



CLOSUP Student Working Paper Series  
Number 67

April 2021

# **The Carbon Tax and Low-Income Individuals: Differences in Concerns Among Rural and Non-Rural Residents**

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This paper is available online at <http://closup.umich.edu>

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April 27, 2021

## **The Carbon Tax and Low-Income Individuals: Differences in Concerns Among Rural and Non-Rural Residents**

### **Abstract**

Carbon taxes have been suggested by economists as the most cost-effective means to curb greenhouse gases emissions, but many people fear that such a tax would be inequitable. A content analysis of newspapers local to British Columbia and Alberta, two Canadian provinces with carbon taxes, was conducted to understand how rural and non-rural residents view this issue. Rural residents are more likely to be concerned that the carbon tax will impact low-income individuals because they will have no alternative energy sources. Rural and non-rural citizens alike fear that the revenue from the carbon tax will be used at the government's discretion. These findings suggest that policymakers should make clear where carbon tax revenues are being spent. In addition, they may choose to use carbon tax revenues to fund expansion of renewable energy in locations that lack alternative energy sources.

### **Introduction**

By 2021, there have been many calls to reduce our greenhouse gas emissions in order to diminish the impacts of global climate change. The annual average temperature has increased by 1.8 degrees Fahrenheit from 1901 to 2016, while the most recent decades have been the warmest in the past 1,500 years (Harrington, 2020). The effects of this warming climate include sea level rise, increased heat flow between the ocean and the atmosphere, changes in precipitation across

the world, and decreased spring snow cover, which negatively impacts soil health (Collins et al., 2008). All of these effects could have negative consequences for humanity's survival on earth, as they weaken our ability to produce food and inhabit certain environments.

In addition, climate change has implications for existing equity issues. Climate change has increased global inequalities; the difference in economic output between the highest and lowest producers is about 25% larger than if climate change did not exist (Garthwaite, 2019). On a more local level, these inequalities also affect individuals living within the same country.

Disadvantaged groups are more likely to be exposed and susceptible to the negative impacts of climate change (Islam & Winkel, 2017). Those who are experiencing chronic health issues, lack of access to adequate resources, and insufficient living conditions are among the groups of people who will be affected by this (Minna, 2017). These groups will likely also have the reduced ability to cope with the impacts of climate change, creating a cycle of inequality (Islam & Winkel, 2017).

Given that climate change has the potential to increase problems associated with equity, it is important that proposed solutions are as equitable as possible. One popular solution to reduce carbon emissions is a carbon tax. The purpose of a carbon tax is to effectively capture the real cost of emitting greenhouse gases, while decreasing the demand for fossil fuels (Amadeo, 2020). Many individuals support the carbon tax because it has been shown to effectively reduce greenhouse gas emissions, while still allowing for economic growth (Amadeo, 2020). Carbon is currently taxed in a limited number of nations around the world. Closest to the United States, carbon is taxed in British Columbia and Alberta, two of the first provinces in Canada to do so.

Although they seem economically and environmentally friendly, carbon taxes must be high in order to be effective. The UN recommends a that a carbon tax be between US\$135 and

US\$5,500 per ton, but the average price of carbon taxes around the world was only US\$35 per ton in 2018 (Amadeo, 2020). Combined with this, carbon taxes are usually regressive (Boyce, 2018). A regressive tax refers to a tax where individuals from lower income groups pay a larger proportion of their income than those from higher income groups. In general, households with the largest carbon footprints have higher incomes. Therefore, they pay the highest carbon taxes. However, the carbon tax is regressive because lower- and middle-income households pay higher amounts relative to their income (Boyce, 2018). Many consumers think this is unfair and view a carbon tax negatively. This could be detrimental to the carbon tax's political viability. This paper will explore existing newspaper articles about the carbon tax in British Columbia and Alberta to understand how communities in rural and urban areas perceive the impacts of a carbon tax on low-income residents.

## **Literature Review**

To understand the economic impacts of and attitudes towards carbon taxes, this paper first reviews previous empirical studies completed on these topics. Hasmi and Alam (2019) conducted a study that explored whether carbon pricing effectively reduces carbon emissions. They ran statistical regressions using carbon emissions as the dependent variable, while using the following as independent variables: regulations on CO<sub>2</sub> emissions, total populations, GDP per capita, number of environmental patent applications filed, number of patent applications filed in all technologies, except environmental patents, and environmental tax revenue per capita were the independent variables. Findings indicated that a 1% increase in environmental tax revenue per capita reduces carbon emissions by 0.03% in OECD countries. Carbon pricing was also found to have reduced carbon emissions at statistically significant levels. These findings indicate that policy makers in OECD countries should invest in green innovation and push for

implementation in green technology. This can be done in addition to using regulatory tools such as carbon taxes and carbon pricing.

Although carbon taxes can effectively reduce greenhouse gas emissions, the question remains: How do such environmental policies impact the economy? To answer this question, Si et al. (2021) collected data on China's GDP and firm's profits per sector. They collected information on environmental policies from online databases and broke the policies into three groups: command and control policies, financial incentives, and awards for accomplishing something. They created dummy variables for each type of policy and then used an econometric regression to understand the relationships between them. Policies that use financial incentives had a positive correlation to output and profits in energy-related industries. However, these policies have a negative impact on GDP overall and in sectors such as agriculture, forestry, animal husbandry, and fisheries. Command and control policies and nonmonetary rewards decrease GDP and profits overall. This suggests that policymakers should focus on policies that offer financial incentives over those that do not. Also, policymakers should consider subsidizing or investing in industries that are negatively impacted by these policies. This work provides important information about general economic impacts of environmental policy, but how do environmental regulations impact income inequality?

The question posed above is answered by Zhou & Li (2020), who explored the interplay between environmental regulations, environmental quality, and income inequality in China. To investigate this, Zhou and Li ran statistical regressions. Results showed that income inequality and environmental regulation were associated with improved environmental quality. At the same time, higher income inequality was associated with lower environmental quality. This suggests that higher income inequality negatively impacts environmental quality, while regulations

improve environmental quality. The policy implications are as follows. Policymakers should use green economic development models to ensure sustainable growth. The government should impose regulations to reduce pollution and encourage green production. Lastly, policymakers should incentivize the use of green energy.

As opposed to studying a whole country's economy, Oladosu & Rose (2007) explore how the carbon tax affects people from different income brackets and whether or not such a tax would contribute to income inequality. The authors used data from the Susquehanna River Basin in order to model their economy and determine how different carbon taxes would impact inequality. They found that the aggregate impacts were negative but small: "approximately a one-third of 1% reduction in GRP in the short run for all scenarios" (Oladosu & Rose, 2007). The carbon tax was found to be mildly progressive, when measured in terms of many metrics, such as income bracket changes, per capita equivalent variation, and Gini coefficient changes. There was also a decrease in business profits as a result of the tax, which is reasonable because a carbon tax is more strongly felt by people with higher incomes. The implications of this study are that a carbon tax in the Susquehanna River Basin would be a viable way to reduce emissions without negatively impacting income inequality.

Even though a carbon tax may not negatively affect inequality in the Susquehanna River Basin, it is still important to understand what the interplay between carbon pricing and inequalities in other economies. Farrell (2017) explores the factors that drive inequalities in carbon tax incidence and how these inequalities can be offset. The author conducted a case study in Ireland. He surveyed many households and collected data on their income and expenditure on motor fuel, electricity, and other fuel. He compared the cost of their emissions to their disposable household income. Then, he calculated how carbon taxes are distributed among the income

distribution. Farrell calculated how progressive the carbon tax is. The results showed that taxes on 'other' fuels are regressively distributed, while motor taxes are the most progressively distributed tax. The variables that are of most importance for determining a household's tax rate for electricity are: appliance ownership, income, dwelling characteristics, household composition, location, and space heating technology are of greatest importance. For motor fuels, the number of motor vehicles, income, occupation and location are important factors. This implies that policies that propose revenue recycling should evaluate tax rates and the redistribution of funds based on this data.

Although the prior studies explore actual economic impacts of carbon taxes, they do not discuss people's perceptions of such a policy. Lange et al. (2007) investigated how people prioritized equity and how they defined it in terms of carbon pricing. The authors conducted a worldwide survey that asked people about their personal views of environmental equity, which equity rules came the nearest to their personal definitions of equity, and their background. Then, they ran an econometric analysis using the data collected. They found that the polluter pays and poor losers rules are most widely accepted as equitable. People from G77 countries or countries with less current per capita GDP and future per capita CO<sub>2</sub> emissions viewed equity as more important. This group also favored the poor losers rule more strongly. People from richer countries were less likely to favor the polluter pays rule and ability-to-pay rules in the future. In the long-run, people from richer countries favor the egalitarian principles. Therefore, it is possible that views on equity issues in climate policy are not solely based on self-interest, and there are some philanthropic considerations at play. This means that future policies could be based on a combination of the polluter pays rule, the egalitarian rule, and exemptions for poor losers.

There is a lot of research about a carbon tax and its effects on the economy. However, there is limited research about people's attitudes towards such a policy. Specifically, there is minimal research that explores a single location that already has a carbon tax. Such research would be important to understanding how citizens view a carbon tax and if it is a politically viable solution in many places. This paper aims to answer the following question: How do perceptions of the impacts of a carbon tax on lower income populations differ among urban and rural regions within British Columbia and Alberta, Canada?

## **Methods**

To understand how citizens view carbon taxes, this study conducted a content analysis of newspapers local to British Columbia and Alberta. The aim of this paper is to understand the positions of the people affected by the carbon tax. Opinion-based newspaper articles are more likely to reflect this information than politically based sources, as newspapers provide an opportunity for the average citizen to learn about an issue and form an opinion on it.

Through Newsbank's *Access World News Database*, a dataset of 198 articles that contain the keywords "carbon tax" and "letters to the editor" was created. All of the articles are local to British Columbia or Alberta. The keyword "carbon tax" was chosen because it is the name most commonly used to refer to the type of policy this paper aims to explore. "Letters to the editor" was chosen because it consists of a letter that an individual sent to a publication. Collectively, these pieces reflect the opinions of a diverse group of citizens, rather than that of professional writers. This reflects a more holistic understanding of citizens' views than newspaper articles that simply report facts. All included articles were published between the years 2008-2015. The carbon tax was introduced in British Columbia in 2008, and in Alberta in 2015. This time frame



captures the views of citizens of each location when the carbon tax was novel, and more people would have felt compelled to share their opinions.

To determine whether or not a newspaper originates from a rural source, this paper uses the definition provided by Statistics Canada, which is Canada’s national statistics office. According to Statistics Canada, a town is rural if the population is fewer than 1,000 people. It is also considered rural if there are more than 1,000 people, but the population density is 400 inhabitants per square kilometer or less (2015). Of the articles included, 30 were from rural origins, while 168 were urban or suburban.

This content analysis used a coding scheme to evaluate people’s concerns about the carbon tax. Table 1 shows all possible codes. Codes 100-104 reflect the anti-carbon tax concerns. Codes 200-202 describe reasons why citizens think the carbon tax will be beneficial. A code of 300 reflects the opinion that concerns about the carbon tax may be overblown, while a code of 0 reflects that no economic concerns about the carbon tax were identified.

*Table 1: Coding Scheme*

<b>Code ID</b>	<b>Theme</b>
100	Anti- Carbon Tax
101	Unnecessary Burden on Low Income Individuals
102	Job Loss
103	Distrust of Government’s Use of Revenue
104	Climate Change Skepticism
200	Pro-Carbon Tax
201	Encourages Reduced Pollutant Consumption
202	Generates Necessary Revenue
203	Needs to be Increased
300	Concerns are overblown
0	Absence of concerns

This coding scheme was developed by sampling the articles from the dataset. 19 of the articles were randomly chosen and evaluated. Codes were selected by determining concerns that were raised in each article. Then, the codes were reviewed, and any obvious themes missing from the sample were added to the coding scheme. Next, codes to all 198 articles were assigned based on the presence of words related to each theme, as well as the overall tone of the article when discussing a carbon tax. Conclusions were made by determining the most prevalent codes from each type of location – rural or non-rural.

## Results

Of the 198 articles coded, 30 (15%) of them were from rural sources, while 168 (85%) were from non-rural sources. Table 2 shows the prevalence of each thematic code among rural and non-rural sources.

*Table 2: Prevalence of Codes Among Urban and Rural Sources*

<b>Code ID</b>	<b>Theme</b>	<b>% Rural Sources Including Theme</b>	<b>% Non-rural Sources Including Theme</b>
100	Anti- Carbon Tax	60	66
101	Unnecessary Burden on Low Income Individuals	33	12
102	Job Loss	3	9
103	Distrust of Government's Use of Revenue	13	8
104	Climate Change Skepticism	17	10
200	Pro-Carbon Tax	20	14
201	Encourages Reduced Pollutant Consumption	13	8
202	Generates Necessary Revenue	10	1
203	Needs to be Increased	7	1
300	Concerns are overblown	0	0
0	Absence of concerns	20	19

### *Rural Results*

Of the Rural articles, 18 (60%) were opposed to the carbon tax. The most common concern was that a carbon tax would unnecessarily burden low-income individuals, which appeared in 10 (33%) of the articles. Climate change skepticism was the next most common concern, which appeared in 5 (17%) of the articles. Concerns how the government would spend revenue appeared in 4 (13%) of the articles. The least common concern was about the potential for job loss, which appeared 1 (3%) time.

Pro-carbon tax ideas were present in 6 (20%) of rural articles. Of these, 4 (13%) of letters showed the belief that a carbon tax would encourage individuals to pollute less and partake in more responsible consumption. The idea that the tax would generate necessary government revenue was present in 3 (10%) of the letters. The conviction that the carbon tax should be raised to be effective was found 2 (7%) times.

The belief that concerns about the tax are overblown was not present, while there were 6 (20%) letters that mentioned the carbon tax, but did not express any concern.

### *Non-Rural Results*

Of non-rural articles, 111 (66%) were opposed to the carbon tax. The most common theme was that the tax would unnecessarily burden low-income individuals, which appeared in 20 (12%) of articles. The next most common theme was climate change skepticism, which appeared 16 (10%) times. Concerns about job loss appeared 15 (9%) times. Skepticism about how the government would spend carbon tax revenue appeared 14 (8%) times, which was the least common complaint.

There were 24 (14%) individuals who viewed the carbon tax favorably. The most common belief was that the carbon tax will incentivize lower levels of pollution. This appeared 13 (8%)

times. The idea that a carbon tax raises necessary revenue appeared 2 (1%) times. The least common pro-carbon tax belief was that it should be raised. This appeared 1 (0.5%) time.

There were 32 (19%) articles with no concerns about the carbon tax. None of the articles mentioned that concerns were overblown.

## **Analysis**

Among rural and non-rural groups, anti-carbon tax sentiments are common. Both groups are most concerned about the burden that the tax will place on low-income groups. However, individuals from rural places are more likely to express pro-carbon tax concerns. This paper will examine individual codes and how their incidences differ among rural and non-rural sources to further understand these findings.

### *Burden on Low Income Individuals*

The most common theme is that the carbon tax will increase costs, which will make it harder for low-income individuals to make ends meet while not changing anything for those who are wealthy. This concern is consistent with Farrell's (2017) findings that carbon taxes on certain types of fuel are usually regressive. Although this theme was common among both groups, the specific reasons behind the concerns differed between groups.

Rural residents indicated that they do not have any alternative energy sources, so the carbon tax would raise prices without providing greener energy options. One Houston resident described environmental policies as a "penalty for Heartland residents" who reside outside of town lines, and therefore must use "electrical hotwater [sic] tanks, clothes dryers and stoves" (Houston Today, 2009). A South Hazelton resident called the carbon tax "a blow to the north, compared to the pampered and transit riddled south" (The Interior News, 2008). Rural residents are concerned because the carbon tax will raise energy prices, but they will not be able to consume renewable

energy that would not be taxed. At the same time, they are aware that residents living closer to cities have more options and use more energy than they do themselves. Non-rural individuals usually referred to low-income concerns more generally. Many would express concerns that higher prices will hurt everyone in Canada, but that “especially the poor” will bear the burdens (The Edmonton Sun, 2015).

### *Climate Change Skepticism*

The next most common theme was climate change skepticism. This was the second most common anti-carbon tax theme among both groups. Rural sources had a slightly higher prevalence of this theme, as it appeared in 17% of rural articles compared to 10% of non-rural articles. Included in this theme are disbelief that global climate change is real, doubt that greenhouse gases significantly contribute to global climate change, or the belief that Canada does not contribute significant enough greenhouse gas emissions to impact global climate change. Some of these articles referred to climate change as a myth used by the government to extract more revenue from its citizens. One Highlands resident states that “the carbon tax is just another tax grab under the guise of being green,” claiming that it “targets the people who can least afford it,” especially “working class people, single parents, seniors and people in rural areas” (Goldstream News Gazette, 2009). There is significant mistrust among all populations that climate change is an issue that needs to be addressed, especially at the expense of Canada’s citizens.

### *Government Spending of Tax Revenue*

Another common theme was dissatisfaction with the government’s use of carbon tax revenue. This code appeared in 13% of rural results and 8% of non-rural results. In Alberta, revenue from the carbon tax is used as general revenue to be spent at the government’s

discretion. The top three places Alberta spent its carbon tax revenue from 2016 to 2018 are consumer rebates, green transit incentive programs, and small business tax reductions (Maclean, 2019). Many Albertans were displeased that their government was taxing them with little transparency about where the money would be spent.

British Columbia's carbon tax is designed to be revenue neutral. Much of the revenue goes towards reduction of income taxes, a low-income tax credit, and corporate income tax reductions (UNFCCC, n.d.). Many British Columbia residents are skeptical that the carbon tax will truly be revenue neutral, and that the government will not be able to fund all of its promises. A Prince George resident is upset that the revenue is not being more directly reinvested into renewable energy: "Instead of just handing out \$100 cheques and tax cuts, the funds generated should be used to help individuals and businesses increase their energy efficiency." (The Calgary Sun, 2008).

Given the reality that each province has a different carbon tax, concerns about government spending were differentiated based on province more so than among rural and urban lines. These concerns are consistent with the prior finding that citizens of rich countries are less likely to support a polluter-pays policy (Lange et al., 2017). Canadians that are affected by this carbon tax, already inclined to view a polluter-pays policy negatively, are unhappy that the revenue is not being spent in ways that they feel will benefit them.

### *Job Loss*

The least common anti-carbon tax concern was that a carbon tax would cause unnecessary job loss. This was more common among non-rural citizens, making up 9% of non-rural letters, compared to 3% of rural letters. The most common sector that people were concerned would decrease employment was the oil and gas sector. Employment in this sector has been steadily

declining, with most displaced workers getting new jobs in construction, highly skilled services, and manufacturing (Statistics Canada, 2020). Reinvestment of carbon tax revenue in renewable energy jobs could quell this fear of job loss, while improving the environment.

### *Pro-Carbon Tax Views*

Pro-carbon tax views were more common among rural residents than non-rural residents. They appeared in 20% of rural articles, as opposed to 14% of non-rural articles. Rural residents were also more likely to state that they believed a carbon tax would reduce pollution, generate necessary revenue, and that it should be increased. Non-rural pro-carbon tax views were more likely to focus on the general state of the environment and concerns that pollution needs to be abated. On Calgary resident describes a carbon tax as “the gentlest and most effective tool we have to correct our skewed economic assumptions which have long supposed that fossil fuels are benign” (The Calgary Sun, 2008). Rural pro-carbon tax views were more likely to lament the specific natural surrounding that could be destroyed by global climate change. A Prince George resident describes what northern British Columbia stands to lose from global warming: “we've already lost most of our pine forest and now we're losing the Stuart sockeye salmon” (Prince George Free Press, 2008). For non-rural residents, global climate change may still feel like a hypothetical that does not immediately impact their way of life. Rural residents are more likely to see these impacts first hand, and that may explain why they are more likely to show pro-carbon tax views.

### **Conclusion**

The data shows that regardless of level of rurality, citizens of Alberta and British Columbia view carbon taxes very negatively. This reveals a major limitation to this paper, as a public policy with such low approval would not likely be passed into law. It is likely that people who

hold a negative view of a policy are more likely to feel compelled to write a letter to the editor than people who believe that government is doing the right thing, or those who are indifferent. Future research could involve conducting a survey about people's views of the carbon tax in order to obtain a more holistic view of a diversity of opinions. Given that some of the most common concerns were low-income concerns and government spending, future research may include surveying opinions on where carbon tax revenue should be spent and how the government can best use the revenue to support low-income residents.

This research suggests that policy makers in all locations should focus on clarifying how revenue from carbon taxes will be spent. Policies that explicitly remove financial burdens from low-income people will likely have more support. In addition, reinvesting revenue in renewable energy would be particularly effective in rural locations. Many rural residents were concerned that they would have no alternative energy sources, so a government sponsored program to increase renewable energy in these areas could placate that fear. Lastly, support for a carbon tax may increase when citizens are directly confronted by the effects of climate change. Carbon tax revenue could also be used to educate people about how the changes in their environment that they can see are due to climate change.



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