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Summaries

Trade and environmental distortions: coordinated intervention

JINHUA ZHAO

In this paper, we study the issue of coordinating environmental and trade policies to improve a country's welfare. Economists have studied extensively the issue of piecemeal reform of one distortion in the presence of other distortions, and equiproportional reduction of all distortions. The purpose of this paper is to study more general reform policies, such as disproportionate reform of all distortions, reform of one distortion at a certain size, or complete removal of one distortion. We also investigate how these policy interventions are affected by such country characteristics as the stock of natural resources and country size. Finally for this paper the environmental distortion is the result of loose property rights governing resources and the environment, rather than pollution as in the piecemeal reform literature.

We model a two-good (manufactured and harvested) and two-factor (labour and resource) economy similar to Brander and Taylor (1998), except that loose property rights over resource stock is the environmental distortion. We represent the level of distortion by the number of extractors of a common property resource. A higher degree of distortion corresponds to a lower degree of (static) property rights over the resource. Trade distortion is represented by a tariff on the import of the resource-intensive good. Using the dual approach of Dixit and Norman (1980), we trace out an 'iso-welfare' curve in the space of the degree of environmental distortion and the level of the import tariff. The curve represents the combinations of environmental and trade distortions that lead to the same welfare level for the country.

Based on the iso-welfare curves, we identify situations where reducing a single distortion is welfare improving, and situations where reducing one distortion should be accompanied by reducing the other. If the reform always sets one distortion optimally given the other, then in the long run which distortion is reduced first does not matter, as the reform will converge to removing both distortions. But if the reform reduces distortions in an arbitrary way, then coordination becomes important when one of the distortions is much more significant than the other, or when the reduction

is more than gradual. Using the iso-welfare curves, we find necessary and sufficient conditions for disproportionate reforms, piecemeal or discrete, to be welfare improving.

In many cases, moving to free trade, especially when completely removing trade distortion, reduces welfare with the presence of domestic property right distortions. We identify how much improvement in property right structure is needed to prevent free trade from reducing welfare. The needed improvement increases when the environmental stock increases and when the country is a larger exporter of the environmentally intensive good.

Trade reform and environmental externalities in general equilibrium: analysis for an archetype poor tropical country

RAMÓN LÓPEZ

This paper provides a conceptual and empirical general equilibrium framework for the analysis of the impact of trade reform on welfare and the environment. The analysis is applied to Côte d'Ivoire explicitly considering externalities affecting biomass (natural vegetation), which is shown to be an important factor determining agricultural productivity.

The econometric analysis shows that land cultivation decisions are made ignoring important components of the value of biomass for agricultural income. This leads to overcultivation and to excessively short fallows (and deforestation), which is translated into significant income losses for the communities as a result of reductions in agricultural productivity. The relationship between proportion of land cultivated and rural income is found to be an inverted U-shape; there is a proportion of land cultivated that generates the maximum net income for rural communities. The empirical analysis shows that the actual area cultivated is above such optimum. This may reflect inadequate institutions that fail to address important externalities related to individual cultivation decisions as well as to insufficient sustainable cultivation practices.

The general equilibrium analysis is a simulation exercise that incorporates the rural as well as the non-rural sectors. The economy is disaggregated into four productive sectors: cereals (land-intensive), tubers and vegetables (labour-intensive), tree crops, and non-agricultural. Trade reform causes a general increase in agricultural profitability and also a

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change in the structure of incentives within agriculture, favouring tree crops over cereals and other land-intensive activities. The former effect is bad for the environment because it induces an expansion of the agricultural land area, thus magnifying the initial effect of the environmental distortion. The second effect, the change in output composition within agriculture, is positive for the environment because the change in crop composition towards less land-intensive crops tends to decrease the area cultivated (and, hence, to increase fallows and forests).

The simulated general equilibrium analysis shows that the agricultural output composition effect dominates the agricultural expansion effect for the case of complete trade liberalization. Thus, in this case, trade liberalization causes a significant improvement in the rural biomass stock by cutting land area cultivated, increases agricultural productivity, and induces dramatic welfare gains. That is, trade liberalization is a win–win type of policy in this case. However, partial trade liberalization that only reduces protection to non-agricultural goods (and does not reduce tariffs to agricultural import substitutes and does not reduce export taxes) causes a further deterioration of the biomass resources and reduces welfare.

Trade and environment: policy linkages

BRIAN R. COPELAND

A key issue in the controversy over trade and the environment is whether agreements on trade and environmental policy should be linked. The objective of this paper is to illustrate how standard economic theory yields a couple of fairly straightforward arguments for linkage. While there are many different potential types of linkage, my main concern here is whether trade liberalization also requires some agreement between countries on environmental policy to protect either the environment or economic interests.

First I consider the case where pollution has only local effects. There is then a strong presumption that efficient environmental policy should differ across countries to reflect differences in local conditions. So there is no need to harmonize environmental policy. However there may be a need for coordination. This is because the option of weakening environmental standards can provide a loophole in a trade agreement. All trade agreements are incomplete contracts that eliminate and restrict some but not all instruments of trade protection. When tariffs are eliminated, governments face the same incentives to protect as they did prior to the trade agreement,

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and so they look for alternative instruments of protection. A weakening of environmental policy may become tempting if more favourable instruments (such as tariffs or subsidies) are constrained by the treaty. One remedy for this is to close the loophole by incorporating restrictions on environmental policy into trade agreements. The model predicts that this will become more of a problem as countries become increasingly integrated and trade agreements expand their scope. Thus a comprehensive trade agreement such as in the European Union would require some international coordination of environmental policy, but less comprehensive agreements, such as in the NAFTA may not yet need to take such a step.

Next I consider global pollution. In this case, the model explains why rich and poor countries may have very different views about the desirability of linking trade and environmental agreements. Suppose a rich and a poor country, such as the US and China, are considering both an agreement on trade liberalization and an agreement on carbon emissions. Our model predicts that the US would not want to agree to trade liberalization unless China also accepts an agreement on carbon emissions. China, on the other hand, would prefer to secure a free trade agreement first, and leave the environment as a separate issue to be dealt with in the future. The key point is that trade liberalization can affect the bargaining power of countries in negotiations over global pollution. A commitment to free trade allows an exporter of pollution-intensive goods to credibly commit to pollute more. This gives a country such as China a strategic advantage in future bargaining over global pollution. Consequently, importers of pollution-intensive goods have an incentive to try to link trade negotiations to global environmental agreements. Failing that, they may be unwilling to liberalize trade unless they are able to retain some trade barriers so as not to compromise their bargaining position in future environmental negotiations.

Freedom, growth, and the environment

SCOTT BARRETT AND KATHRYN GRADDY

Recent research has found that the relationship between certain measures of environmental quality and income per head obeys an inverted-U: pollution worsens and then improves with increases in income.

Though this research does not explain why pollution should improve once incomes become high enough, it is widely believed that an induced policy response must play a role—that as incomes rise, citizens demand improvements in environmental quality, and that these demands are somehow delivered by the political system. However, civil and political

freedoms vary widely, both across countries and over time. Hence, if the induced policy response hypothesis is correct, freedoms should be significant determinants of environmental quality. In this paper we ask: Is more freedom good or bad for the environment?

Since a number of studies have previously explored the growth–environment relationship, and obtained very different results, we investigate this question by making only a very small change to an earlier analysis by Grossman and Krueger (1995). We simply add as explanatory variables certain measures of freedoms developed by Freedom House.

We find that freedoms are statistically significant for measures of pollution that directly affect human health: concentrations of sulfur dioxide, smoke, heavy particles, and fecal coliform. Indeed, freedoms are often quantitatively important. A low-freedom, poor country can reduce its pollution at least as much by increasing its freedoms as it can by increasing its income per head. This is policy relevant if, as we argue, freedoms can be controlled independently of incomes.

The literature on trade and environment shows that free trade may not be best if environmental policies are less than optimal. However, proposals for constraining environmental policy externally cannot be sure of improving welfare. It may be better to encourage internal reforms, especially by encouraging a shift toward greater democracy. This paper provides evidence that such a shift would indeed increase environmental quality—at least in the measures that relate directly to human health.

Reducing coal subsidies and trade barriers: their contribution to greenhouse gas abatement

KYM ANDERSON AND WARWICK J. McKIBBIN

The international negotiations leading up to the Kyoto meeting of the Framework Convention for Climate Change in December 1997 focussed attention on the need to produce concrete and comprehensive policies for an effective agreement to reduce greenhouse gas emissions. The policy measures advocated by the European Union and Japan would be economically very costly to major industries in rich countries and would not prevent 'leakage' through a re-location of those carbon-intensive industries to poorer countries. An alternative or supplementary approach that is more likely to achieve carbon and methane emission reductions, and at the same time generate national and global economic benefits rather than costs, involves lowering coal subsidies and trade barriers.

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Coal policies have encouraged excessive production of coal in a number of industrial countries and excessive coal consumption in numerous developing and transition economies—when the opposite policies are what are needed to overcome the environmental damage associated with coal mining and burning. These distortionary policies are currently under review or have begun to be reformed by numerous governments. This paper documents those distortions and outlines the circumstances under which their reform could not only improve the economy but also lower greenhouse gas emissions globally. It also provides empirical estimates of what could be involved in reducing those distortions. The effects on economic activity as well as global carbon emissions are examined using the G-Cubed multi-country dynamic general equilibrium model of the world economy.

Both the gains in economic efficiency and the reductions in carbon dioxide emissions that could result from such coal policy reforms are found to be substantial. Even if just Western Europe and Japan were to gradually remove their coal production subsidies and import restrictions by 2005 (let alone raise their current relatively low tax on coal use and impose a tax on the environmental damage from coal mining), that would lower OECD emissions of carbon dioxide by 13 per cent and global CO_2 emissions by 5 per cent below what would otherwise be the case in 2005 if the policies of 1990 were maintained over the subsequent 15 years. If in addition the currently low domestic price of coal in major non-OECD countries were gradually to be raised to the level in international markets, that would lower their CO_2 emissions by 4 per cent below what would otherwise be the case in 2005. Global emissions from these combined reforms would be 8 per cent lower than if there were no coal policy reforms over that period. More specifically, with no reforms, global CO_2 emissions would rise from 22 billion tonnes in 1990 to a projected 30 billion tonnes in 2005, whereas with the coal policy reforms in both rich and poorer countries that projected level of global CO_2 emissions would be only 27 billion tonnes in 2005.

The impact of these reforms on national output and income levels are complicated because, in addition to efficiency gains, removing price distortions stimulates terms of trade changes and international capital movements. Western European countries and Japan, as net importers of coal, turn their terms of trade against themselves when they reform, which benefits Australia and the coal-exporting transition economies of Eastern Europe, the former Soviet Union and China, while harming net coal-importing developing countries. And both transition and developing economies are projected to be even better off—environmentally as well as economically – when their coal markets also are reformed.

In contrast to many other proposals, the environmental gain from coal market reform is a 'no regrets' outcome, or a win–win Pareto improvement for the economy and the environment. Both gains would be even greater if Western European countries raised also their low coal consumer tax rates as they phase out their coal producer subsidies, since those consumer taxes are currently relatively low. And both gains would also be enhanced if countries taxed domestic coal production optimally so as to ensure coal mining enterprises compensate society for the pollution they cause.

Thankfully the process of lowering coal subsidies and trade barriers has already begun, with some EU economies already advancing in dismantling their coal production subsidies and others beginning to do so. Also, in some transition economies the low prices of coal (and also oil and gas) are gradually being raised. The results in this paper suggest these reforms should be applauded as a positive contribution to the reduction of greenhouse gas emissions, and countries should be encouraged to complete the process.