Carbon tax, emissions reduction and employment: Some evidence from France

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In September 2019 the French Parliament adopted the law on energy and climate which enshrines in the French law the objective of Carbon Neutrality by 2050, in line with the 2015 Paris Climate Agreement. Achieving carbon neutrality in France will require a drastic decrease in greenhouse gas (GHG) emissions of 75% by 2050 compared to 1990 levels.

To ensure this target is met, the French government developed a "National Low Carbon Strategy", which acts as a roadmap for implementing a low-emission transition in each sector of the economy. For example, GHG emissions from industry account for almost one fifth of emissions in France, equivalent to total GHG emissions of Romania, and, under the proposed sectoral plan, will be reduced by a quarter within the next ten years.

France is currently employing two main carbon pricing mechanisms:

1. European Union Emissions Trading System (EU-ETS), which has been in place since 2005 and covers 75% of French industrial emissions.
2. A carbon tax on fossil fuel consumption, starting at 7 euros per tonne of CO2 and now amounting to 45 euros per tonne, in place since 2014.

These increasingly stringent carbon pricing policies have taken place in a period of rising industrial energy costs generating concerns about their impact on the competitiveness of the manufacturing sector. At first glance, such concerns appear to be borne out. Recent trends show real output and total employment in the sector decreased by 5% and 26%, respectively, between 2001 and 2016.

However, a recent OECD report, shed another light on this issue. This study is the first to estimate the impact of energy prices and carbon taxes on the environmental and economic performance using data at the firm and industry level.

What does the OECD study tell us?

1. **At the firm level**, a 10% increase in energy costs results in a 6% decline in energy use, a 9% decrease in carbon emissions, and a 2% decrease in the number of full-time employees within one year. However, these jobs are not lost, but are reallocated to other firms.
2. **At the industry level**, there is no statistical link between energy prices and net job creation, indicating that jobs lost at affected firms are compensated by increases in employment in other firms operating in the same sector during the same year.

These **effects vary both between industries and according to the size of the firm and their energy intensity:** For example,

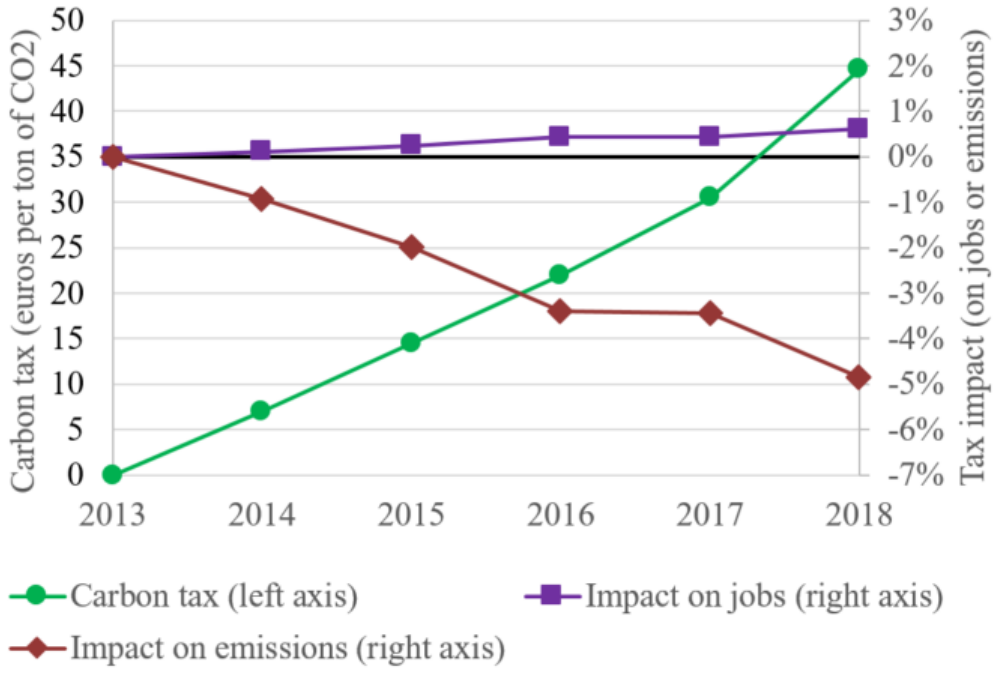
- When facing the same increase in the energy cost, firms in the wearing apparel industry reduces their carbon

emissions twice as much as firms producing non-metallic minerals.

- Reallocation of workers in the food products industry is half the reallocation in the basic metals industry.
- On average, large and energy intensive firms experience greater reduction in carbon emissions and greater job reallocation than smaller and energy efficient firms.

With this, the paper is able to measure the causal effect of the carbon tax on the aggregate manufacturing sector since its introduction in 2014. Figure 1 plots the carbon tax on the left axis (green line) together with the impacts of the carbon tax on the French manufacturing sector's jobs (purple line) and carbon emissions (red line) on the right axis. In five years, the carbon tax decreased carbon emissions by 5%. The net effect on employment is much smaller in magnitude and even slightly positive at +0.8%.

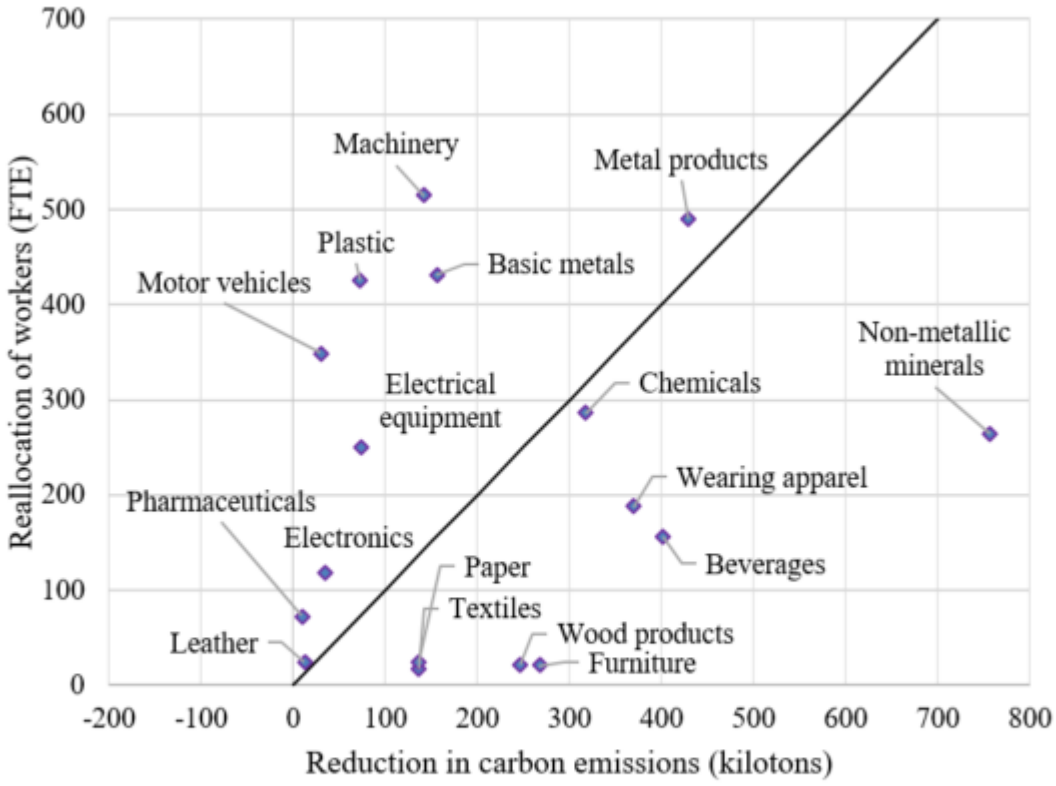
Figure 1. The impact of the French carbon tax on aggregate jobs and CO2 emissions



Note: The graph shows the simulated impact of the carbon tax on the job reallocation and CO_2 emissions of the French manufacturing sector.
Source: Dussaux (2020).

Finally, the paper considers a scenario where the carbon tax is doubled from its current rate of 45 € per tonne of CO2. Figure 2 shows the simulated effect of the tax increase on job reallocations and carbon emissions for each manufacturing industry. These job reallocations are not net job losses, but the number of people forced to change jobs (within the same industry or between industries).

Figure 2. The impact of a doubling of the carbon tax on job reallocations and CO2 emissions



Note: The graph shows the causal impact of an increase in the carbon tax from 44.6 € to 86.2 € per ton of CO_2 on the job reallocation and CO_2 emissions of French manufacturing industries. For clarity, the food products sector is not included.
Source: Dussaux (2020) Table 11.

A simulated **doubling of the carbon tax highlights significant heterogeneity across sectors**. Several industries such as furniture, wood products, paper, and textiles experience large reductions in carbon emissions with little job reallocation. On the contrary, the motor vehicles and the plastic industries experience larger job reallocations and smaller declines in

carbon emissions. Other industries such as metal products experience large job reallocation and emissions reduction because of their size.

Higher energy prices and carbon taxes are effective at reducing carbon emissions, but costs of job reallocation must be considered…

Although the carbon tax enables the French manufacturing sector to meet its carbon budget and does not affect total employment negatively, it however generates non-negligible job reallocations in several industries. Because these reallocation effects have redistributive implications and generate costs for workers who are forced to change jobs, these results call for complementary labour market policies that minimise those costs on affected workers and ease between-firms adjustments in employment. Moreover, since these transition costs are typically highly localised in regions specialised in polluting activities, they can also translate into potentially significant regional effects and thus political costs.

References:

Dussaux, D. (2020), "The joint effects of energy prices and carbon taxes on environmental and economic performance: Evidence from the French manufacturing sector", *OECD Environment Working Papers*, No. 154, OECD Publishing, Paris, https://doi.org/10.1787/b84b1b7d-en.