Carbon Leakage and Green Growth.
M. Altaghlibi
Summary

Regions around the world are witnessing unprecedented phenomena in recent years: habitat shifting and alteration (sea-level rise, desertification, ..et cetera), droughts, temperature extremes, storms and flooding, and seasons shifting. As people start perceiving changes in their conventional life patterns, concerns and about the climate change and global warming have been increasing. Green House Gases (GHG) such as CO2, halocarbons, methane, and nitrous oxide have been identified as a main source for global warming. The global nature of transboundary pollution highlights the necessity for international cooperation to maintain the rise in global temperature below certain levels necessary for our survival.

The global nature of climate change and transboundary pollution make it in the interest of all countries to direct the growth path of developing countries towards a greener path. Giving international environmentally motivated aid is one way developed countries can help poor country grow in a sustainable way that achieves "green growth".

A general introduction to the problem of carbon leakage and the necessity of sustainable development is furnished in the first chapter. In chapter 2, we argue that the usual practice of giving aid conditionally is not effective, and we therefore study aid that is given unconditionally. Our framework is a differential open-loop Stackelberg game between a developed country (leader) and a developing country (follower). The leader chooses the amount of mitigation aid given to the follower, which the follower either consumes or invests in costly nonpolluting capital or cheap high-emission capital. The leader gives unconditional mitigation aid only when sufficiently rich or caring sufficiently about the environmental quality, while the follower cares about environmental quality to some extent. If aid is given in steady state, it decreases the steady state level of high-emission capital and capital investments in the recipient country and the global pollution stock, but it has no effect on the levels of non-polluting capital and nonpolluting investments. Transitional aid accelerates the economic growth of the follower; this effect is however lower than what static growth theory predicts since most of the aid is consumed. Moreover, we find that the increase in growth takes place in the nonpolluting sector.
Asymmetry in the views towards climate change, and in the implemented policies across countries, create distortions in international competitiveness, making these policies both less efficient and less acceptable to firms and citizens. Firms in countries that implement a carbon tax or emissions permits face additional production costs, which their international competitors do not bear. The demand for their products decreases, leading to a reduction in output and a loss in profits and market shares. At the same time, emissions in countries with a lax climate policy increase, inducing so-called carbon leakage. Border adjustments (BA) have been promoted by many economists to be effective instruments to mitigate the leakage and limit the distortion in competitiveness among trading partners.

In chapter 3, we extend Melitz (2003) model to investigate the competitiveness driven channel of carbon leakage and to study the effects of unilateral carbon tax, Border Tax Adjustment (BTA), and Border Carbon Adjustment (BCA) on leakage, competitiveness, and welfare. We analyze in particular how these policies affect firms across the productivity spectrum. Following Kreickemeier & Richter (2014) we stress the importance of the correlation between productivity and emissions levels. When firm-specific emission intensity is weakly decreasing with its productivity level, we find that a carbon tax in one country reduces average profitability and increases the probability of successful entry of firms, leading paradoxically less productive firms to enter the market after the tax. We conclude that both border adjustments are effective in mitigating carbon leakage and restoring international competitiveness partially. Their efficiency however depends on the objectives of the implementing country. In general, a BCA is a better instrument to mitigate the leakage in emissions than a BTA, as it targets directly carbon contents of imports; a BTA represents a more credible threat to induce cooperation however.

Finally, in chapter 4 I theoretically analyzes the growth and welfare impacts of Border Carbon Taxes (BCTs) across trading countries. I build a trade model with dynamic investment decisions using a Ramsey growth model. The government in each country can invest either in costly nonpolluting capital or in cheap polluting capital. The model is solved numerically for an open loop Nash equilibrium to study different configurations of BCTs across
countries. I find that a unilateral BCT is welfare enhancing for the country that applies it and an effective tool to shift the growth of the other country towards greener path even when countries are not concerned about the environment. Results show that a bilateral BCT becomes welfare enhancing for both countries if governments care sufficiently about the environmental quality of their citizens. Moreover, the asymmetry in initial development levels across countries induces a slower growth for the initially poorer country only if the other country is richer in the polluting capital. Furthermore, the model shows that trade openness should be achieved gradually along the development path of countries.

References
