

A



PROJECT

Tackling Leakage in a World of Unequal Carbon Prices

Preliminary Work Packages and Project Details

Under the current EU ETS the competitiveness and leakage effects of a unilateral climate policy for industry with trade exposure have been under discussion. While leakage is of major concern to climate policy makers, industry and industrial policy makers pronounce competitive disadvantages from carbon pricing. Leakage effects are becoming increasingly relevant for the next unilateral climate policy steps in a number of countries. Among the nations and regions embarking on a stricter climate policy, including ETS, are Australia, New Zealand, and regions and provinces within the United States and Canada. Carbon pricing gives room for leakages, either by a shift of consumption of carbon-intensive goods towards cheaper import substitutes, entailing more CO₂-intensive production in regions without carbon pricing, or by a (re)location of industrial production to areas without carbon pricing. In a world of unequal carbon prices more certainty for effective emission reduction is needed, especially when it comes to investment in sectors with carbon-intensive production. A commitment to a longer term ETS and other national measures thus needs to consider remedies against leakage.

For the EU ETS some sectors that face competitive disadvantages from carbon pricing have been identified already by the Climate Strategies project “Differentiation and Dynamics of EU ETS Industrial Competitiveness Impacts”. Sectors include cement, iron and steel, aluminium, pulp and paper, refinery and fertilisers. Empirical work for the UK has clarified that leakage and competitiveness are only a concern for a very limited number of sub-sectors. Therefore policies and measures to address leakage concerns only need to be targeted to these sectors (representing for the UK less than 1% of GDP for the specific

application). There are basically three options to circumvent leakage from these sectors. First, under an ETS certificates could be grandfathered to the industries that are prone to competitiveness effects from trade exposure. Second, industry and governments could establish cross-country sectoral agreements that level the playing field for each sector. Third, countries or regions could set up a system of border adjustment measures for imports or a system of trade agreements that differentiate tariffs according to the carbon content of traded goods.

This Climate Strategies project will in part build upon the results from the Climate Strategies 2007 project “Differentiation and Dynamics of EU ETS Industrial Competitiveness Impacts”. Still, there is lack of evidence in major European countries and not all sectors are similarly affected within the EU. As in the new EU Directive on the ETS after 2012 provisions on leakage will be included (to be presented on the 23rd January), the project will depart from the European perspective on sectoral exposure to competitiveness effects. This includes the intra-European perspective, with Eastern European countries having different industry structures compared to the EU-15, and moreover, having as their neighbours non-EU trade partners without emission mitigation targets. For each sector there needs to be clarification whether balancing competitiveness concerns also means balancing leakage concerns or vice versa. We will focus on the options for governments to handle the effects. Departing from the European perspective, we will then broaden the scope to include other countries’ climate policies. These countries include Australia, New Zealand, the United States and Japan. The motivation for this is twofold: first, it will address the leakage issue already at the stage of creating other nations’ climate policy. EU experiences could be introduced into the debate, including free allocation or border adjustment as part of unilateral climate policy (as advocated e.g. by the Liberman-Warner Bill in the U.S., or by the French president Nicolas Sarkozy at his November visit in China). Special attention will be given to border adjustments, such as import taxes, export tariffs, standards, and requirements to buy emission allowances for imports or to alleviate exporters from allowance costs.

Second, the international scope needs investigation, as the interaction between countries with ambitious mitigation targets is part of the solution to the leakage problem. We will discuss how to deal with leakage and competitiveness in the longer-term, especially within the post-2012 international climate regime. This includes implications from adjustment measures for major trading partners with or without lower mitigation policy in place, especially the compatibility of border adjustment with world trade law under the WTO, and with the global attempt to reach agreement on climate policy with emerging economies. As the latter deem any environmentally motivated trade measure as disguised protectionism, this part of the project yields important aspects for the future of the global climate regime.

In particular, we plan to address the following issues in this project:

Part I: Illustrating leakage and competitiveness for selected industries in the EU

Empirical evidence for France and the UK (Demailly/Quirion 2006; Neuhoff/Sato 2007) shows that some sectors producing homogenous goods, including cement, basic iron and steel, pulp and paper, or refineries are prone to suffer high costs from carbon pricing through emissions trading. However,

previous work has also clarified that leakage and competitiveness concerns arise only for a very limited number of sub-sectors. Therefore measures to address these effects should be tailored to these sectors (representing in case of the UK less than 1% of GDP). Under the EU ETS, carbon costs occur via two channels: electricity production and direct carbon emissions from production. Electricity cost matter especially for aluminium and chemical production. However, the effects differ among sub-sectors and depend on emission rights allocation methods. Direct and indirect costs, depending on the actual carbon price, could e.g. rise up to 35% of value added in UK cement production (assuming a price of 20 Euro per tonne CO₂). This establishes a strong incentive to recalculate production and location. The quantification of potential effects from carbon pricing illustrates along single sectoral features how leakage and competitiveness interact. It also exemplifies the diversity of the economic interactions in the value chain and across the border. For the Eastern borders of the EU there is another situation under debate. If carbon pricing is affecting costs of electricity production within the EU, new sites in Ukraine, Belarus or Russia could deliver to Poland or the Baltic states at lower cost once the infrastructure is enabling increasing trade.

Range of potential research questions when illustrating leakage and competitiveness: how can leakage and competitiveness effects be measured? Which are the relevant sectors in different EU member countries? Which instruments are most effective in avoiding leakage? What are the trade-offs between leakage and competitiveness effects? What are the regional differences on the sectoral level within the EU and between the EU and other countries or regions? Are there feedbacks from climate policy measures which create unintended leakages (e.g. in making the building sector more energy efficient)?

I.1. Leakage and competitiveness: trade-offs and synergies

I.2: Quantification of effects based on statistics and sectoral interviews

I.3: Regional disparities within Europe: Central Europe, South Europe, UK, Germany

I.4: Regional disparities at the international level: Australia, Japan, California, US

Part II: Free allocation of emission rights to address leakage and competitiveness

Free allocation of emission rights is a potential remedy which can be incorporated in an ETS. However, it does not ensure that firms do not relocate or pass on carbon costs to consumers (based on opportunity costs), both causing leakage. There are inherent problems, too, with dynamic efficiency as incentives to reduce emissions are missing, at least if past emissions are the benchmark for allocation. In order to eliminate the distortions from free allocation, there are a number of specific solutions. These include baselines, benchmark or closure provisions (e.g. Neuhoff 2007). Another issue would be that if there is free allocation for selected industries, should there be differentiation between Member States based on their geographical location and their industrial structure within the EU and how could this be considered. This is an again referring to the New Member States' challenge to contribute to future EU emission reductions, as relocation to Russia or Belarus could cause leakage in Poland or Hungary in sectors where geographical proximity to markets matters and where few sectors dominate industrial production.

Range of potential research questions on free allocation: how can leakage and competitiveness be addressed by free allocation of emission rights? What are the implications across sectors and across regions? How would free allocation affect the effectiveness of ETS?

II.1 Free allocation across sectors, carbon prices, timing and leakage effects

II. 2 Free allocation across regions, carbon prices, timing and leakage effects

II. 3 Free allocation, dynamic efficiency and effectiveness in reducing emissions

Part III: Border adjustment policy

The negative impacts of a unilateral carbon pricing policy on the international competitiveness of industry and on leakage can be addressed by balancing the cost differentials at the border. There are two major ways to implement this. First imported products that compete with domestic ones could be taxed according to the cost incurred by emissions trading in the home market. This concept stems from international trade regulation allowing for border tax adjustment between members of the WTO. However, as EU carbon pricing policy applies the ETS or regulation, but rarely taxes, a definition and calculation of the relevant amount has to be developed. Economic and legal analyses of border adjustment agree that border taxes could be applied to offset competitiveness effects (Ismer Neuhoff 2007; Asselt/Biermann 2007; Godard 2007). Yet, the evolving debate on import taxes as part of an ambitious climate policy within the EU and the US needs clarification with respect to the more practical implications and the international political signals of such a measure.

Second, the alternative to a tax equivalent could be the enforcement of emissions allowance trading for all importers. In the U.S. this is suggested by two Senate bills, introducing “international reserve allowances” issued by the U.S. government (Brewer 2007). Then, importers need to buy emission rights for the carbon content of their imports, although their production takes place abroad. This clearly reduces leakage problems by adjusting the prices of producing substitutes at home and abroad.

For both tools, the political dimension is crucial. The border tax falls under the realm of international trade policy, not climate policy. The application could signal to major trade partners a willingness to impair market access – a very sensitive issue under the current Doha Round of multilateral trade negotiations, especially for the emerging large emitters like China or India. Last but not least, the creation of tariff revenues and their recycling needs to be addressed. They could be earmarked for further climate policy measures, or could be transferred to exporting countries by agreement that instead of import taxes the exporting countries levied the tariff.¹ The imposition of emission allowances for imports is extending the national emissions trading system to foreign producers. In case that importers are forced to buy emission allowances, this implies extraterritorial application of domestic climate policy. Whether or not this is manageable under current trade agreements needs careful investigation and as with border taxes the international political implications could be challenging. It is in accord with WTO trade rules if it applies in

¹Benito Müller, Anju Sharma 2005: Trade tactic could unlock climate negotiations. See <http://www.scidev.net/content/opinions/eng/trade-tactic-could-unlock-climate-negotiations.cfm>

the same, i.e. non-discriminating way to domestic producers and importers. Importers need easy access to fulfilling this import regulation, otherwise they could claim to be discriminated against.

In order to discuss broader implications the project will set up an example of border adjustment for the sectors that have been identified as suffering from competitiveness effects and creating leakage problems.

Range of potential research questions on border adjustments: How can border adjustments help to tackle leakage and competitiveness? What are the economic and legal prerequisites? Is implementation of border adjustments manageable in terms of transaction costs and transparency, including revenue recycling in case of taxes? What types of implementation could be considered? How could an EU border adjustment look like? What are the social costs associated with border taxes?

III. 1 The role of border adjustments for leakage and competitiveness concerns

III. 2 A border adjustment for EU climate policy for cement, iron and steel, and potentially relevant sectors: economic and legal framing, implementation and institutions

III.3 Implications: Will border adjustment forge or hinder international trade and climate partnerships?

Part IV: Implications for international climate policy

EU action against leakage effects needs to be discussed with a view, first, on other countries embarking on unilateral carbon pricing, second, on countries not embarking on such climate policy, and third, on the implications for the UNFCCC climate process. For this, the interaction with other climate policy strategies has to be clarified, namely linking of ETS and sectoral agreements. Latest attempts to set a global price for carbon include linking emission trading schemes across countries. A wider carbon market promises a levelling of the playing field. If ETS of industrialised countries expand across borders, this has implications for the exposure of industries to cost disadvantages, depending on how their trade integration complies with ETS integration. Moreover, sectoral agreements offer another option for tackling leakage and competitiveness as they could address the largest emitting industries not only from countries with ambitious mitigation policy, but also from emerging emitters like China and India. If led by governments, sectoral agreements could offer technological advancements and transfers, while voluntary agreements are very likely to fail on these aims and thus on solving the leakage problems (Baron et al. 2007).

Range of potential research questions addressing policy implications: What political obstacles and trade-offs can be expected from introducing compensating measures at the EU, at a regional (multilateral) or at a national level? Which government level (national, supranational, global) is appropriate to support measures deemed as being appropriate? What are long-term implications? How would a policy that offsets leakage/competitiveness effects relate to the post2012 international regime? How does such a policy relate to climate policy cooperation with emerging economies, to the international trade regime and to other tools of climate protection that could evolve in parallel (e.g. linking of ETS, sectoral agreements)?

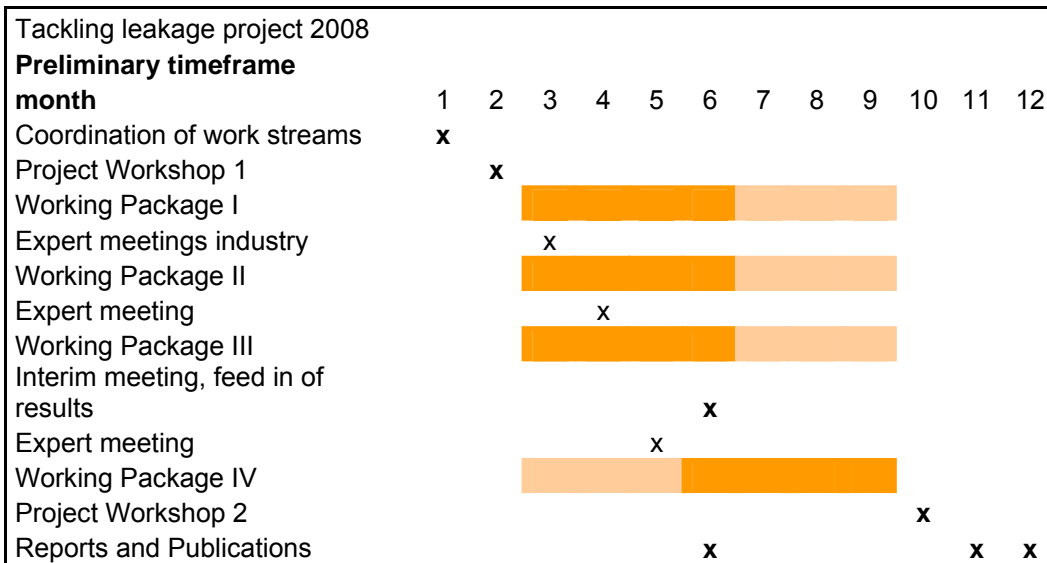
IV.1 The EU policy and interaction with other countries' climate policy

IV.2 Leakage and linking of ETS

JANUARY 2007

IV.3 Sectoral agreements

IV.4 Implications for a post2012 climate regime



Coordinating Institute

The German Institute for International and Security Affairs of the Stiftung Wissenschaft und Politik (SWP) is an independent scientific research institute that conducts applied policy research. It advises the German Bundestag (the German parliament) and the federal government on foreign and security policy issues. Detailed information is available at: <http://www.swp-berlin.org/en/index.php>

Coordinator:

Susanne Dröge, www.swp-berlin.org/

Partners and Stakeholders:

The project will bring together the following experts (tentative list): Karsten Neuhoff, Cambridge; Roland Ismer, Munich; Harro van Asselt, IVM Amsterdam; Thomas Brewer, Georgetown University; MJ Mace FIELD, London; Michel Colombier, Tancrède Voituriez, Matthieu Wemaere (IDDRI, Paris). Researchers from the CBS, Copenhagen; Partners from Poland, Australia, Japan, US, Canada are being enquired. Stakeholders will include experts from industry, research institutions, national governments across Europe, US, AUS, NZ, Japan as well as international institutions (OECD, WTO, EU COM).

References:

- Asselt, Harro van & Biermann, Frank. 2007. European emissions trading and the international competitiveness of energy-intensive industries: A legal and political evaluation of possible supporting measures. *Energy Policy* 35(1), 497-507.
- Babiker, Mustafa H. (2005): Climate change policy, market structure, and carbon leakage, *Journal of International Economics* 65, pp. 412-445.
- Baron, R.; Reinaud, J.; Genasci, M. Philibert, C. (2007): Sectoral approaches to greenhouse gas mitigation. Exploring issues for heavy industry, IEA Information Paper, OECD/IEA, November 2007
- Biermann, Frank, and Rainer Brohm. 2005. Implementing the Kyoto Protocol without the United States: The strategic role of energy tax adjustments at the border. *Climate Policy* 4: 3, 289-302.
- Biermann, Frank. 2005. Between the United States and the South. Strategic Choices for European Climate Policy. Global Governance Working Paper No 17. Appeared revised in *Climate Policy* 5 (2005), pp. 273-290.
- Brewer, Thomas L. (2007): U.S: Climate Change Policies and International Trade Policies: Intersections and Implications for International Negotiations, paper prepared for a seminar of the Georgetown University Center for Business and Public Policy, posted to www.usclimatechange.com on 27 November 2007
- Carbon Trust (2004): The European Emission Trading Scheme: Implications for Industrial Competitiveness, <http://www.thecarbontrust.co.uk>.
- Carnegie Mellon University Green Design Initiative (2003): Economic Input-Output life Cycle Assessment (EIO-LCA) model, www.eiolca.net, Accessed September 2003.
- Crals, Evy and Lode Vereeck (2005): Taxes, Tradable Rights and Transaction Costs, *European Journal of Law and Economics* 20, pp. 199-223.
- Daniel C. Esty (1994): Greening the GATT – Trade, Environment and the Future, Washington/D.C.
- De Cendra, Javier (2006): Can Emissions Trading Schemes be Coupled with Border Tax Adjustments? An Analysis vis-à-vis WTO Law, *Review of European Community and International Environmental Law* 15:2, pp. 131-145.
- Demaiilly, Damien and Philippe Quirion (2005): Leakage from climate policies and border tax adjustment: lessons from a geographic model of the cement industry, www.centre-cired.fr/perso/quirion/demaiilly_quirion_venice_final.pdf
- Demaret, Paul and Raoul Stewardson (1994): BTA under GATT and EC Law and General Implications for Environmental Taxes, *Journal of World Trade* 28:4, pp. 5 – 65.
- Doelle, Meinhard (2004): Climate Change and the WTO: Opportunities to Motivate State Action on Climate Change through the World Trade Organization, *Review of European Community and International Environmental Law* 13:1, pp. 85-103.
- Düerkopf, Marco (1994): Trade and Environment: International Trade Law Aspects of the Proposed EC Directive Introducing a Tax on Carbon Dioxide Emissions and Energy, *Common Market Law Review*, pp. 807-844.
- Dröge, Susanne (2007): Linkages between trade policy and environmental policy. Options for the promotion of environmental standards on processes and production methods, Books on Demand, Norderstedt.
- Dröge, S., Kemfert, C. (2005): Trade Policy to Control Climate Change: Does the Stick Beat the Carrot?, in: *Quarterly Journal of Economic Research* 74 (2), 235-248.
- Dröge, S. (with Biermann, F., Böhm, F., Brohm, R., Trabold, H.) (2004): National Climate Change Policies and WTO Law: A Case Study of Germany's New Policies, in: *World Trade Review*, Vol 3 (2), pp. 161-187
- Fauchald, Ole Kristian (1998): Environmental Taxes and Trade Discrimination, Oslo.
- Gerlagh, R. and Kuik, O.J. (2007). Carbon Leakage With International Technology Spillovers, FEEM WORKING PAPERS, Vol. 7, No. 9: May 4, 2007
- Godard, Olivier 2007: Unilateral European Post-Kyoto climate policy and Economic adjustment at EU borders, Ecole Polytechnique, Pole de Recherche en Economie et Gestion, Paris, Working Paper
- Goh, Gavin (2004): The World Trade Organization, Kyoto and Energy Tax Adjustments at the Border, *Journal of World Trade* 38 (3): pp. 395-423.
- Grosman, Gene M. (1980): BTA: Do they distort trade, *Journal of international economics* No. 10, pp. 117-128.
- G8 + 5 (2007) Joint declaration by the G8-Presidency and Brazil, China, India, Mexico and South Africa, 2007
- Hoel, Michael (2005): The Triple Inefficiency of Uncoordinated Environmental Policies, *Scandinavian Journal of Economics* 107 (1), pp. 157-173.
- Hoerner, Andrew and Frank Muller (1997): Compatibility of Offsets with International Trade Rules, in Staehlin-Witt, E., Blöchliger, H. (eds.), *Ökologisch orientierte Steuerreformen: die fiskal- und ausenwirtschaftspolitischen Aspekte*, Bern.
- Howse, Roland and Regan Donald (2000): The Product/Process Distinction – An Illusory Basis for Disciplining “Unilateralism” in Trade Policy, *European Journal of International Law* no.11, pp. 249-289.
- Hufbauer, Gary C. (1996): *Fundamental Tax Reform and Border Tax Adjustments*, Washington/D.C.
- Ismer, R.; Neuhoff, K. (2007): Border Tax Adjustment: A feasible way to support stringent emission trading European *Journal of Law and Economic* 24: 137–164.
- Ismer, Roland and Norbert J. Sailer (2003) Der neue Artikel 27 OECD-MA: Amtshilfe bei der Beitreibung und Sicherung von Steueransprüchen, *Internationales Steuerrecht* 2003, pp. 622-632.
- Jackson, John H. (2000): Comments on Shrimps/Turtle and the Product/Process Distinction, *European Journal of International Law*, No. 11, pp. 303-307.
- Johansson, Bengt (2006): Climate policy instruments and industry – effects and potential responses in the Swedish context, *Energy Economics* 43: pp 2344-2360.
- Kuik, O.J. (2005). Climate change policies, international trade, and carbon leakage: an applied general equilibrium analysis.

- PhD-thesis, Vrije Universiteit, Amsterdam.
- Kuik, O.J., & Mulder, M. (2004). Emissions trading and competitiveness: pros and cons of relative and absolute schemes. *Energy Policy*, 32(6), 737-745.
- Kuik, O.J., & Gerlagh, R. (2003). Trade liberalization and carbon leakage. *The Energy Journal*, 24, 97-120.
- Kuik, O.J. & Verbruggen, H. (2002). The Kyoto Regime, Changing Patterns of International Trade and Carbon Leakage. In Marsiliani, L., Rauscher, M. & Withagen, C. (Eds.), *Environmental Economics and the International Economy* (pp. 239-257). Dordrecht: Kluwer Academic
- Lang, Michael (2005): "Taxes Covered" - What is a "Tax" according to Art. 2 OECD Model Convention?, *Bulletin for International Fiscal Documentation* 2005, pp. 216-223.
- Mæstad, Ottar (1998): On the Efficiency of Green Trade Policy, *Environmental and Resource Economics*, 11, pp. 1-18.
- Mæstad, Ottar (2007): Allocation of emission permits with leakage through capital markets, *Resource and Energy Economics* 29, pp. 40-57
- Mathiesen, Lars and Ottar Mæstad (2004): Climate Policy and the Steel Industry: Achieving Global Emission Reductions by an Incomplete Climate Agreement, *Energy Journal* 25, pp. 91-114.
- Marceau, Gabrielle (2001): Conflicts of Norms and Conflicts of Jurisdictions – The Relationship between the WTO Agreement and MEAs and other Treaties, *Journal of World Trade* 35 (6).
- Meier, Mike (1997): GATT, WTO, and the Environment: To what extent do GATT/WTO rules allowance member states to protect the environment when doing so adversely affects trade?, *Colorado Journal of International Environmental Law & Policy*, No. 8, pp. 241-282.
- Motaal, Doaa Abdel (2001): Multilateral Environmental Agreements (MEAs) and WTO Rules – Why the “Burden of Accommodation” Should Shift to MEAs, *Journal of World Trade* 35 (6), pp. 1215-1233.
- Mattoo, Aadity and Arvin Subramanian (1998): Regulatory Autonomy and Multilateral Disciplines: The Dilemma and a Possible Solution, *Journal of International Economic Law* No. 1, pp. 303-322.
- Neuhoff, K.; Droege, S. 2007: International Strategies to Address Competitiveness Concerns, Working Paper 6 July 2007,
- Petersmann, Ernst-Ulrich (2000): International Trade Law and International Environmental Law: Environmental Taxes and BTA in WTO Law and EU Law, in: Revesz/Sands/Stewart (eds.), *Environmental Law, the Economy and Sustainable Development*, Cambridge/UK.
- Pitschas, Christian (1994): GATT/WTO Rules for BTA and the Proposed European Directive Introducing a Tax on Carbon Dioxide Emissions and Energy, *Georgia Journal of International and Comparative Law* 24, pp. 479-500.
- Quick, Reinhard and Christian Lau (2003): Environmentally Motivated Tax Distinctions and WTO Law – The European Commission’s Green Paper on Integrated Product Policy in Light of ‘Like Product’ and ‘PPM’-Debates, *JIEL* 6(2), pp. 419-458.
- Rutgeerts, Ann (1999): Trade and Environment – Reconciling the Montreal Protocol and the GATT, *JWT* 33 (4): p. 61-86
- van Calster, Geert (1999) The WTO Appellate Body in Shrimp/Turtle: Picking up the Pieces, *European Environmental Law Review* 8 (4), pp. 111-119.
- Weber, Frank-Andreas, Wolfgang Jenseits and Uwe R. Fritsche (1999): Bestimmung des Kumulierten Energieaufwands (KEA) durch Input-Output- und Prozessketten-Analyse am Beispiel des Sektors NE-Metalle“, Working Paper, Oeko-Institut.
- Zarrilli, Simonetta (2003): Domestic Taxation of Energy Products and Multilateral Trade Rules: Is this a Case of Unlawful Discrimination? *Journal of World Trade* 37 (2), pp. 359-394.
- Zhang, Zhong Xiang (1998): Greenhouse Gas Emissions Trading and the World Trading System, *Journal of World Trade*, 32(5), pp. 219-239.
- Zhang, Zhong Xiang and Andrea Baranzini (2003): What Do We Know About Carbon Taxes? An Inquiry into their Impacts on Competitiveness and Distribution of Income, *East-West Center Working Papers*, No. 56.