Citizens' Climate Lobby

FAQ for Impact of CCL's proposed carbon fee and dividend policy: A high-resolution analysis of the financial effect on U.S. households

Study by Kevin Ummel

FAQ by Danny Richter

List of questions:

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Answers:

1. This is a working paper; what does that mean?
It is common practice in Economics to submit working papers. Often, authors will release working papers to share ideas about a topic or to elicit feedback before submitting to a peer reviewed conference or academic journal. Working papers are often the basis for related works, and may in themselves be cited by peer-review papers. They may be considered as grey literature. As such, the current publication may change over time. The most recent version reflects the best available data and understanding at the time of publication. CCL will ensure that the most current version of the working paper is the version available on our website.

2. Will the author try to get this published in a peer-reviewed journal?
Yes, it is the intention of the author to have this published in a peer-reviewed journal, and he is currently seeking comment on it from other economists. In the field of economics, it can frequently take years between when a paper is first submitted, and when it is finally published.

3. Does this study look at GHGs other than CO_2, as the CCL proposal does?
No, this study only considers a fee on fossil fuels for their CO_2 emissions. Considering only CO_2 is common practice in economic literature investigating carbon taxes. It helps make studies more comparable to each other, and prevents considerable uncertainty related to exactly how to count various other GHGs.

4. Are climate benefits included in this study?
No. No households accrue any benefit because of avoided climate impacts or local air pollution in this study. This is an important assumption to make when conducting such a study.

5. What are the main differences between the policy modeled and CCL's proposal?
There are 4 main differences between this study and CCL's proposal:
1. This study considers CO_2 only, whereas CCL's proposal would seek to place a fee on other GHG's associated with fossil fuel burning or man-made GHGs: methane, nitrous oxide, sulfur hexafluoride, hydrofluorocarbons (HFCs), perfluorocarbons, and nitrogen trifluoride.
2. For simplicity, this study refunds the fee placed on fossil fuels produced within the US when they are exported. CCL would keep the fees on such exported fossil fuels (see footnote 34).
3. This proposal envisions one pot into which revenues from the fee and the border adjustment are placed, whereas the CCL proposal has 2 separate funds for revenues collected from the fee, and revenues collected from the border adjustment on carbon-intensive goods.
4. Of course, this study only considers the impacts of a single carbon price, $15 per ton of CO_2, whereas the CCL proposal increases over time. However, this is perhaps better described as a limitation of the model than a difference, since it is designed to assess only the short-term effect of the policy.

6. Is this based on the REMI study?

No, this is a completely different study. While both studies attempt to model the same policy, they do so in completely different ways, and try to get at completely different information.

7. How is this different from the REMI study?
The biggest difference is that REMI tries to get at macro effects, while this study looks at micro (household) effects. Thus, this analysis is "static" and does not consider "dynamic" effects that a carbon tax would have on economic growth, employment, wages, trade, or consumption patterns over time. Instead, the Household Impacts study calculates the short-run financial effect on families, assuming that the policy is implemented "overnight" with 100% pass-through of the tax into consumer prices, no change in household behavior, and no change in production processes, technologies, or emissions. The fee is taxable in this study, whereas it is not in the REMI study (though this would not have substantially have changed REMI's results), and the two studies treat the border differently.

8. Why does the report refer to the fee as a tax?
A tax has the primary purpose of raising revenue. By contrast, a fee recovers the cost of providing a service from a beneficiary. So, the proposal modeled and CCL's policy are both most accurately called fees. However, in the academic literature, "carbon tax" is the general term for various policies that increase the price of burning fossil fuels by a fixed amount based on the carbon content of the fuel burned. Fee is more specific. The distinction is analogous to describing your pet Fluffy as a "dog" or as a "cocker spaniel". Cocker Spaniel provides more information, but dog is also accurate.

9. What is the difference between direct and indirect emissions?
Direct emissions include emissions associated with direct consumption of energy (e.g. electricity, natural gas, gasoline, etc.). Indirect CO_2 emissions are emitted during the production of other goods and services (e.g. food, electronics, a visit to the doctor, etc.; see p. 2 of the full report).

10. Is the dividend taxable in this study?
Yes. Output from the Urban-Brookings Tax Policy Center Microsimulation Model was used to estimate the income tax burden on different households. See Figure 7. The dividend in the study is assumed to be taxable income at federal level but not at the state level.

11. Does it include a border adjustment?
Yes, but there are some differences between the border adjustment modeled and the border adjustment envisioned in CCL's policy (see FAQ #5).

12. What kind of a model is this?
This study consists of a simulation of household-level effects using two nation-wide surveys (American Community Survey and Consumer Expenditure Survey) and industry-specific "input-output" data from the Bureau of Economic Analysis as primary inputs.

13. Why do only 53% of households do better in this study instead of 2/3?
First, please note that the 53% of households that do better includes 58% of individuals. Overall, 72% of households experience either a net financial benefit or a minor loss of no more than 0.2% of income. This study employed new techniques to arrive at a different picture of how American households use fossil fuels, and attempts to include the effects of a border adjustment. This results in a different estimate than that provided by the "rough and ready" estimate of the Carbon Tax Center, which found 65% of households benefit, and Resources For the Future, which found the mean of the 3 lowest-income quintile households benefit. Such variation between such different approaches is to be expected.

14. Why are the number of households and individuals that do well different?

Children explain the difference. The child dividends and the high carbon efficiencies realized in households with multiple people living in the same home mean that households with children are disproportionately likely to end up ahead. So, you can have a lower percentage of households but a higher percentage of the population living in such households.

15. How would the results change if the fee were higher?

First, it is important to remember that this kind of modeling assumes instantaneous implementation, and so cannot envision more than one carbon price. If the initial price modeled were, say, $30 instead of $15, the *proportions* of households ending up ahead or behind would be roughly consistent, but the *absolute numbers* for the net benefit or loss would change a bit.

16. Does this study account for changes in behavior?

No. Importantly, this analysis is "static" and does not consider "dynamic" effects that a carbon tax would have on economic growth, employment, wages, trade, or consumption patterns over time. Nor does it consider local or global environmental benefits. Instead, the study calculates the short-term financial effect on families, assuming that the policy is implemented "overnight" with 100% pass-through of the tax into consumer prices, no change in household behavior, and no change in production processes, technologies, or emissions.

17. *What sources of information were used to do this work?*

Several databases were used to compute the results in this study. A basic description of what they are and how they were used follows:

- Household-level expenditure by category is available from the Bureau of Labor Statistic (BLS) **Consumer Expenditure Survey (CEX)**. It uses consumer-reported data.
- "**Input-output" tables and "national accounts" data from the Bureau of Economic Analysis (BEA)** are used which detail monetary flows of commodities to and from industries. These tables are used to estimate carbon intensity of expenditure (CIE) for individual commodities.
- The **American Community Survey (ACS)** is much larger than the CEX, but both have large overlap in household and geographic variables.   This study takes the fused CEX-ACS dataset as its starting point. It contains inflation-adjusted expenditures (2012 dollars) for nearly 6 million households across 52 different expenditure categories over the period 2008-2012, along with the complete set of household-level   variables inherent to the ACS.
- Integrated **Energy Information Administration (EIA) data** into I-O tables on the amount of CO_2 emitted, by fuel, in the "Electricity" and "Other" sectors are used.
- In the case of fuel imports and exports, the associated carbon is   calculated separately by integrating additional EIA data on physical quantities of fossil fuel produced, imported, and exported in conjunction with CO_2 **emission factors from the EPA**.
- A proprietary dataset of consumer prices provided by the **Council for Community and Economic Research (C2ER)** provides reported   consumer prices for 53 individual goods and services (referred to here as "items") over 2008-2012 and for nearly 400 urban areas. These data indicate, for example, the retail price of a gallon of regular gasoline or a 2-liter bottle of Coca Cola, etc.
- The **National Health and Nutrition Examination Survey (NHANES)** contains a dietary interview in which participants recall physical quantities of food eaten over a two-day period. It is used to estimate the Gucci effect.

- EIA's **Residential Energy Consumption Survey (RECS)** was used to analyze how the effective price-per-kWh varies with the level of electricity expenditure in different parts of the country.
- Results for community types (rural, suburb/town, or urban) are derived by estimating the dominant type for each of the 30,000+ zip codes using the "locale codes" spatial dataset developed by the **National Center for Education Statistics (NCES)**.

18. How are imports treated at the border?

This study assumes that the carbon intensity of goods imported at the border is identical to the carbon intensity of like goods produced in the US. This is a politically and economically conservative assumption. Politically because such treatment is least likely to fall afoul of WTO considerations regarding National Treatment, and economically because the US power sector is relatively clean and carbon-efficient compared to that of other countries.

19. What is the difference between "poverty" and "low-income"?

For the categories in this study, "poverty" includes households earning less than 100% of the federal poverty level (FPL), while "low-income" includes households earning less than 200% of the FPL. 88% of households living below the FPL experience a positive net benefit, and 82% of low-income households benefit (see Figure 14).

20. Why do Latino households do so well?

On average, Latino households are not only poorer than White households (generally associated with a lower footprint) but also significantly larger in size. Since the dividend formula benefits larger households (and especially households with multiple adults), this leads to both higher pre-tax dividend and net financial benefit (see Figure 15).

21. Why do rich households do better relative to findings from previous studies?

In this study 15% of the wealthiest quintile end up ahead (Figure 8). For the 85% who end up behind, the median loss is a tiny -0.20% of income. In fact, 42% of this quintile experiences a minor loss of .2% of annual income, or less.

22. What is the Manhattan Effect?

The Manhattan Effect describes variation in the price of *identical products*. For example a household in Manhattan (New York City) spends $2.00 for a 2-liter bottle of Coca Cola, whereas a household in Tulsa, Oklahoma spends only $1.33 for the same product. It is reasonable to assume that the real-world carbon footprints of each purchase are not significantly different despite fact that one costs 50% more than the other.

23. What is the Gucci Effect?

The Gucci Effect describes differences in price paid across households within a given *expenditure category*. For example, a pair of shoes purchased at Walmart might cost $30, while a pair of Gucci luxury brand shoes might cost $600. Both transactions are categorized as "Shoes and other footwear" in the datasets used in this study. The Gucci shoes may, in fact, have a higher carbon footprint than those from Walmart – but probably not 20 times higher as suggested by their prices alone.

24. Does this study account for state and local taxes?

Yes, the study does account for differences in state and local excise and sales tax, but not state income or property taxes, when calculating price differences across space. First, the study subtracted various state and federal excise taxes from prices (see p. 9 for details). Following spatial interpolation of tax-free prices,

applicable sales and excise tax for each item were added back to arrive at the tax-inclusive retail price in each zip code.

25. The Congressional Budget Office assumes that if a dividend is taxable, the policy is revenue-neutral. Why does this study find this policy leaves the government in deficit?
The 25% "haircut" rule-of-thumb used by the Congressional Budget Office (CBO) is just that - a rule of thumb. In reality, depending on both the policy design and the details of implementation, a proposal like CCL's could in fact be revenue-negative, revenue-neutral, or revenue-positive for the federal government. Different models will come to different answers for the same policy, but what matters from an advocacy standpoint is the model and the assumptions that the CBO uses.

This study found that the government experienced a net deficit of -$1.1 billion as a result of the modeled policy. Please note, "government" in the paper refers to all levels of government when it comes to the costs imposed by carbon pricing, not just the federal government. Note as well that the study did not account for state income taxes (see FAQ#24). The CBO is concerned only with the Federal Government.

26. What explains the spatial variation in different parts of the country?
The study does not provide a formal analysis of the drivers of spatial patterns. However, it is possible to surmise three factors that explain at least some of the variation. First, areas with comparatively low-carbon electricity tend to fare better (compare national map with Figure 5 in Section 5.5). Second, households in suburban areas tend to fare worse, reflecting higher incomes/ consumption and carbon footprints (red "hotspots" around urban cores). Third, areas with comparatively mild climates tend to do better.

27. What explains the age distribution?
The pattern of benefits across groups makes sense given the impact of age on both carbon footprints and dividend received. Older households tend to have smaller footprints, reflecting reduced mobility and less consumption as a result of low fixed incomes. Younger households tend to be larger – and therefore benefited by the dividend formula – in addition to less income/consumption in early career.

28. Is income the only factor determining who benefits?
Household income is not the sole factor driving results. This is evidenced by comparing results for the "Minority" and "Elderly" groups (Figure 14). Household income as a percentage of the federal poverty line (FPL) is similar for the two groups, but minority households see significantly larger positive effects: mean net financial benefit (NFB) of $148 versus just $2 for elderly households. This is likely due to differences in household composition (i.e. children) and the resulting dividend allotment.

29. Does "household" in this study consistent with a tax-filing unit, or the number of people living under one roof?
In this study, "household" refers to the number of people living under one roof.

30. How do you define "minor loss?"
An additional 19% of households nationwide incur a "minor loss", defined as a net financial loss that does not exceed 0.2% of pre-tax household income. Since the median income in the US is close to $50,000, then 0.2% of that income is $100.

31. How are Rural, Suburban or Town, and Urban households defined?

Rural, suburban or town, and urban status are determined at the zip-code level, by determining how the majority of the zip-code is categorized according to the "locale codes" spatial dataset created by the National Center for Education Statistics.

32. What is in each of the different expenditure categories of Figure 16?
These data are reported in Table 2 on pages 39-40 of the full report. Private fixed investment (PFI) measures spending by private businesses, nonprofit institutions, and households on fixed assets in the U.S. economy. Fixed assets consist of structures, equipment, and software that are used in the production of goods and services. PFI encompasses the creation of new productive assets, the improvement of existing assets, and the replacement of worn out or obsolete assets

33. How many expenditure categories are there?
There are 48 expenditure categories.

34. Does Figure 16 indicate households in the bottom income quintile use significantly less health care than the other quintiles?
Because most elderly and low-income households in the model are assumed to be covered by public healthcare (Medicare and Medicaid, respectively) their health care expenditures are not included in the costs tallied in this graph. Instead, this graph displays only private health care expenditures, which is why there is a large contrast between the 1st income quintile and the other quintiles.

35. That 53% of the households benefit seems too good to be true; why should we believe it?
There are many reasons why this study is conservative. The most obvious reason is that it assumes full pass-through of costs to consumers. Other research indicates that somewhere between 10 and 20 percent of the cost of the tax would be paid by producers and not passed onto consumers. This would mean that consumers would face smaller price increases than currently projected in the study, though there would be other effects on employment, salaries, and investment returns. This would in turn result in a larger NFB for some households and lower for others.

36. Which members of the bottom 20% do not experience a positive net financial benefit?
This is an important question to CCL, though it is ultimately beyond the scope of this study. Some in this category may be individuals whom we might not worry about too much. For example, a college student supported by his/her parents yet whose own income through a part-time job lands him/her in the bottom quintile. However, it is doubtful such instances comprise the entirety or even the majority of the 11% of households in the bottom quintile who experience neither a positive net financial benefit nor a minor loss. CCL is interested in characterizing such households in future investigations, but at the moment, we are happy the current study highlights the fact that no everyone in the bottom quintile benefits; a fact which previous research has not cast in such high relief. It is better to be aware that a problem exists than to continue in ignorance.

37. Who is the author, and why should we believe him?
Kevin Ummel is currently a Research Scholar in the energy program at the International Institute for Applied Systems Analysis (IIASA). He has a master's degree in Environmental Sciences, Policy, and Management from the University of Manchester and a bachelor's degree in public policy from Stanford University.

In 2014, Mr. Ummel published a working paper entitled "Who Pollutes? A Household-Level Database of America's Greenhouse Gas Footprint," while working as a Visiting Senior Associate at the Center for Global Development (CGD). This paper was the first to create a new database which matched the American

Community Survey (ACS), a large-scale, nationally representative survey of households, with highly-detailed carbon footprint information.

This database is ideally constructed to examine the impact of a carbon tax, because of the large sample size in the database, relative to data sources that have been used in the past (such as the Consumer Expenditure Survey). The analysis conducted for the CCL report improves this database by using additional data to create more accurate simulations of household expenditures and carbon footprints.

For links to Mr. Ummel's biographies at the CGD and IIASA, including working papers and citations, see below:

CGD: http://www.cgdev.org/expert/kevin-ummel

IIASA: http://www.iiasa.ac.at/staff/staff.php?type=auto&visibility=visible&search=true&login=ummel

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