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Questions for the Record
from Senator Charles E. Grassley
for Dr. Joao Gomes
“Recreation at Risk: The Nature of Climate Costs”
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Question #1

Your testimony was a stern warning of the dangers of our current fiscal trajectory. What warning signs should this committee heed?

Answer:

Most economists now agree that the currently projected path for the US Federal debt is unsustainable and will eventually require a major correction in our fiscal policy. The current and projected future deficits are simply too large for our economy to function well.

I have two major concerns about our continued failure to address this explosion in US Federal debt. First, there is a distinct possibility of a fiscal crisis in the, not too distant, future. Such an event would undoubtedly trigger a disorderly correction and permanently damage our economy and society. The European sovereign debt crisis of the past decade offers a very clear warning of how this scenario might unfold, while the UK crisis in September 2022 shows how suddenly it can develop.

Second, even if a full-fledged fiscal crisis is averted, an economy operating with the currently projected levels of government debt will be materially damaged. Japan’s lost growth decades, with banks and households forced to absorb enormous amounts of government debt, at the expense of consumption spending and private investment, offer a good preview of how this scenario might look like.

The most pointed observation in my testimony is my forecast that real interest rates – and hence the cost of funding the US Federal debt - are going to be much higher in the coming decade or so. Thus, if there is one single indicator to watch for over the coming years, is the evolution in the **real cost of funding** the US Federal debt.

Given the CBO’s estimated path for future spending implied by current law, and projections for average long-term real GDP growth below 2%, the real interest rate cannot rise consistently above 1% without significantly endangering our fiscal position and, consequently, the US economy. Unfortunately, real interest rates currently exceed 2% and I expect they will rise even further in the coming decade. I outlined many specific reasons for this sea change in my written testimony to the Committee.

Question #2

Democrats commonly claim that tax increases on the rich will be enough to right our fiscal ship. Is “taxing the rich” a feasible solution to our monumental fiscal challenges?

Answer:

Recent estimates from our [Penn Wharton Budget Model](#) show that it is almost impossible to address our current fiscal challenges by raising tax increases only on US corporations and the top few percent of our income distribution.

The study shows that even an expansive version of President Biden’s recent tax proposal, that, among other things, lets the temporary provisions of the 2017 Tax Cuts and Jobs Act expire in 2025, increases the top marginal tax rate to 45%, and adds a new AMT rate of 45% above \$1 million, would still fail to prevent the Federal debt held by the public from continuing to grow steadily and reach 150% of GDP by 2050. That is not enough to remove the existential threat that our precarious fiscal position poses to the US economy.

The same study shows that, without meaningful entitlement reform, only very significant, across the board, tax increases and spending cuts would stabilize the US Federal debt.

Question #3

Chairman Whitehouse indicated his support for a carbon tax during the hearing. He claims that his carbon tax would generate \$2 trillion in savings. Who would end up paying the price tag for his “Save Our Future Act?” Are there any other pitfalls of his carbon consumption tax?

Answer:

I have not seen any estimates of the impact of these types of taxes in the context of detailed dynamic macroeconomic models (such as those used by the CBO and PWBM) that plausibly account for the equilibrium impact of such large tax changes on the overall economy.

The estimates I know, including those in the [IMF study](#) discussed in my answer to Question #5, take place in narrowly contained micro, lab-like, environments. As a result, I find that the study’s estimate that a tax that, roughly doubles US energy prices, could raise nearly \$400 billion in 2025 is impossibly optimistic. Such a large tax would almost surely plunge the overall US economy into a major recession, weakening tax revenue across the board. The model used in the study assumes away this possibility.

Nevertheless, I am inclined to agree with Senator Whitehouse that a carbon tax system could probably raise significant tax revenues, in *the near term*. It is apparent, however that, to be able to raise substantive revenues from carbon taxes, we *need a lot of carbon*. A tax that raises considerable revenue initially, but phases out carbon, will have a negligible budget impact after 10 years or so.

Conversely, a tax with a limited impact on carbon emissions may generate sustained tax revenues for many years. It might, however, make it very difficult for future policymakers to pursue aggressive climate goals that undermine this new source of tax revenue.

The lack of a proper macro study also makes it impossible for me to provide you with accurate estimates of the potential impact of various tax options on consumers, businesses, and the economy. However, the IMF's study discussed above also finds that US energy prices are generally in line with the supply costs. This strongly suggests that any new taxes on energy will ultimately be passed directly to US consumers.

Question #4

Democrats have consistently claimed in our hearings that climate change presents a systemic risk. Is this true?

Answer:

It is difficult for me to answer this question with a great deal of certainty. Economists reserve the term, "systemic risks" to describe the risk of inducing a cascading failure throughout the economy, and most commonly apply it to the financial system.¹²

We have heard testimony suggesting that climate change poses a serious risk to various industries and regions. From an economic standpoint, this is very much like the transformations induced by openness to international trade and outsourcing, which were equally if not more costly.

These types of risks are largely *diversifiable* across different individuals, firms, and regions, in the sense that we also see many benefits and winners from the transformation. It seems likely that the bulk of the climate risks we face are redistributive rather than truly systemic.

¹ SEC chair Gary Gensler recently referred to systemic risk as resulting from "network interconnectedness and monocultures that could lead to financial instability".

² For events that pose a direct risk to the entire economy, such as pandemics, wars or a government default, economists use instead the term *systematic* risks.

Question #5

Chairman Whitehouse frequently cites a September 2021 International Monetary Fund Working Paper titled “Still Not Getting Energy Prices Right: A Global and Country Update of Fossil Fuel Subsidies” when attempting to assess the cost of climate change to discredit the costs of his extreme climate change proposals. This study has been consistently debunked throughout our numerous hearings. Can you identify any problems with its underlying economic assumptions?

Answer:

This [IMF study](#) provides estimates of the supply, environmental, and other (e.g. congestion, VAT taxes) costs for each major energy source for a cross-section of countries. Although it is not peer-reviewed, this is a well-executed and transparently written paper. The methodology is clearly described and appears intellectually sound to me.

My only reservation is about the empirical implementation and, specifically, the exact costs assigned to environmental harm, congestion, and health damages. These numbers are certainly large, and the evidence cited is sparse and sometimes conflicting. Unfortunately, my expertise in the field of energy economics is limited so I am unable to assess if these estimates are reasonable.

For the US energy market, the results indicate that US prices for the various sources of energy are very much in line with their supply/generation cost but fail to include the (sizable) environmental and congestion costs. Consistent with many other studies, the report also indicates that the problem is most prevalent in East Asia, which accounts for nearly half of the estimated energy underpricing or “subsidies” around the world.

As I indicated in my answer to Question #3 above, the report’s estimates of the (net) benefits of energy taxes to the US economy of over 1% of GDP, largely due to increased tax revenues of about \$400 billion, are greatly misleading. This estimate fails to account for the – almost surely recessionary - impact of a near doubling in energy prices on the overall US economy.

Question #6

The Chairman referenced Deloitte research during the hearing, which allegedly reveals that inaction on climate change could cost the world’s economy \$178 trillion by 2070. Can you identify any problems with this research and its underlying economic assumptions?

Answer:

I was not familiar with the 2022 [Deloitte study](#) mentioned by Senator Whitehouse during his questioning. Unlike the IMF study above, however, I found the quality of the economic analysis in this work to be extremely poor. The writing is almost purposely confusing, failing to discuss key modeling assumptions. Unsurprisingly, this is not a peer-reviewed article in an academic journal.

As a result, it is impossible for me to judge the scientific validity of the precise annual cost estimates provided in the report since there is only a very cursory description of the macroeconomic model used. A careful read of the technical appendix was not enough for me to obtain sufficient technical details about the key mathematical equations or computation methods used.

Nevertheless, even if we accept the study's estimates of GDP losses at face value, the study indicates that the present value for the US of the gains from **all** climate mitigation investments is **only** equal to \$3 trillion by 2070.

During my testimony, Senator Whitehouse used this study to suggest that the cost of climate change was equal to \$178 trillion. This number is indeed the report's headlines, but it is the report's estimated worldwide cost of climate change. The corresponding costs for the US are estimated at \$14.5 trillion.³

Importantly, however, the estimated benefits of decarbonization are *far smaller* than the costs of climate change. Although the wording in the report greatly obscures this fact, it is very clear from Figure 3 in the report (reproduced below), that the proposed mitigation only partially reverses the impact of climate change on the economy. For policy purposes, the relevant numbers are the estimated gains from mitigation policies. The report places the present value of these at \$3 trillion in the US and \$43 trillion worldwide.

Finally, these estimated gains depend crucially on the "interest rate" used to discount GDP improvements which only take place well after 2048. Although this crucial choice is only discussed in the report's technical appendix, the authors use a low discount rate of 2%, on "social" grounds, and perform no sensitivity analysis at all.

I believe this is an unrealistically low choice. For example, even the February 2021 [IWG report](#) uses discount rates between 2.5% and 5%. The larger number is justified by the possibility that climate damage will be correlated with market returns, as it seems highly plausible. As is well known, the correct discount rate for proper cost-benefit analysis is never the funding cost of the government (or private enterprise) undertaking the project, but one that accurately reflects the underlying risks in future costs/benefits. As a result, virtually all financial economists would agree that expected future GDP gains and losses should be discounted using rates far above 2%.⁴

Given our best current estimates of average market risk premia, I believe that a real discount rate in the range of 6%-8%, more accurately capture the GDP risks in these estimates. This is also very

³ The 2021 [IWG report](#) argues we should incorporate estimates of worldwide damages in calculations about the benefits of US mitigation policies, because (i) climate damages will affect our future economy in several ways; and (ii) because several US citizens and businesses reside and operate abroad. Neither argument is persuasive. First, any future impact on our economy is already directly reflected in the US GDP estimated losses. Second, since 1946, the net economic value of all offshore operations to the US economy averaged less than 1% of GDP per year.

⁴ The IWG report cites the "latest scientific evidence" from a [2017 National Academies](#) report to argue for discount rates closer to 3%. However, this is a theoretical, not empirical, review that fails to seriously consider how GDP risk impacts the choice of the appropriate discount rates. By contrast, [Weitzman \(2007\)](#) shows how a model that properly accounts for the impact of disaster risks, such as climate events, generates discount rates around 6% per year.

much in line with the Office of Management and Budget's (OMB) Circular A-4. Applying a 7% discount rate to the projected GDP losses, I estimate the present value of the US costs of climate change will fall to \$5.8 trillion while the decarbonization benefits are essentially zero.

FIGURE 3. This illustration depicts the opportunity of new economic growth under a net-zero scenario

