Climate change policy and the balance of trade

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Overview

In the absence of a global climate agreement, countries employ local policies to curb pollution and introduce clean energy. These policies, however, result in subtle consequences. In this paper we show that environmental policy intended to curb pollution of a traded energy source will reduce domestic consumption but increase exports thus improving a country's balance of trade. The internationally traded non-renewable resource questions the importance of the Green Paradox when discussing local regulation. While focusing on US energy policy, we show this phenomenon for both petroleum products and for coal.

Methods

We begin the analysis while modeling resource firms' investment decisions, assuming the resource is a traded commodity and introducing export costs. We use this framework to better understand resource firms' response to deteriorating domestic market conditions, because of introduction of domestic regulations or because of new (technological) discoveries. We then introduce dynamics. The dynamic framework is used to shed new light on the Green Paradox in the context of current US energy policy and introduction of alternatives to conventional fossil fuels. The model is used to better understand the Green Paradox and how it interacts with leakages, and also the impact of regulation on future investments.

After developing the conceptual framework, empirical analysis is used to support the main conclusions, while focusing on the US petroleum industry as well as the coal industry. The empirical analysis is case-study based research, while focusing on the US.

Results

We use the conceptual framework to show that with local environmental policy, the introduction of clean technologies yields pollution leakages and significant gains in the country's balance of trade, but that the Green Paradox is not key to the policy debate. The current decline in aggregate demand results in less investment in new discoveries, and in changes that may prolong the use of fossil fuels.

After developing the conceptual framework, empirical analysis is used to support our main conclusions. We argue that biofuels accounted for roughly 40% of the decline in gasoline consumption in the US, while policies affecting demand and fuel efficiency (e.g., CAFE2) contributed the other 60%. The US government ushered the adoption of fuel efficient technologies, leading to the decline of gasoline consumption and to the introduction of light vehicle fleets with higher miles per gallon. Policies and funding also accelerated the modernization and increase efficiency of power generation and transfer.

Policy that introduced alternatives to gasoline and diesel and reduced US appetite for petroleum products affected petroleum trade flows and substantially improved the US energy trade-balance; the US became a net exporter of petroleum products in 2012. The decline in domestic consumption was not met with a similar decline in production but in an increase in exports.

We then expand the analysis to the war on coal and the introduction of shale gas, and show that policies the ushered these changes led to significant positive effect on the US balance of trade. Newly adopted technologies of hydraulic fracturing and new discoveries of shale formation led to abundance of domestic natural gas supplies in the US and to the decline in the price of natural gas. At the same time, proposals to limit pollution from coal power plants led

construction of new coal power plants to a complete halt. Coal became an exported commodity, while domestic consumption of coal declined and coal plants were shut down and replaced with ones operating on natural gas. Because the US ability to influence international prices – either for petroleum products or for coal – is limited, the effect of policy and introduction of backstop technologies on international prices of energy sources is small. Thus, the incentives to increase current period extractions are kept at bay. Although we do observe leakages and the US becoming a country that exports CO2 to the rest of the world, we cannot offer support for the Green Paradox.

Conclusions

Grennhouse gases and balance of trade (as well as rural develoment) motives were the drivers behind the introduction of energy conservation and alternatives. When domestic demand of a local energy feedstock unexpectitely declines, domestic consumption declines but the residual is being exported. The question to the future is what to do with the saved fossil fuel: export it or stop producing it. This suggests that the debate about the Canadian pipeline (i.e., Keystone) is only the beginning.