



Contents lists available at SciVerse ScienceDirect

Journal of Environmental Economics and Management

journal homepage: www.elsevier.com/locate/jeem

Trade and the environment with pre-existing subsidies: A dynamic general equilibrium analysis [☆]

Claustre Bajona ^a, David L. Kelly ^{b,*}^a Department of Economics, Ryerson University, 350 Victoria Street, Toronto, Ontario, Canada M5B 2K3^b Department of Economics, University of Miami, Box 248126, Coral Gables, FL 33124, United States

ARTICLE INFO

Article history:

Received 27 October 2008

Available online 9 June 2012

Keywords:

Perverse Subsidies

Pollution Emissions

China

State Owned Enterprises

WTO Agreement

Applied General Equilibrium

Emissions Intensity

ABSTRACT

Countries that wish to erect trade barriers have a variety of instruments at their disposal. In addition to tariffs and quotas, countries can offer tax relief, low interest financing, reduced regulation, and other subsidies to domestic industries facing foreign competition. In a trade agreement, countries typically agree to reduce not only tariffs but also subsidies. We consider the effect of a free trade agreement on pollution emissions. We show that while reducing tariffs may indeed increase output and pollution, reductions in some subsidies required by the trade agreement reduce pollution in general equilibrium for reasonable parameter values. Reducing subsidies has three effects on pollution: (1) reducing subsidies to firms reduces pollution-causing capital accumulation, (2) if subsidized firms are more pollution intensive, then reducing subsidies moves capital and labor from more to less pollution intensive firms, and (3) reducing subsidies concentrates production in more productive firms, increasing output and thus pollution. We derive straightforward conditions for which (1) and (2) outweigh (3). We then calibrate the model to China in 1997, and find that pollution has a more elastic response to reducing subsidies than to reducing tariffs. While a 5% reduction in tariffs increases all pollutants by approximately 1%, a 5% reduction in subsidies reduces pollution by 1.8–11.6%, depending on the pollutant. The reductions in pollution occur without any environmental side agreements or abatement policy changes.

© 2012 Elsevier Inc. All rights reserved.

1. Introduction

Countries that wish to erect trade barriers have a variety of instruments at their disposal. In addition to tariffs and quotas, countries can offer tax relief, low interest financing, reduced regulation, and other subsidies to domestic industries facing foreign competition. The political process is unlikely to produce a uniform tariff. Instead, countries with high trade barriers employ a complex mixture of all these instruments, resulting in significant distortions. In a trade agreement, countries typically agree to reduce not only tariffs but also subsidies. For example, subsidies to exporting industries violate WTO rules.¹

[☆] We would like to thank Libby Ashley, Emily Blanchard, Karen Fisher-Vanden, Amy Glass, Linda Goldberg, Charles Mason, Carol McAusland, Oscar Mitnik, Maurice Roche, M. Scott Taylor, two anonymous referees, and seminar participants at the University of Calgary, the University of Miami, the University of Western Ontario, the National Bureau of Economic Research Summer Institute, and the Eighth Occasional California Workshop on Environmental and Natural Resource Economics for comments and suggestions.

* Corresponding author.

E-mail addresses: cbajona@arts.ryerson.ca (C. Bajona), dkelly@miami.edu (D.L. Kelly).

¹ Specifically, subsidies specific to an individual or group of firms, products, or industries which are either contingent on export performance ("prohibited") or have adverse effects on member industries ("actionable") are not allowed. Member countries may bring suit to have such subsidies removed or be allowed to retaliate. See Annex 1A, Agreement on Subsidies and Countervailing Measures of the WTO's legal document on the Uruguay

The main claim of our paper is that reductions in domestic subsidies implied by some trade agreements have significant effects on pollution emissions. These effects are associated with a country's opening to trade and, therefore, cannot be ignored when considering the effects of trade agreements on pollution. The focus of trade agreements and of this paper is not on benign and well-studied subsidies designed to correct an externality, but instead on subsidies designed solely to support a particular industry or firm (typically facing foreign competition). Such subsidies are sometimes called "perverse subsidies" (for example [26]). We show that reducing such subsidies has three effects on pollution. First, a reduction in subsidies to firms reduces pollution-causing capital accumulation. Second, if subsidized firms, industries, and/or state owned enterprises (SOEs) are more pollution intensive, then reducing subsidies moves capital and labor from more to less pollution intensive firms. Third, reducing subsidies concentrates capital and labor in more productive firms, increasing output and thus pollution. We derive conditions under which the first two effects outweigh the third. In our calibration, the condition is satisfied for all three pollutants studied.

Thus even if world tariff reductions cause pollution-intensive production to increase in a country, overall pollution may still fall because the tariff effect is more than offset by the reduction in pollution caused by the reduction in subsidies. Indeed, we calibrate the model to China in 1997 and find that pollution has a more elastic response to reducing subsidies than to reducing tariffs. While a 5% reduction in tariffs increases all pollutants by approximately 1%, a 5% reduction in subsidies reduces pollution by 1.8–11.6%, depending on the pollutant. The reductions in pollution occur without any environmental side agreements or abatement policy changes.

There is a large theoretical literature on trade and the environment.² Research has focused on three possible channels whereby a reduction in trade barriers can affect environmental quality. Following Copeland and Taylor [8] and others, we denote the idea that a reduction in trade barriers causes pollution intensive production to shift from countries with relatively stringent regulation to countries with relatively weak regulation the *pollution haven hypothesis* (PHH). The PHH predicts that, following a reduction in trade barriers, pollution rises in the country with weak regulation and falls in the country with stringent regulation. A second channel, the *factor endowment hypothesis* says that since pollution is capital intensive, reducing trade barriers should cause pollution intensive industries to move to the more capital intensive country, usually the more developed country. In the third channel, increases in income caused by a reduction in trade barriers affects both pollution intensive production and abatement spending.

Mani and Wheeler [24], Low and Yeats [22], Ratnayake [28], and others find some evidence in favor of the PHH. These studies lack pollution data in less developed countries, and so must instead classify industries according to their pollution intensity in the US and then correlate output in pollution intensive industries to openness. On the other hand, Birdsall and Wheeler [6] and Lucas et al. [23] find that pollution intensity is relatively lower in more open economies. In general, environmental regulations do not seem to be a major factor in plant location decisions.

As Antweiler et al. [2] note, both theoretical and empirical studies generally take pollution regulations and/or income to be exogenous. For example, countries may tighten environmental regulations after an inflow of pollution intensive capital. Even if pollution regulations are identical across countries, production moves to its most efficient location, causing production and pollution to increase. The resulting increase in income may itself cause countries to increase abatement or otherwise tighten pollution regulations, as has been noted in the Environmental Kuznets Curve (EKC) literature [13]. Antweiler et al. [2] study the effect of reducing trade barriers on SO₂ concentrations. They decompose the effect into scale, composition, and technique effects. Reducing trade barriers causes output to rise, which increases pollution (the scale effect). However, the increase in income also results in increased abatement spending, reducing pollution (the technique effect). Finally, a reduction in trade frictions causes the country exporting the dirty good to specialize in that good, increasing pollution (the composition effect). They also avoid the data problems present in previous studies by using data on SO₂ pollution emissions from the Global Environmental Monitoring database. They find a particularly strong technique effect, implying that trade improves the quality of the environment by raising income and abatement. This channel has perhaps the best support in the data. However, the EKC does not seem to be robust to changes in empirical specification or across pollutants [16,31], so the result may not generalize to pollutants other than SO₂.

We propose here an entirely new channel by which free trade agreements may affect the environment: the free trade agreement acts as a catalyst by which governments reduce subsidies. The subsidies are typically in industries facing foreign competition. The reduction in subsidies affects the share of production by subsidized firms, total production, terms of trade, and capital accumulation, each of which has an effect on pollution.

The related literature on how perverse subsidies to industry affect the environment is less developed.³ Since almost all countries have industrial policies which favor some industries, what effect subsidies have on the environment is an

(footnote continued)

Round Agreements. Bagwell and Staiger [3] argue the criteria for challenging domestic subsidies in the WTO is weak enough so that governments can in principle challenge any positive subsidy.

² Survey papers include Copeland and Taylor [8], Kolstad and Xing [21], Rauscher [29], and Ulph [35].

³ Barde and Honkatukia [5] discuss the extent of subsidies in environmentally sensitive industries and discuss a few channels by which subsidies may affect the quality of the environment, but note that a full assessment would require a general equilibrium analysis, which we do here. van Beers and van den Bergh [36] show in a static, partial equilibrium setting how subsidies can increase output and pollution in a small open economy. Fisher-Vanden and Ho [12] show that capital subsidies reduce the cost of adopting a carbon tax in China, since the carbon tax offsets some of the distortions caused by the capital subsidy. More established is the literature on agricultural subsidies and the environment (see for example [1]).

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات