

Adlung, Rudolf

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Rudolf Adlung*

Trade Policies and the Environment – Subsidies, Taxes and Border Adjustments

Border tax adjustments rank high on the environmental policy agenda in many countries, in particular in western Europe. They seem to offer an easy solution to policymakers confronted with both ecological and fiscal constraints. However, while appealing from the perspective of policy implementation, such schemes may pose economic, ecological and trade problems.

Economists usually associate environmental problems with the existence of negative externalities resulting from the production or consumption of goods and services. Such externalities may occur across the whole spectrum of economic activities, for example in the form of water pollution (e.g. from farm fertilizers or recreational boats), air contamination (from electricity generation or road vehicle traffic) or noise (from construction work or open-air concerts). As these effects are not normally imputed to the individual producer or consumer involved, environmental resources tend to be over-exploited – at the local, national or even international level.

Governments may use a variety of instruments to “internalize” production or consumption externalities or otherwise fight environmental degradation. Policies may impose physical limits on the use or discharge of harmful substances and/or employ economic sanctions or incentives. On efficiency grounds, economists tend to prefer price-based instruments, in particular taxes and charges, to direct regulation through command-and-control-measures.¹ Ideally, though fraught with intricate valuation problems, the tax rate should be set so as to reduce pollution to a level where the marginal environmental damage equals the marginal cost of pollution abatement. In the case of production externalities, the relevant taxes may be levied either on production inputs or actual emissions. While input-related taxes, e.g. a carbon tax on fossil fuels, may help to ease assessment and monitoring problems, their effectiveness depends not least on a

relatively stable relationship between input use and environmental damage.

Under textbook conditions, eco-subsidies are able to produce environmental results similar to taxes, although with different distributional effects.² The subsidies may be used to promote environmentally beneficial product or process innovation, encourage investment in pollution-control equipment or honour production cuts (e.g. set-aside programmes in agriculture). However, if granted on a permanent basis, subsidies tend to be inferior to taxes in a dynamic environment characterized by social and industrial change; with unlimited market access, they may entice additional producers or users of the products concerned.³ Moreover, if subsidy recipients are compensated simply for production cuts, they may fail to explore other adjustment possibilities, including a shift towards more environmentally sound products or processes.

For a variety of reasons, however, eco-subsidies may prove politically attractive. First, subsidies tend to draw less resistance, if any, from the targeted producer or consumer groups while the adverse impact on taxation or public debt is not immediately evident.⁴ Second, the granting of financial incentives may be the only policy option in certain instances; for

* WTO Secretariat, Geneva, Switzerland. The paper has benefited from the comments of colleagues in the Trade and Environment Division, in particular Scott Vaughan. However, the views expressed remain those of the author and should not be attributed to the WTO Secretariat.

¹ There are qualifications, however. For example, tight regulatory controls may prove inevitable in cases where (a) serious health risks are involved; (b) emissions are (over-)concentrated in a few regions; or (c) chemical reactions between individual pollutants result in unacceptable or incalculable environmental effects. Thus, actual policies often rely on a mix of regulatory and economic instruments.

² Subsidies may be granted in a variety of forms, including direct payments, below-market interest rates or tax benefits.

³ Adjustment-related subsidies may be viewed in a different light.

⁴ There may be counterpressure, however, from non-subsidized producers of substitute products.

example, local authorities may not be empowered to raise taxes or impose prohibitions, but to offer payments. Finally, the same target groups may benefit from various types of financial assistance – payments compensating for positive externalities, social transfers, and subsidies encouraging pollution control – which are too closely entwined to be distinguished in practice. Small-scale alpine farming is a case in point for the coincidence of such different objectives and transfer mechanisms.

The following two sections seek to identify, from both a domestic industrial and trade policy perspective, the pros and cons of environmental taxes and subsidies if transboundary spillovers are involved. Given widespread concerns about the effects of non-coordinated taxes on international competitiveness, especially in countries facing slow growth and high unemployment, a fourth section deals with the use of border adjustment mechanisms. A final section summarizes previous discussions on border tax adjustments in the GATT and lists a number of questions that may help to advance the debate.

Domestic versus International Environmental Problems

In the absence of cross-border spillovers, well-conceived environmental policies do not have particular external ramifications. Rather, such policies could be compared to many other domestic initiatives, e.g. in the area of infrastructure, aimed at redefining a country's locational conditions. Adverse effects on industrial competitiveness, disposable income or public debt, which may be associated with polluter charges or eco-subsidies, would normally be offset by gains elsewhere in the domestic economic system: increased profitability in sectors relying on a clean production environment (e.g. food processing, high-tech chemicals or electronics) and/or improved living conditions through growing non-monetary income. However, governments would need to address the valuation problems involved and provide an institutional framework that helps to accommodate the adjustment pressures and distributional consequences involved. If incentive mechanisms are allowed to operate and transparency is ensured, environment-related initiatives could then focus on removing adjustment barriers and encouraging interregional, intersectoral and interprofessional mobility. Pre-announced implementation programmes may facilitate long-term investment planning.

Additional considerations come into play whenever transboundary spillovers exist. This applies in par-

ticular to production externalities, where environmental aspects are normally considered as one factor in a larger economic and trade policy equation.

The following examples are intended to illustrate possible policy patterns, and economic effects, in a two-country case where one country introduces eco-subsidies or taxes on polluting effluents. The countries are assumed to be of similar size and produce a similar range of largely standardized, mature products under similar conditions; however, A-people are more environmentally sensitive than B-people.⁵ Secondary effects on allocation, distribution and growth flowing from changes in taxation and/or public spending are not taken into account, industries benefiting from domestic substitution processes are assumed to be environmentally benign, and no attention is paid, for the time being, to WTO-legal aspects.⁶

Case Ia: Country A subsidizes more environmentally friendly production methods.

The adjacent country B benefits, as a free rider, from reduced cross-border pollution. The environmental effects in both countries are limited, however, in the absence of similar policy changes in B. Market prices and production levels in the sectors concerned remain largely unchanged as long as the subsidies are limited to offsetting environment-related cost increases.

Case Ib: A's subsidies over-compensate the adjustment costs involved.

The environmental effects in B are similar to case Ia. However, while consumers and downstream industries may capitalize on low-priced imports, B's non-subsidized producers of competing products would

- ☐ suffer a decline in profitability and, in response, scale down their activities (with positive environmental effects in both countries);
- ☐ press the authorities for similar support; or
- ☐ call for retaliatory action, for example via countervailing duties.

Depending on B's policy choice, any environmental benefits would need to be set against the economic

⁵ Such differences may be attributed, for example, to cultural factors or dissimilar levels of per capita GDP and, thus, preferences for monetary versus non-monetary income.

⁶ For an overview of the WTO-legal constraints on environmental policies see Ernst-Ulrich Petersmann: *International and European Trade and Environmental Law after the Uruguay Round*, London 1995.

losses associated with increased subsidization and/or trade frictions.

Case IIa: A introduces an ecotax sanctioning "excessive" environmental damages.

In the absence of similar initiatives abroad, production in A would decline and/or shift towards less polluting processes. Ensuing supply gaps would be filled by producers in B and market prices remain largely stable. While there might be environmental benefits, these would certainly be lower than with parallel policies in both countries.

Case IIb: A over-taxes its polluting activities.

Faster and stronger adjustment than in IIa. However, this scenario is rather unrealistic, given the political resistance of affected industries. In addition, if the competent authorities are able to specify target levels for individual pollutants that may be released, the adequate "tax rate" could be determined through market-based instruments, e.g. through the auctioning of emission certificates.

Industrial versus Trade Policy Interests

The above highly stylized cases suggest that, while subsidies are easier to implement domestically, there is a risk of causing external frictions. It might be difficult internationally to agree on an appropriate level of environmentally justified support.

In the WTO Agreement on Subsidies and Countervailing Measures, eco-subsidies are considered "non-actionable" and, thus, tolerable under certain conditions. (Aid for disadvantaged regions and support for research have a similar status.) For example, the assistance is directly linked and proportionate to the

environmental results and does not cover manufacturing cost savings.⁷ Verifying compliance with these requirements could prove controversial, however, as the environmental impact of new equipment is not easy to distinguish from productivity or capacity effects. While no such cases have been brought to the WTO to date, ensuing frictions are likely to focus in particular on "sunset" industries, like steel or base chemicals, which are subject at the same time to ecological and economic pressures in virtually all industrial countries. In turn, this suggests that case Ib could be more than a rare exception.

A tax-based approach, while avoiding these shortcomings, is likely to meet opposition from affected industries. While, on average for the business sector, the cost impact of environment-related taxes tends to be dwarfed by other locational costs (wages, social security charges, corporate taxes, etc.), there may be significant sectoral variations.⁸ International policy co-ordination would help to ease industry-specific competitiveness problems and, thus, overcome resistance, but a joint approach may be difficult to achieve as long as value judgements, problem analyses and/or policy priorities differ between the countries involved. In addition, even if B shared A's environmental objectives, it might prefer to disguise its "true" preferences and rely on A shouldering a larger economic burden.

This scenario could be over-pessimistic, however, if global environmental resources are threatened. There are examples of voluntary co-operation to protect these resources, such as the Montreal Protocol on Substances that Deplete the Ozone Layer and, currently under negotiation, the UN Framework Convention on Climate Change.⁹ Further, it might be argued that parallel policies have emerged in health-related areas without international co-ordination; heavy taxation of tobacco and alcohol is a case in point. However, such "sin taxes" are not a persuasive precedent as their introduction has been driven largely by fiscal considerations and the fact that, with low demand elasticities, the ultimate tax incidence lies predominantly with consumers rather than producers. In addition, transboundary spillovers, the main reason for international policy co-ordination, are not involved. The question thus remains how to protect genuine environmental agreements – or alternative forms of policy co-ordination – from non-participants undermining, through expanding production and trade, other countries' pursuit of common targets. (Available estimates of "carbon leakage", i.e. the partial offsetting of emission reductions under the

⁷ In addition, Article 8.2(c) of the Agreement requires that assistance be granted on a once for all, non-recurring basis; be limited to 20 per cent of adaptation cost; does not cover the cost of replacing and operating the assisted investment; and be available to all firms which can adopt the new equipment and processes. No distinction is made in the Agreement between subsidies for equipment intended to reduce either local, transboundary or global externalities.

⁸ A recent OECD study concludes that "one of the major problems of measuring the relationship between environmental taxes and trade is the fact that environmental taxes are generally low – in most cases probably quite below their optimal level – thus making it impossible to deduce with statistical methods the impact of optimally set environmental taxes on trade volumes and trade structures". And further: "Some simulation studies predict strong effects for only very few sectors of the economy... (they) often concern hypothetical high carbon energy taxes, currently not in existence." OECD: Implementation Strategies for Environmental Taxes, Paris 1996, pp. 36 and 77.

⁹ The Convention is intended to help stabilize "greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system ... within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner."

Framework Convention on Climate Change through increases in non-complying countries, range between zero and 35 per cent.)¹⁰

Pending international co-ordination, a more environmentally conscious country (country A) may review its domestic policy options to ease cost pressures in the wake of eco-taxation and, thus, allay concerns about industrial "competitiveness". The policy options, which may be associated with various concepts of fiscal neutrality, include:

- ☐ compensatory tax cuts to prevent an increase in the overall level of corporate-taxation (revenue neutrality);
- ☐ exemptions from ecotaxes for particularly affected producers (neutralizing sectoral adjustment pressures); and
- ☐ tax adjustments at the border, relieving exports while submitting imports to eco-taxation (neutral effects on industrial competitiveness).

The first two options are not without pitfalls. While a general tax reduction would do little to ease the cost impact of, say, a carbon tax on steel producers, sector-specific cuts would be tantamount to granting a production subsidy – with all the problems involved (cases Ia and Ib). Moreover, sectoral variations in eco-taxation would not only contravene economic and environmental efficiency objectives, but set a questionable precedent for further cases. There may be a point, however, in granting longer implementation periods where short-term adjustments are particularly painful, e.g. in industries with high capital intensity and long investment cycles.

At first glance, border tax adjustments (BTAs) seem to avoid such problems, combining political benefits with economic expedience and environmental gains. BTAs would not only offset the affected industry's competitive disadvantage on both domestic and foreign markets but, in eliminating B's free-rider status, enhance prospects for international co-ordination. However, there are qualifications as well.

Border Tax Adjustments

The following considerations continue to be based on the assumption that a country's environmental situation is affected by both domestic and transboundary pollution in a given industry. Although sometimes ignored in policy debates, in the absence of transboundary effects, border adjustments for ecotaxes would be justified neither on economic nor environmental grounds. If country A's objective is to encourage domestic environmental improve-

ments – e.g. through production cuts, new equipment and/or process innovation – these could be attained autonomously, without compensatory trade measures. Rather, in driving up internal prices, BTAs would shift adjustment pressures from the targeted sector to downstream domestic industries and/or consumers.¹¹ As a result, overall welfare in A would be lower than under an ecotax system without BTA.

Setting up and calibrating BTAs for individual products would prove difficult in practice as the full amount of eco-taxation, accumulated over various production stages, is not immediately evident. Moreover, there may not be one standard tax rate per product if the underlying processes – and, consequently, tax incidences – differ between producers, regions and countries. Carbon taxes, currently applied in particular in northern European countries, are a case in point.¹²

Carbon taxes are normally levied at a specific rate on fossil fuels, assuming that a producer's emissions of (environmentally harmful) carbon dioxide are roughly proportional to the amounts of fuel used. The actual tax burden depends on the fuel-efficiency of the processes and technologies employed; for example, steel produced in traditional coal-fired converters is likely to attract higher taxes than similar steel produced in electrical furnaces which are fed from nuclear or gas-fired plants. Uniform export refunds by way of BTAs, regardless of the processes involved, might thus imply a significant element of subsidization in the former case (equivalent to case Ib). In order to avoid distortions, the refunds would need to be limited to the tax burden associated with the most fuel-efficient processes available and, in addition, to the damage attributable to cross-border emissions.

¹⁰ Australian Bureau of Agricultural and Resource Economics: *Global Climate Change – Economic dimensions of a cooperative international policy response beyond 2000*, Canberra 1995.

¹¹ For example, a country may decide to impose an ecotax on agricultural chemicals with a view to encouraging less intensive use of fertilizers and pesticides and, thus, improving groundwater quality. It is difficult to see in such instances why the tax should qualify for BTA and why, by implication, food processing industries and consumers should suffer from resulting price increases. Principle 16 of the Rio Declaration states that "National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment."

¹² The countries are Finland, Norway, the Netherlands and Sweden. However, according to OECD (*Implementation Strategies for Environmental Taxes*, Paris 1996), Sweden redesigned its carbon tax because of concerns about competitiveness in 1993, requiring that the manufacturing and horticultural sectors pay only one quarter of the tax levied on other users. Similar exceptions for energy-intensive producers, such as electricity plants, exist in Norway.

By the same token, tax adjustments on imports should be limited to cover the environmental costs incurred through transboundary emissions. Thus, in a multi-country setting, imports might carry various BTA-rates depending on the geographical distance of the originating country and, possibly, the production processes employed. Again, there would be no economic or environmental justification for full adjustment, i.e. for the importing country acting on behalf of, and extending its value judgements on, the exporting country. Full tax adjustment might be considered only if "global commons" are involved, i.e. in cases where the environmental impact is largely unrelated to a person's/group's geographical distance from the point of emission.

Border adjustments for consumption-related eco-taxes do not seem to raise particular economic problems. The assessment of products would again be based on the destination principle, thus subjecting imports and exempting exports, comparable to the operation of value-added or excise taxes. The place of taxation would normally coincide with the place of consumption and pollution, except for transboundary emissions where, in an ideal world, the "victims" abroad would be compensated through financial transfers.

It is evident, however, that the struggle for such perfect solutions would be met with unsurmountable data and implementation problems. As the very concept of eco-taxation may hinge on the question of border adjustments, it is important to contemplate simplified alternatives. Yet the stakes are high. The resulting scheme should not only be environmentally efficient, economically sound and easy to administer, but – in order to be accepted in WTO fora – live up to the relevant legal requirements. As things currently stand, this may come close to squaring a circle.

Open Questions

A GATT Working Party, established in 28 March 1968, focused on the GATT-legal questions involved in border tax adjustments. The Working Party's report, adopted on 2 December 1970, came to the conclusion that taxes directly levied on products, including specific excise duties and sales taxes, were eligible for BTAs.¹³ By contrast, certain other taxes, including social security charges and payroll taxes, were considered ineligible. The Working Party reached no common view, however, with regard to the treatment of "taxes occultes", i.e. taxes on goods and services consumed during the production process.

The inconclusive situation in the latter area may strengthen the political rationale for devising ecotaxes as sales taxes, rather than relating them to the processes employed or the emissions actually discharged.¹⁴ Like other direct taxes, they would be refunded or, as the case may be, levied at the border. However, as indicated above, while this approach might meet the *formal* requirement of trade neutrality, it appears highly unsatisfactory from both an economic and environmental perspective. Production externalities would not be addressed as such, but treated as if they were attributable to consumption. There would thus be no incentives for producers to shift towards more environmentally benign sources of energy or invest in less polluting processes.

In its Report to the Singapore Ministerial Conference, the WTO Committee on Trade and Environment (CTE) referred to the Working Party's findings as well as to the WTO Agreement on Subsidies and Countervailing Measures.¹⁵ In conclusion, the Report noted that scope existed under WTO provisions to apply environmental charges and taxes, but that further work was required in the CTE on this issue. In general terms, the Report strongly endorsed non-restrictive solutions to any competitiveness effects associated with environmental policies; member governments were committed "not to introduce WTO-inconsistent or protectionist trade restrictions or countervailing measures in an attempt to offset any real or perceived domestic economic or competitiveness effects of applying environmental policies ...".

There is no point in speculating on the agenda that WTO Members may wish to pursue in future. The above discussion leads, nevertheless, to a range of questions that may contribute to advancing the debate on eco-taxation and accommodating trade policy concerns:

☐ Could an international understanding on the range of appropriate policy instruments help prevent

¹³ The main findings are reproduced in GATT document TRE/W/20, 11 January 1994.

¹⁴ In late 1996, the European Commission tabled proposals for increasing current EC minimum rates for excise duties on mineral oils and extending the system to other energy sources such as coal and natural gas. According to press reports, the approximation of excise rates was intended to discourage cross-border shopping and incorporate environmental concerns in the tax system after the specific proposal for an EC energy/CO₂ tax had foundered. See European Report, 26 October 1996.

¹⁵ In the latter context, particular reference was made to the provisions on "Prohibited Subsidies" and the "Guidelines on Consumption of Inputs in the Production Process". See WTO document WT/CTE/1, 12 November 1996.

countries from relying exclusively, for reasons of "competitiveness", on direct product taxes for environmental purposes?

☐ Is it possible to devise WTO mechanisms that would encourage participation in, and compliance with, such an understanding?¹⁶

☐ In this context, should the 1970 GATT Working Party Report be reconsidered with a view to condoning some form of border adjustment for both consumption- and production-related ecotaxes? If so,

(a) are BTAs to be considered legitimate if no cross-border externalities exist?

(b) how should BTAs be applied in the event of domestic economic distortions, e.g. if products are subsidized and eco-taxed at the same time or if producers, behind import barriers, use more environmentally damaging inputs (e.g. high-sulphur coal) than would be available abroad?

(c) should there be, thus, additional rules governing the environmental efficiency of the individual products, processes and technologies used?

BTA's rank high on the environmental policy agenda in many countries, in particular in western Europe. They seem to offer an easy solution to policy makers confronted with both ecological and fiscal constraints. However, while appealing from the perspective of policy implementation, such schemes may pose economic, ecological and trade problems. It is important that these be discussed before current blueprints are actually implemented.

¹⁶ A reference point may be the WTO Agreement on Technical Barriers to Trade which, in order to promote the use of international standards, relies on the (rebuttable) presumption that domestic regulations conforming to such standards do not create an unnecessary obstacle to international trade and, thus, do not contravene one of the Agreement's basic requirements.

Rainer Thiele*

The Role of the Private and Public Sector in Human Capital Formation

While there are strong equity and efficiency reasons for subsidizing education in developing countries, the prevailing dominance of governments in the financing and provision of educational services can be questioned. There is some evidence supporting the conclusion that a partial cost recovery through user fees may reduce the rationing of services which is still a pressing problem in many low-income countries, and that private providers tend to be more cost-efficient than their public counterparts.

While it is now widely accepted that developing countries should pursue a market-oriented development strategy, there is still considerable debate about the proper role of the state in such an approach. The formation of human capital is one important field where governments are supposed to take at least partial responsibility but where the exact delineation between the state and the private sector is controversial.¹

Human capital is mainly built up through formal education and work experience,² but certain basic health and nutrition expenditures are also likely to augment the stock of human capital.³ This paper focuses on formal school and university education

because this is the part of human capital formation in which governments are most heavily involved. To demonstrate the importance of investments in education, the paper begins with a review of the social returns these investments promise. It is then discussed why and how the state must intervene in order to secure that the social returns can be realized, and whether there is a potential for greater private sector participation compared to the status quo which in

¹ See, for example, Christopher Colclough: Education and the Market: Which Parts of the Neoliberal Solution are correct?, in: World Development, Vol. 24, 1996, pp. 589-610.

² Gary Becker: Human Capital. A Theoretical and Empirical Analysis with Special Reference to Education, National Bureau of Economic Research, New York 1964; Jacob Mincer: Schooling, Experience, and Earnings, National Bureau of Economic Research, New York 1974.

* The Kiel Institute of World Economics, Kiel, Germany.