Cross-Country Mitigation Policies and Cross Border Emission Taxes

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Abstract : Pollution is a classic example of economic externality: agents who produce it do not face direct costs from emissions. Therefore, there are no direct economic incentives for reducing pollution. One way to address this market failure would be directly taxing emissions. However, because emissions are global, governments might as well find it optimal to wait let foreign countries to tax emissions so that they can enjoy the benefits of lower pollution without facing its direct costs. In this paper, we first document the empirical relation between pollution and economic output with static and dynamic regression methods. We show that there is a negative relation between aggregate output and the stock of pollution (measured as the stock of CO_2 emissions). This relationship is also highly non-linear, increasing at an exponential rate. In the second part of the paper, we develop and estimate a two-country, two-sector model for the US and the euro area. With this model, we aim at analyzing how the public sector should respond to higher emissions and what are the direct costs that these policies might have. In the model, there are two types of firms, brown firms (which produce a polluting technology) and green firms. Brown firms also produce an externality, CO_2 emissions, which has detrimental effects on aggregate output. As brown firms do not face direct costs from polluting, they do not have incentives to reduce emissions. Notably, emissions in our model are global: the stock of CO_2 in the economy affects all countries, independently from where it is produced. This simplified economy captures the main trade-off between emissions and production, generating a classic market failure. According to our results, the current level of emission reduces output by between 0.4 and 0.75%. Notably, these estimates lay in the upper bound of the distribution of those delivered by studies in the early 2000s. To address market failure, governments should step in introducing taxes on emissions. With the tax, brown firms pay a cost for polluting hence facing the incentive to move to green technologies. Governments, however, might also adopt a beggar-thy-neighbour strategy. Reducing emissions is costly, as moves production away from the 'optimal' production mix of brown and green technology. Because emissions are global, a government could just wait for the other country to tackle climate change, ripping the benefits without facing any costs. We study how this strategic game unfolds and show three important results: first, cooperation is first-best optimal from a global prospective; second, countries face incentives to deviate from the cooperating equilibria; third, tariffs on imported brown goods (the only retaliation policy in case of deviation from the cooperation equilibrium) are ineffective because the exchange rate would move to compensate. We finally study monetary policy under when costs for climate change rise and show that the monetary authority should react stronger to deviations of inflation from its target.

Keywords : climate change, general equilibrium, optimal taxation, monetary policy