Fiscal Consolidation and Climate Policy: An Overlapping Generations Perspective

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(1) Overview

Putting a price on carbon—which is the most prevalent greenhouse gas—has the potential to address two long-term problems. One is the problem of growing debt in the United States with potentially detrimental implications for economic growth. The revenue from a carbon tax could be used to reduce the deficit or to finance reductions in marginal rates of existing taxes while holding the deficit constant (or a combination of both). The other problem is the build-up of carbon dioxide in the atmosphere–the principal anthropogenically sourced greenhouse gas (GHG)–contributing to global climate change derived from burning fossil fuels. Leaving this environmental externality unaddressed is expected to create costly damages.

We examine the distributional and efficiency impacts of climate policy in the context of fiscal consolidation in a dynamic general-equilibrium overlapping generations model of the US economy. The model includes a disaggregated production structure, including energy sector detail and advanced low- or zero-carbon energy technologies, and detail on government taxes and spending. In contrast to revenue-neutral carbon tax swaps, using the carbon revenue for deficit reduction implies a relaxation of future public budgets as debt repayment results in lower interest obligations. While intergenerational welfare impacts depend importantly on what tax recycling instrument is used, we show that combining debt consolidation with a carbon policy entails the possibility of sustained welfare gains for future generations. We thus argue that combining fiscal and climate policy may offer the chance for positive societal gains (without considering potential benefits from averted climate change). Importantly, this may enhance the political support for revenue-raising climate policies that are framed over the next couples of decades.

(2) Methods

To shed light on the efficiency and intergenerational distributional effects of such a combined climate and fiscal consolidation policy, we develop a dynamic general-equilibrium overlapping generations (OLG) model for the US economy that is uniquely well-suited to assessing the impacts of a carbon price on the macro-economy, its interactions with important fiscal tax distortions, and the public budget (including government spending and income from a range of different tax instruments). Our model setup is similar to Auerbach & Kotlikoff (1987) and Altig et al. (2001) where households with rational expectations live for a finite number of periods and maximize their lifetime utility by choosing optimal life-cycle consumption and savings behavior. A key difference is the disaggregated multi-sectoral production structure of the model including intermediate production, specific detail on the energy sector both in terms of primary energy carriers and energy-intensive industries, and sector- and fuel-specific carbon inputs. The model thus combines elements of a standard Auerbach & Kotlikoff (1987)-type OLG approach with those of energy-economy models typically employed to investigate climate policy issues (see e.g., Paltsev et al., 2005; Caron et al., 2012).

(3) Results

Our model produces several surprising results. First, in the context of a conventional revenue-neutral carbon tax swap current old and all future generations incur welfare losses (regardless of the choice for the revenue recycling instrument). In contrast, if the carbon revenue is recycled via repayments of the principal debt the level of future tax rate can be reduced. We find that while elderly households and current young are worse off as compared to a revenue-neutral tax swap, that future generations stand the chance of sustained welfare gains. These gains are larger if future budget surpluses are used to fund rate cuts in marginal capital and labor taxes positively affecting capital and labor supply decisions of households. Second, when we evaluate these outcomes formally, using an explicit social welfare function, we find that revenue-neutral carbon tax swaps results in a negative societal assessment for virtually any combination of social discount rates and inequality aversion. The picture is changed dramatically if debt reduction is considered as a option to recycle the revenue from a carbon pricing policy. For social discount rates of less than 2%, we find that such a combined policy can indeed be desirable from a social standpoint (without considering potential benefits from averted climate change). Finally, our analysis shows that the benefits from combining climate and debt consolidation policies are limited. While a more stringent carbon policy generates more revenue that can be used to repay government debt, and thus has the potential to result in large reductions of future interest obligations, an

aggressive carbon policy at the same time reduces economic growth and brings about lower revenue from other tax sources. We find that moderate carbon policies (in combination with a debt consolidation program) starting with a carbon price of $20 per ton of CO2 yield societal welfare gains for social discount rates of up to 2.5% per year. Much lower social discount rates are required to support more stringent carbon policies.

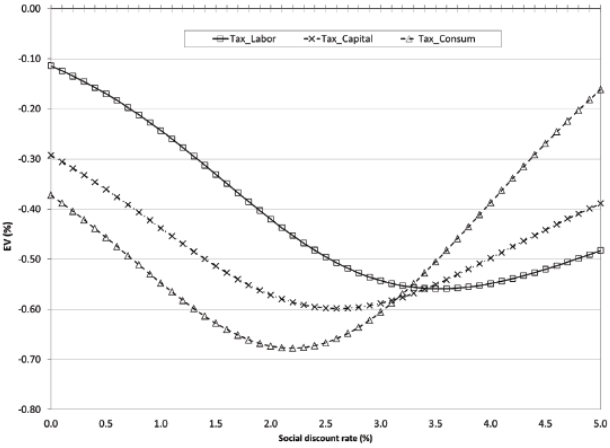

Figure 6: Social welfare assessment of revenue-neutral tax swap cases (for $\rho = 1$).

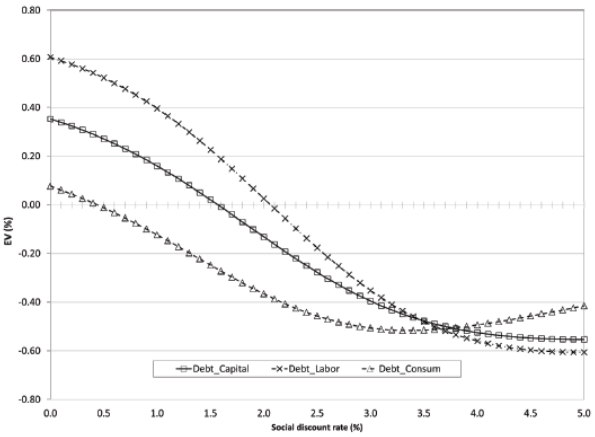

Figure 7: Social welfare assessment of debt repayment cases (for $\rho = 1$).

Fig. 1: Social welfare assessment of revenue-neutral carbon tax swaps (left) and of debt repayment cases (right).

(4) Conclusions

In view of the current stance of public finances in the United States (and many other nations), a revenue-raising climate policy can help relax future public budgets. An extensive literature has examined the interactions of environmental taxation and the broader fiscal system typically focusing on the efficiency effects from using the carbon revenue to fund rate cuts in distortionary taxes. The interactions between a revenue-raising climate policy and a debt consolidation program have, however, not been investigated. Such a combined fiscal and climate policy package can potentially address the two long-term problems of growing public debt and the build-up of greenhouse gas emissions.

This paper has examined the efficiency and intergenerational distributional impacts of a jointly implemented fiscal and climate policy package that uses the revenue from putting a price on carbon to repay the principal government debt. Using carbon revenues for deficit reduction implies a relaxation of future public budgets as debt repayment results in lower interest obligations. While any debt reduction program raises concerns of intergenerational equity between generations living through the fiscal consolidation period and those future generations who can reap the benefits of future public budget surpluses, our analysis suggests that a carbon policy combined with a fiscal consolidation program is likely to receive a more favorable societal assessment than just a carbon policy alone. Importantly, this may enhance the political support for revenue-raising climate policies that are framed over the next couples of decades.

This analysis represents a modest first step towards a more complete assessment of the interactions of climate policy and public debt reduction alternatives in an economy with large-scale government. There are a number of shortcomings of our model. We do not incorporate any notion of (aggregate, household-specific or climate-related) risk, demographic projections, nor do we introduce features of the system of direct taxation or consider energy-saving technological progress. Moreover, including environmental benefits of CO2 abatement will address the important fact that climate change policy involves important intergenerational effects. Despite all of these deficiencies, we find the results to be quite thought provoking, as it is clear that the design of fiscal consolidation programs requires a careful balance between intergenerational fairness. Further work is clearly needed to provide an assessment of the conclusions based on the simple model analyzed in this paper.

References

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