final blow came due to statements from key I-732 figure Yoram Bauman (suggesting leftists who oppose 732 are driven by "an unyielding desire to tie everything to bigger government, and a willingness to use race and class as political weapons in order to pursue that desire") [46], causing the I-732 campaign to be perceived as having little regard for issues of social justice, clashing with the progressive/climate justice view that climate policy should include careful concern for the most disadvantaged. Opposition organizations included the Alliance for Jobs and Clean Energy, Fuse Washington, Front and Centered, and OneAmerica. The Sierra Club, while they did not oppose I-732 *per se*, was vocal about not supporting it. Another organization, 350 Seattle, pulled its support for I-732 citing the lack of concern for racial and class issues [2].

Further, the revenue neutrality of I-732 was challenged, notably by the state's own Democratic party [45]. The party called attention to a financial impact assessment calculating the policy to be revenue negative, losing around $800 million for the state in the first six years. This point was challenged by I-732 organizers (who maintained it was revenue neutral) and an alternative assessment from the Sightline Institute—an organization for which Bauman formerly worked [47]—but the potential revenue loss was a key part of the opposition campaign.

In 2018, a number of different explanations emerged for I-1631's defeat. This time the liberal and environmental organizations supported the initiative for its revenue-positive plan. This eliminated the possibility of revenue loss but the initiative still failed. A common explanation was that, this time, fossil fuel-producing corporations were paying much more attention and devoted significantly more resources to opposing the initiative than in 2016. This is an indisputable fact: the "No on 1631" campaign raised $31.5 million compared to $16.4 million raised by "Yes on 1631". However, there is reason to question the impact of fundraising. While the opposition campaign roughly doubled the funding for "Yes on 1631", the opposite was true in 2016: "Yes on 732" raised $3.2 million compared to $1.4 million from "No on 732". In other words, the carbon tax *performed better* when out-funded by the opposition: votes in favor of carbon taxation were 40.75% in 2016 and 43.44% in 2018. One study even failed to find an effect from opposition television ads [11]. It may be true that I-1631 would have performed better had the opposition spent less, but available data make this a difficult claim to assess.

Another factor may have been the perception of unaccountability with respect to spending. Most of the ads from the opposition noted an undemocratically appointed committee would hold a "blank check" to spend however they see fit. Whether true or not, it certainly seems the

point was a salient argument among people who opposed I-1631. In general, I-1631 suffered from the perception the revenues were not clearly devoted to specific spending projects. Studies in sociology demonstrate that people generally support taxation under the condition that they can see clear, tangible benefits from generated revenues [8], but when benefits are ambiguous people are likely to vote in the material interests according to the information they have, thus opposing an increase in fuel and energy costs.

Other explanations apply equally to both initiatives. One is that Washington voters are opposed to tax increases in general. Two other races on the 2018 midterm ballot also resulted in anti-tax victories: Advisory Vote 19 to repeal an oil spill tax, and Initiative 1634 to ban additional grocery taxes [48]. Again, citizens support taxation when they see clear benefits from the resulting government spending, and when this is not the case they often perceive "other" communities benefiting from their contributions to the state. The regressive nature of both taxes was highlighted in opposition campaigns—despite claims from supporters for I-732, replacing a regressive tax (the sales tax) with another regressive tax (a carbon tax) does not make it progressive (although the expansion of the Working Families benefits helps). Raising taxes, and thus revenues, may be an uphill battle in Washington state.

There is one last explanation for why each ballot initiative was defeated in Washington: the ballot initiative is a mechanism that makes passing both a tax and environmental policy particularly difficult. Since 1912 Washington has allowed citizens to vote directly on issues on the November ballot. For the most part, scholars believe direct democracy leads to results that are supported by the majority of the citizenry and in policies in their best interest [49], although there are a number of notable exceptions [50,51].

Matsusaka identifies certain outcomes associated with states employing direct democracy: (a) lower state and local revenue, (b) shifting taxes from the state to the local, and (c) a shift from taxes to user fees and charges ". . .requiring those who use government services pay for them" [49]. Other scholarship suggests direct democracy, on average, results in more conservative policies (death penalty and abortion restrictions) [52].

Therefore, it seems carbon taxation may be disadvantaged in the context of direct democracy for reasons highlighted by each of these points, as it would increase revenues, and increase them at the state level, and add a "tax" when shifting to service-use charges is the trend. Further, a carbon tax is at odds with the tendency for direct democracy to favor conservative policies, as it is decidedly coded as a liberal project. These points are supported by research suggesting that, in direct democracy, voters generally act according to their material interests [48]. This helps explain the contradiction between strong liberal politics/support for carbon mitigation, and the defeat of two carbon tax initiatives seen in Washington. The institution of direct democracy may be ill equipped to pass such a policy.

Conclusion

This paper explores why Washington state has come the closest to passing a carbon tax with two ballot initiatives, discusses the role of indirect taxation in support for carbon taxation, and discusses various explanations for why they failed. Washington provides an ideal interest group and political context that make it a prime candidate to remain a leader in the race to be the first carbon-taxing state. It also has a tax structure that may shape the preferences of political actors and voters in favor of carbon taxation over other alternatives. Yet despite these conditions, each initiative failed. These failures will be studied in more detail as more information becomes available and hopefully this study provides an informed launching point for such work.

While it is certainly disappointing for climate activists that carbon taxation remains elusive in Washington and other U.S. states, there is still reason to be hopeful for its implementation in the future. I hope this paper can inform future efforts to tax carbon in the U.S. One lesson is that political mechanisms other than direct democracy should continue to be utilized. Of course, Washington has seen carbon taxes defeated in the legislature, but the persistence demonstrated yet again with another carbon tax introduced in the senate may signal efforts to tax carbon are here to stay. If these two elections can tell us anything, support for carbon taxation in Washington is on the rise.

Voters need to see clear benefits from carbon tax revenues. Tying a pricing policy to concrete spending plans that provide tangible benefits to voters is essential, especially if spending relates to additional mitigation. A number of conservative economists and political figures have supported a plan that would do this, one that would provide an equal dividend to all households [53,54]. While this plan would address the regressivity of any carbon tax, it would not provide funding for green projects and technology. A dividend nevertheless provides a clear benefit, and time is running out—conservative efforts to price carbon should be celebrated and liberals should join them. Whether benefits are in the form of jobs, dividends, or funding education as with Inslee's plan, these should be the central feature emphasized in all carbon pricing policies.

Supporting information

S1 Table. S1 Table includes summary statistics for the measures used in the multilevel regression model. The table displays the mean, standard deviation, minimum, percentiles (25th and 75th), median, and maximum values, as well as histograms to show the distribution. The variables "CC is happening" and "Regulate CO2" are measured in county-level percentages. The "'16 Democratic vote %" shows the county-level Democratic presidential vote share. The gas tax, sin tax, and average state and local sales tax indices are standardized additive measures created with state-level tax rates (each displayed in terms of standard deviations from the mean). The racial measures each show the percentage of people from each racial group as a share of the total population within a county. Median age is displayed in years. Median income is displayed in thousands of dollars of annual household income. Average driving time is calculated in minutes. Shares of employment in construction, transportation, agriculture, professional and management occupations, and trade are presented as a percentage employed in those areas at the county-level. The education measures show the percentage of the population with their highest degree corresponding to each category. Non-CO2 emitting electricity displays the state-level share of electricity generated from non-CO2 emitting sources (including nuclear).
(TIFF)

S2 Table. S2 Table displays the full model output from the multilevel regression model. All variables were standardized for the model fit and estimated coefficients can be interpreted as changes in the dependent variable that correspond to 1 standard deviation increases in each independent variable.
(TIFF)

S1 Text. S1 Text includes detailed descriptions of the 2016 I-732 and 2018 I-1631 ballot initiatives in Washington State.
(DOCX)

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Author Contributions

Conceptualization: Steven M. Karceski.

Data curation: Steven M. Karceski.

Investigation: Steven M. Karceski.

Visualization: Steven M. Karceski.

Writing – original draft: Steven M. Karceski.

Writing – review & editing: Steven M. Karceski.

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