Potential Linkages between a U.S. Carbon Tax and the Earned Income Tax Credit

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Economists have long argued that a price on carbon, such as through a carbon tax, is an indispensable component of efforts to stabilize greenhouse gases (GHGs) in the atmosphere. One concern about the policy, however, is its negative effect on low-income households, both in absolute terms and relative to higher income households. Stone (2015) and others call for designing a U.S. carbon tax in a way that channels at least some of the revenues to low-income households through a portfolio of existing social safety net programs, such as the Earned Income Tax Credit (EITC). The EITC is a tax credit for low- and moderate-income working people proportional to their earned income. It is fully refundable, meaning eligible participants can benefit whether or not they owe income taxes. The EITC is one of the largest anti-poverty programs in the United States, and it is widely viewed as effective in encouraging work and alleviating poverty. Estimates suggest that expanding the EITC, along with supplements to social security payments and state-run food stamp benefits, could ensure that about 95 percent of households with incomes below 150 percent of poverty levels would be no worse off under a carbon tax than they would be without it.[1]

This policy brief summarizes Mathur and Morris (2017), which examines potential intersections between an excise tax on carbon and an expansion of EITC benefits to childless workers. The analysis comes in two parts. First, we model the potential impacts a carbon tax on EITC benefits under different assumptions about how the burden falls on consumers and workers. Second, we analyze the distributional outcomes of combining an EITC expansion and a carbon tax. This study analyzes a carbon tax of $32 per metric ton of CO_2 emitted from fossil fuel combustion. According to emissions data from 2013, the tax would have generated about $167 billion in gross revenue in that year, ignoring dynamic outcomes such as emissions reductions and any changes in other tax revenues.[2] We attribute the revenue from oil, natural gas, and coal combusted in the United States in proportion to each fuel's emissions in the U.S. inventory of CO_2 emissions from those fuels in 2013.[3] Using data from the U.S. Bureau of Economic Analysis (BEA) that show how much each industry makes and uses each commodity, we follow carbon through the supply chain to final price increases in consumer goods. Then, we use household level expenditure data from the U.S. Bureau of Labor Statistics' Consumer Expenditure Survey (CEX) for 2014 to estimate the carbon taxes paid (via those higher prices) by each household.

We sort households by annual income (before the carbon tax) into ten groups, or deciles, from the ten percent of households with the lowest income to the ten percent with the highest income, and then calculate the *gross* burdens each group bears before any rebates, tax cuts, or other disposition of

[1] Stone(2015)

[2] EIA (2015) and EPA (2016) estimate 2013 emissions from U.S. fossil fuel combustion were 5,355 and 5,157 million metric tons, respectively. For comparison, the Congressional Budget Office (CBO) analyzed a GHG tax that starts at $25 per metric ton on most GHG emissions (not just fossil fuel-related CO_2) in the United States and increases at an annual real rate of 2 percent.[2] CBO (2016) estimates that in the first full fiscal year of implementation the tax would raise $90.3 billion in net revenue, accounting for the tax's effect on emissions and its general equilibrium effects on revenues from other instruments. During the first decade the tax in in effect, CBO projects that cumulative emissions from sources subject to the tax would fall by roughly 9 percent.

[3] A tax at the same rate that covers more of the U.S. GHG inventory would result in both greater overall tax burdens and greater environmental benefits.

the revenue. We structure the analysis to allow the carbon tax to flow forward into higher consumer prices or backward to lower wages for workers. A number of large-scale general equilibrium models suggest that in the short to medium run, the burden of a carbon tax passes forward into higher consumer prices, but our approach also allows us to assume some of the burden to fall on workers.[4]

CARBON TAX EFFECTS ON EITC BENEFITS

The incidence of the tax on low- to moderate-income households could depend on how it affects their EITC benefits, which are a function of wage income. To investigate how important this effect might be, we analyze four scenarios, each of which assumes the entire burden of the carbon tax falls on households via higher retail prices and lower wages; in other words, the tax has no effect on capital income.

The first scenario assumes all of the carbon tax passes through to prices paid by households, i.e. all the burden falls on consumption. This reprises results that are familiar in the carbon tax literature, namely that the carbon tax is regressive across the entire income distribution.[5] The burden in the lowest income decile is over five times the burden in the top decile when measured as a fraction of annual income. However, the average dollar value of the tax burden is four times higher for the top decile than the bottom decile. Aggregating the burden across the bottom two deciles, our results suggest that the total burden on these low-income households is $13.5 billion. Therefore, assuming full pass through of the tax to consumption, about eight percent of the gross carbon tax revenue could hold these households harmless on average.[6]

The second scenario splits the burden across the uses and sources of income: 80 percent falls on consumption, and 20 percent falls on wages.[7] All households bear the labor portion of the burden in the same proportion as their share in total labor income. In this scenario, we find that the tax is a little less regressive than in Scenario 1.[8] The difference arises because higher income households have proportionately more of total national wage income than they do of total consumption, so the more the burden falls on wage income, the greater their share of it. Accordingly, the aggregate burden across the bottom two deciles is a little lower than in the first scenario at $11.3 billion.

The third scenario reanalyzes the second, while also taking into account how the EITC benefits change for households because of the loss in wage income. We find out that this makes virtually no difference to the aggregate and average burdens in each income decile. Thus, we conclude that

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[4] See, for example, Bovenberg and Goulder (2001) and Metcalf et al. (2008).
[5] Mathur and Morris (2014), Hassett, Mathur and Metcalf (2009), Marron and Toder (2013), Dinan and Lim Rogers (2002), Dinan (2012) and Rausch and Reilly (2012)
[6] As shown in Mathur and Morris (2014), the incidence of a carbon tax varies significantly within income deciles, meaning that offsetting the burden on average could still leave many poor households worse off.
[7] These scenarios ignore the effect of the carbon tax on labor income and payroll taxes, which would be especially important in Scenario 4, which assumes 80 percent of the incidence flows through lower wages.
[8] This is in line with results from Metcalf, Mathur, Hassett (2009).

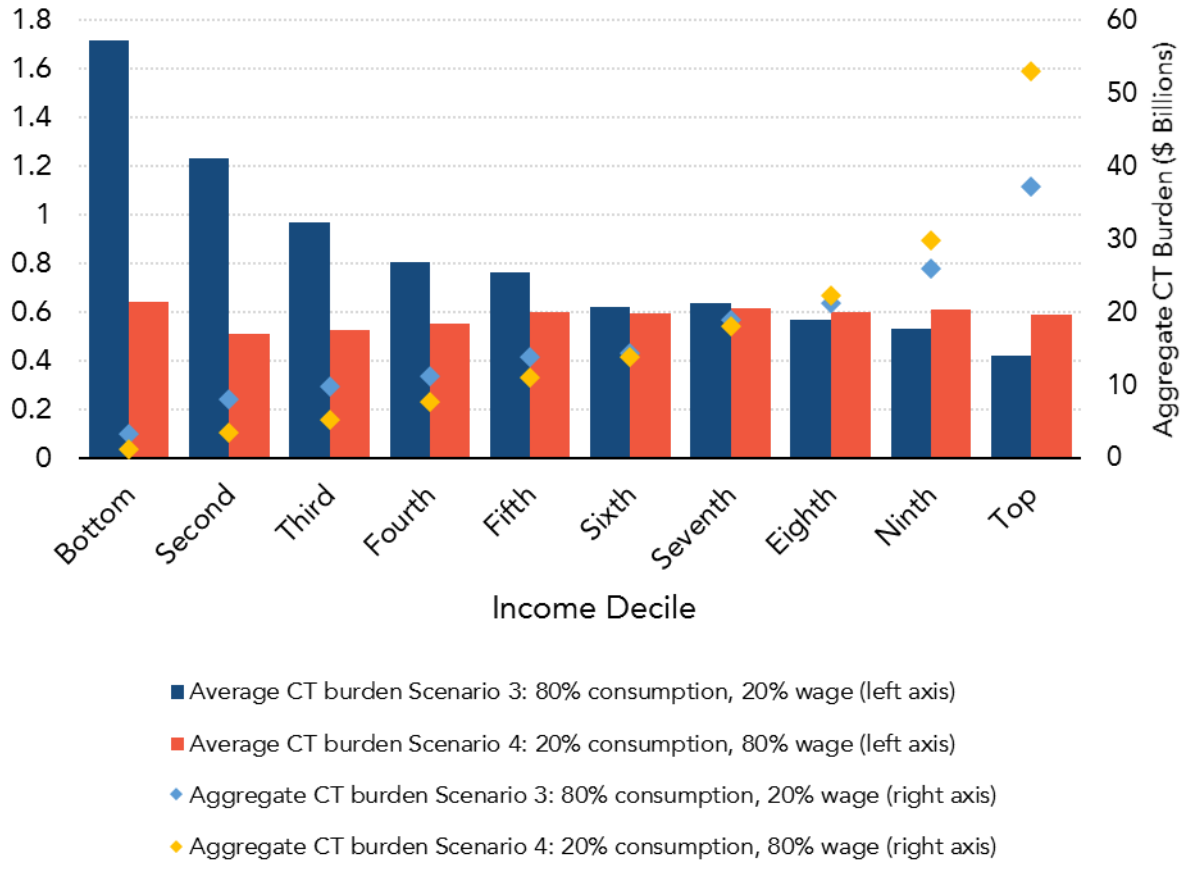
policymakers need not worry about the incidence of a carbon tax on low-income households via its effect on their EITC benefits.

One might be concerned, however, that this is true only if relatively little of the burden falls on wages. What if most of the burden of a carbon tax passes through to lower wages and thus has a greater effect on EITC benefits? Our fourth scenario tests this by splitting the burdens such that only 20 percent of the burden falls consumers in the form of higher prices and 80 percent falls on workers in the form of lower wages. Again, we find trivial effects of the carbon tax on EITC benefits. What is dramatically different in this scenario is the distributional pattern of the tax across income deciles, as shown in Figure 1. The policy is clearly regressive when the burden falls primarily on consumption (the blue bars and diamonds) and nearly distributionally neutral in the scenario with 80 percent of the burden on wages (the orange bars and diamonds). We conclude that the relative effects of the policy on prices and wages matters far more than its effect on EITC benefits.

FIGURE I

Distributional Outcomes

Depend on Proportion of Burden on Consumption and Wages



EXPANDING THE EITC

In the second part of this analysis, we investigate the distributional outcomes of a scenario in which Congress expands the EITC program to childless workers and funds the expansions with carbon tax revenue. The carbon tax burdens households, but some of that comes back in the program targeted to low income households. One plausible expansion of the EITC would benefit married and single adults with no children, leaving benefits to households with children unchanged. We suppose the EITC expansion that:

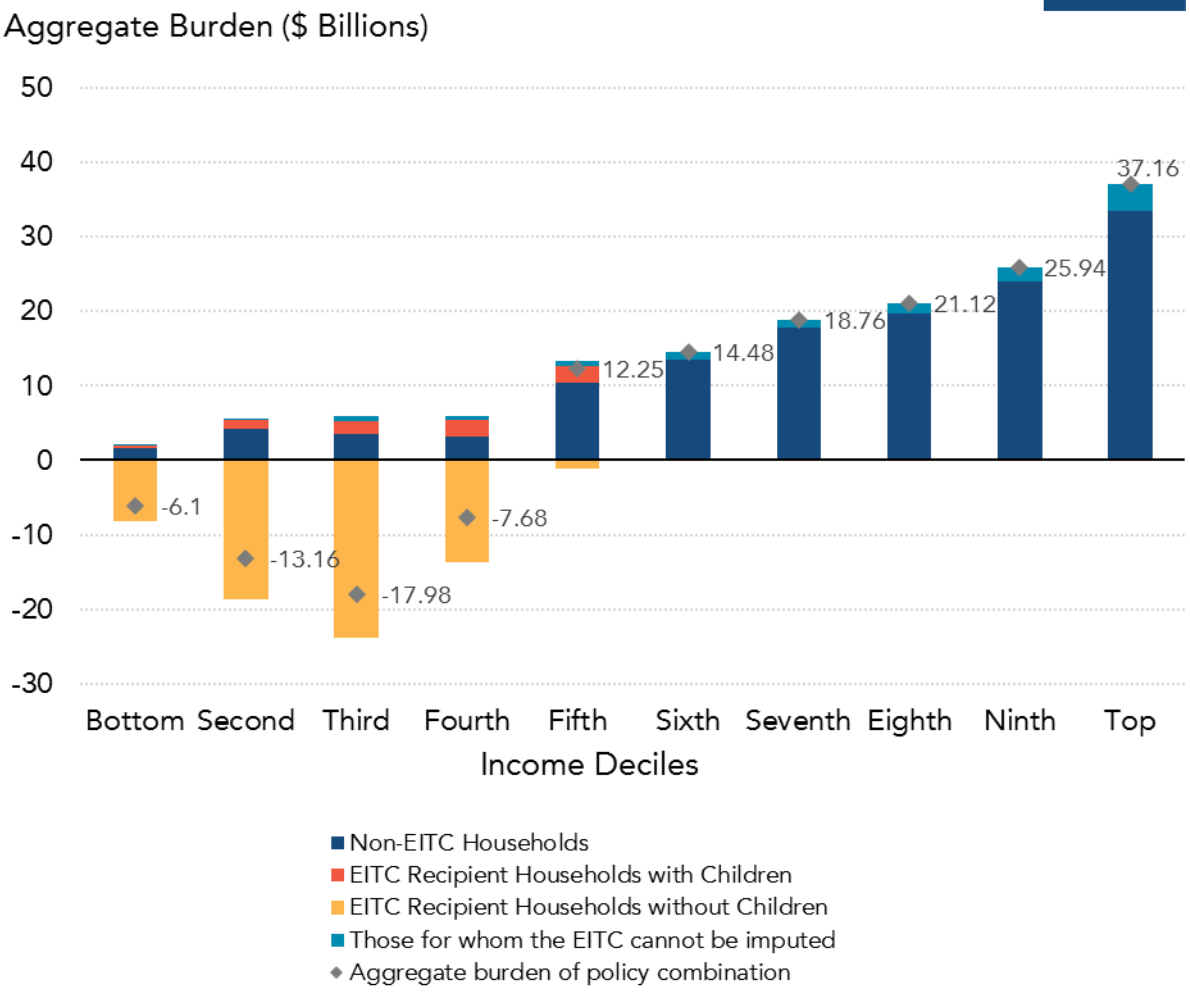
- Gives the same benefits to childless married couples that now apply to married couples with the same income that have one child.
- Gives single childless adults the same EITC benefits that now apply to single parents with the same income that have one child.

The estimated budget cost of the EITC expansion to married and single childless adults (about $80 billion using our data from 2014) is well within the scope of the federal revenue raised by our illustrative $32 per ton tax on CO_2 (about $167 billion). We find that this type of expansion would significantly increase the EITC benefits going to lower income households, adding about $9.4 billion and $21.2 billion to the incomes of childless adults in the lowest two income deciles, not counting any shifts because of the new incentives to work. Taken together, the EITC expansion and our estimated EITC expenditures from the current program of $62.21 billion would total about $142 billion for the year.

In Figure 2, we report the overall incidence on households of the combination of the carbon tax, its EITC effects, and the EITC expansion. The negative values in the chart show that the EITC expansion to childless adults in aggregate more than compensates the bottom four deciles for the imposition of a carbon tax. The benefits of the EITC expansion do not compensate all low-income households; low-income households that do not benefit from the expansion are still worse off by $5.82 billion for non-EITC recipients and $1.55 billion for EITC recipients with children. However, Figure 2 does not account for the disposition of the carbon tax revenue that does not pay to expand the EITC. Thus, if policymakers target $18 billion of the remaining $87 billion in gross revenue to the bottom four deciles, they could offset on average the entire burden of the carbon tax for households that do not benefit from the EITC expansion.

FIGURE 2

Carbon Tax Combined with EITC Expansion



CONCLUSION

Policymakers could use a carbon tax to fund a long-discussed expansion of EITC benefits for childless workers, thus combining a regressive tax with a progressive benefit. We simulate an expansion of the EITC that gives the same benefits to married couples that currently apply to married couples with the same income that have one child and gives single childless adults the same EITC benefits as single parents with the same income that have one child. We find that the overall estimated budget cost of this expansion would have been about $80 billion in 2014, well below the estimated carbon tax revenue. In aggregate, the greater EITC benefits more than offsets the carbon tax burden for the bottom four deciles. However, since our hypothetical EITC expansion only benefits certain childless workers, we find that policymakers would have to target some of the remaining revenue to other low-to-moderate income households if they wish to hold them harmless from the carbon tax.

A few qualifications to our results apply. First, we do not account for how the policies affect incentives to work on net. The carbon tax could lower incentives to work by reducing the after-tax real wage, while an expansion of the EITC may increase incentives to work. Also outside this analysis are the revenue effects and second-order distributional outcomes from ways in which a carbon tax lowers the revenues from other tax instruments, such as income and payroll taxes.[9] Likewise, we do not estimate how higher real prices affect baseline government spending, such as on higher energy costs, and how the price indexing of certain social safety net payments could buffer the impact of a carbon tax on poor households and social security recipients. And we do not account for other changes that could affect welfare, such as environmental benefits, general equilibrium effects, changes in regulatory programs, and state-level policy and revenue changes. Although the incidence estimates reported here do not take account of the full range of economic and fiscal outcomes of the tax, our results are a reasonable first approximation of the short run welfare impacts of a carbon tax.

[9] To analyze excise tax changes, CBO, the Joint Committee on Taxation, and U.S. Treasury incorporate revenue offsets of about 25 percent. See JCT(2011), JCT(2016), and Horowitz et al. (2017).

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