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Assessing short-term and long-term economic and environmental effects of the COVID-19 crisis in France

(Long abstract)

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Summary:

This paper provides a quantitative assessment of the economic and environmental impacts of the COVID-19 crisis in France. Using a CGE model, we find a significant decrease in economic output, but a positive impact in terms of CO_2 emissions reduction in 2020. Both effects are temporary with a return to the baseline trajectory after a few years. CO_2 emissions even end up significantly higher after the crisis when we account for persistently low oil prices. Finally, we find that implementing ambitious carbon pricing with the full redistribution of tax proceeds speeds up the post-COVID economic recovery while significantly reducing emissions.

Context/Motivation

In order to slow down the rate of spread of the COVID-19 virus, the French government imposed an unprecedented national lockdown over a period of 55 days from March to May 2020. The simulations conducted in this paper pursue two main objectives. First, we aim to provide a quantitative assessment of the economic and environmental impacts of these exceptional measures in the short- and long-term. Second, we investigate whether implementing carbon pricing can still yield positive macroeconomic dividends in the context of the post-COVID recovery.

Methodology

The analysis is conducted using the French version of ThreeME[1], an open source Computable General Equilibrium (CGE) model specifically designed to assess short- and long-term impact of environmental and energy policies at the macroeconomic and sector levels. The sectoral disaggregation allows for analyzing the transfer of activities from one sector to another, particularly in terms of employment, investment, energy consumption or balance of trade. Furthermore, the highly detailed representation of energy flows through the economy allows for analyzing the consumption behavior of economic agents with respect to energy. Sectors can

[1] www.threeme.org

arbitrage between capital and energy when the relative price of energy increases, and substitute between energy vectors. Consumers can substitute between energy vectors, transportation modes or consumption goods.

Within this modeling framework, in addition to a baseline reference scenario, we designed four alternative scenarios in order to investigate the impact of the COVID-19 crisis on the French economy with and without the implementation of a climate policy:

(i) a scenario that considers the implementation of a carbon tax, compatible with the French government's economy-wide carbon neutrality objective by 2050, and with a redistribution of the fiscal incomes as tax credits to firms and households.

(ii) a scenario where only the COVID crisis shock is simulated through a shock on the demand in 2020 *via* a reduction of consumption, investment and exports.

(iii) a scenario, where the same COVID shock is simulated, but where we consider a different international context, with an OPEC strategy that maintain low oil prices over the long-run.

(iv) and finally, we augment the previous scenario with the carbon tax introduced in the climate policy scenario

Results

We focus our analysis on three main macroeconomic indicators – GDP, employment and aggregate investment – along with CO_2 emissions from 2020 to 2040. All simulation results are presented in terms of deviation to the baseline scenario (see figure 1).

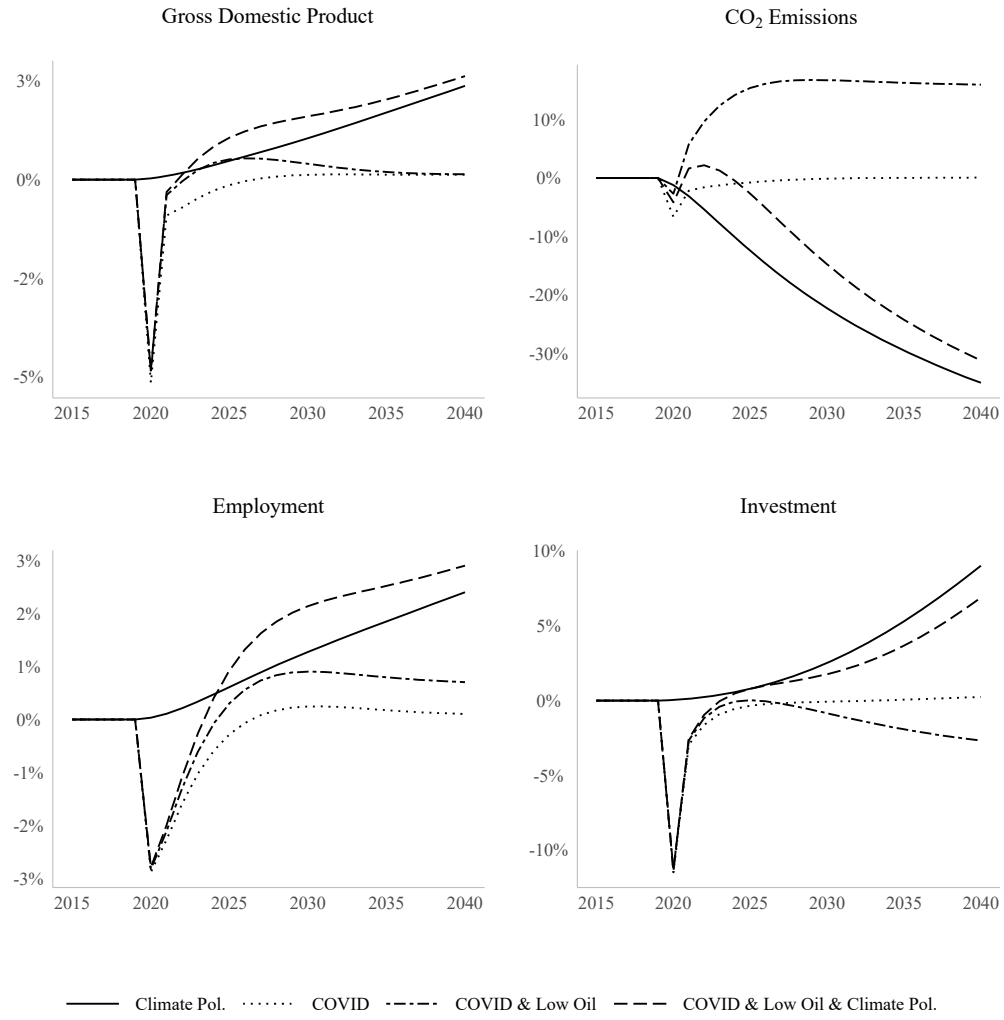

Figure 1: Deviation from baseline along four economy-wide indicators for each scenario

We start by investigating the economic and environmental impacts of the COVID-19 crisis. We find that the lockdown has had significant negative short-term consequences on economic activity with a 5% GDP decline in 2020 compared to its baseline trajectory. However, the demand shock induced by the lockdown is temporary: the economy progressively recovers toward its baseline trajectory over the following decade. This economic slowdown has an instant mechanical impact on CO_2 emissions, with an estimated 6.6% decrease in 2020 compared to the baseline path. Yet, as a consequence of the economic recovery, CO_2 emissions also quickly catch up to their baseline trajectory. The positive environmental impact of the COVID-19 crisis is thus purely temporary. Further, one of the main global macroeconomic consequences of the pandemic

has been a significant decrease in oil prices – which could be sustained over the coming years. Our simulations suggest that this would make the long-term environmental consequences of the COVID-19 crisis negative. In the medium to long run, CO_2 emissions end up above their baseline trajectory since lower oil prices allow for a faster economic recovery while encouraging the development of carbon-intensive technologies.

Then, we investigate the macroeconomic impact of climate policy in the post-COVID recovery. We find that implementing ambitious carbon pricing speeds up economic recovery by stimulating employment and investment while reducing CO_2 emissions significantly – even when combined with persistently low oil prices. Increasing fossil energy prices through a carbon tax leads to the substitution of energy for capital, in other words to energy efficiency investments. This in turn yields a decrease in energy use and CO_2 emissions. Over the long run, GDP even ends up larger than in a non-COVID-19 scenario implementing the exact same climate policy. By maintaining a high fossil fuel price, the carbon tax reduces the imports of fossil energy while fully redistributing carbon tax proceeds is primarily beneficial to the domestic economy. This acts as an additional economic stimulus which strengthens the recovery while preventing an increase in CO_2 emissions. However, low oil prices delay and reduce CO_2 emissions reductions achievable by a given level of carbon taxation. This underlines the need for higher carbon pricing should oil markets remain depressed in the post-COVID recovery.

The severity of the global economic crisis induced by the COVID-19 pandemic might appear to support the postponement of ambitious climate mitigation. Our results directly contradict this idea, and support instead the strengthening of climate policies at a critical junction where mishandling of the post-COVID recovery could have dramatic consequences for GHG emissions mitigation efforts.