

Lecture # 27 – International Trade Agreements

I. Globalization and the Environment

- Three key questions:
 - First, how does international trade affect environmental quality within a country?
 - For example, does it make it more difficult to strengthen environmental regulations?
 - Second, should environmental issues be included in international trade agreements?
 - Third, can sanctions using trade policy be useful to address global environmental problems, such as climate change?
- Classification of environmental objectives
 - Environmental damage internal to the household or firm
 - Indoor air pollution from smoke is an example
 - Higher incomes generally improve the situation
 - National externalities
 - Most pollution falls here
 - External to the individual causing the pollution
 - Damage felt within the country
 - Government intervention necessary to address
 - International externalities
 - Pollution that crosses borders
 - Acid rain
 - Greenhouse gasses
 - Habitat destruction that reduces biodiversity
- Effects of openness to trade
 - Frankel discusses several ways in which trade affects the environment. He speculates that the largest effects from trade on the environment come through its effects on income
 - What are other avenues through which trade can affect the environment?
 - Race to the bottom
 - Fear that trade pressures countries to weaken environmental standards
 - Concerns of workers that stronger domestic regulations will make firms less competitive globally
 - Note that does not require a weakening of regulations. It may just slow the pace at which regulations become more stringent

- How important is this in practice?
 - Environmental regulation typically not one of the most important determinants of a firm's ability to compete globally
 - Labor costs and market access matter more for firm location
 - Gains from trade
 - Consumer power
 - It is through importing Mexican tuna that Americans can influence Mexican fishermen to use dolphin friendly nets
 - Multilateral rules
 - Statistical evidence/information
 - Countries can learn from other nation's experiences
 - Trade allows countries to get more of what they want
 - This may include environmental goods
 - Possible mechanisms
 - Trade encourages innovation
 - Innovation could benefit the environment
 - Ratcheting up of environmental standards
 - "California effect" in the United States
 - Multinational corporations (MNCs) bring state of the art production techniques to host countries
 - Prefer to use the same processes in all locations
 - Want to avoid negative publicity
 - Concerned about liability for meeting standards
- These theories illustrate that international trade can have multiple effects on environmental quality. These can be summarized by the following three effects of economic growth or trade on the environment:
 - Scale effects
 - Higher incomes => increased pollution due to greater consumption.
 - Composition effects
 - Higher incomes=> preferences for cleaner goods.
 - E.g. an economy that, over time, switches from agriculture to manufacturing to service as the dominant sector.
 - Technique
 - Higher incomes => cleaner production processes.

II. Evidence

- Because trade can affect the environment in multiple ways, we turn to empirical evidence to see which effect dominates
 - Most of the studies cited in Frankel suggest the net effect is positive
 - Eg. Copeland and Taylor: Scale effect increases pollution, but technique effect reduces pollution more
 - Frankel notes that CO₂ may be an exception
- Evidence on pollution haven hypothesis
 - Early studies looked at variation in pollution abatement costs and trade flows in a cross-section
 - These studies found no relationship
 - Suggested race to the bottom not a concern
 - Two critiques
 - Doesn't account for unobserved heterogeneity across industries
 - More recent studies address this using more disaggregated data
 - Example: Levinson *et al.* ("[Footloose and Pollution Free](#)", [Review of Economics and Statistics, 2005](#))
 - They argue that aggregate data misses effects in specific industries.
 - Their work proposes three reasons why others find little effect
 - Most trade is between similar countries (North/North)
 - If look specifically at North/South trade, find an effect.
 - They divide countries into low and high environmental costs
 - When US environmental costs rise, net imports to low cost countries increase. Elasticity is 0.2 (10% increase in US costs => 2% increase in imports)
 - Not all industries are mobile
 - Industries are mobile if:
 - Low benefits to agglomeration
 - Low transport costs
 - Industries that are mobile are more sensitive to environmental costs
 - Not all industries are pollution intensive
 - Surprisingly, they do not find a bigger effect of environmental costs on pollution intensive industries, unless they control for mobility.
 - *It appears that pollution intensive industries are also less mobile!*

- However, this also means that the argument that there is no pollution haven effect because most PACE costs are insignificant is not sufficient.
- Endogeneity of pollution abatement cost measures
 - Policies may be set simultaneously
 - E.g. governments relax environmental regulations on firms facing competition for imports
 - Thus, trade policy could determine environmental regulation, rather than the other way around
 - Using an instrumental variable approach to address this suggests more stringent regulation leads to greater net imports (e.g. domestic firms are less competitive)
 - Elasticity of 5.8
- Levinson and Taylor ([2008](#))
 - Using indirect measures of environmental regulations (such as PACE), may bias estimates downward.
 - Thus, findings of small or non-existent pollution haven effect may be because of measurement error
 - Use panel IV where the instruments use geographic variation in factors that affect pollution demand and supply
 - Study trade between US, Mexico, and Canada from 1977-1986
 - Results
 - Environmental regulations have a large significant effect on trade flows
 - 1% increase in PACE increases net exports from Mexico (0.4%) and Canada (0.6%)

- Aichele and Felbermayr ([2012](#), [2015](#))
 - Study effects of Kyoto Protocol on trade and emissions from 1995-2007
 - Use input-output tables to attribute the emissions from production in each country to where the goods are consumed
 - Compare countries that ratify the Kyoto Protocol and must reduce emissions to those that don't
 - 2012: Countries that ratify the Kyoto Protocol shift emissions to developing countries
 - Emissions in country fall by 7%, but import of carbon increases by 14%
 - Suggests carbon footprint increases by about 7%
 - 2015: Study the carbon content of trade from 1995-2007
 - Use a gravity model
 - In bilateral pairs of countries with importer committed to Kyoto and exporter not committed, Kyoto Protocol led to a 5% increase in imports
- Tanaka et al. ([2021](#)) examine the relocation of lead-acid battery recycling to Mexico in response to the imposition of more stringent U.S. air quality standards.
 - Upward trend in US exports of used lead-acid batteries increased after a 2009 policy change
 - Found a 39% increase in low birthweight incidence (a consequence of lead exposure) near battery-recycling plants in Mexico after the change

- These recent studies provide evidence of a Pollution Haven effect
 - Environmental policy affects trade flows
 - But does trade affect environmental outcomes?
 - Here there is less evidence
 - Levinson ([REEP 2010](#)) shows that the U.S. imports proportionally more clean goods and fewer polluting goods than 30 years ago
 - This is true despite U.S. manufacturing being relatively cleaner
 - Focuses on air pollution
 - Measurement is a challenge
 - Pollution abatement expenditures are an imperfect proxy
 - Direct measures require attributing pollution to the right final product
 - One possible explanation is that labor intensive industries have moved abroad, and they are relatively cleaner
 - Levinson ([2009](#), [2015](#)) studies by measuring technique, scale, and composition effects
 - Scale and composition effect measured using observed data
 - Technique effect calculated as residual of total observed effect minus scale and composition effects
 - Compares actual pollution levels to what they would have been if:
 - Pollution intensities remained the same (e.g. no technique effect)
 - But manufacturing output (scale effect) and mix of goods produced (composition effect) allowed to change
 - Figure 1 in the 2009 paper is an example
 - Scale effect: US manufacturing increased by 24% from 1987 to 2001
 - Total SO₂ emission from US manufacturing fell by 27%
 - If emissions per unit of output held constant (e.g. no technique effect), pollution would have increased by 12%
 - Pollution would have increased 12%
 - The difference between this increase and the increase in manufacturing is due to the change in composition of production.
 - The composition effect reduced pollution by 12%.
 - The remaining difference is the technique effect
 - Leads to a 39% drop in emissions
 - Explains 77% of the total gap between emissions and output
 - Trade plays a smaller role
 - Increased imports between 1987 and 2001 accounts for less than 1/3 of the shift in US manufacturing

- Shapiro and Walker ([AER 2018](#)) find similar results using plant-level data from 1990-2008
 - Their plant-level data allows them to decompose U.S. manufacturing emissions by *product*, rather than by industry
 - Captures changes towards cleaner products within an industry, which previous studies do not
 - Most changes in emissions are due to within-product changes in emissions intensity, rather than changes in the product mix
 - Trade once again plays a small role
 - Figure 5 in their paper summarizes the key results
 - The blue line is actual data
 - Dashed lines are counterfactuals holding all but one factor constant
 - Red stars: only foreign completion changes
 - Represent foreign productivity, foreign environmental regulation, and foreign exporting costs
 - Little effect on emissions. Why not?
 - China's exports not in particularly dirty sectors
 - Competition from China reduced employment more than it reduced manufacturing output
 - Red dots: US competitiveness shock only
 - Represents changes in US productivity and trade costs for exports
 - Again, little effect
 - Red triangles: US expenditure share shocks
 - Represent share of country's expenditure on sector s in a counterfactual versus the baseline year
 - Captures changing expenditure shares across polluted products
 - After 2000, expenditure on pollution-intensive sectors would have otherwise increased pollution
 - There was increased spending on pollution-intensive sectors
 - Pollution would have increased 10-20% if all else was held constant
 - Red squares: US regulatory shocks
 - Most closely matches historical trends
 - Thus, it is changes in technique induced by environmental regulation that explains most of the decrease in emissions, not competition from international trade.

- These results are consistent with other recent studies. Small composition effects suggest trade has little effect on emissions
 - Copeland *et al.* ([2021](#)) calculate scale, composition, and technique effect for several countries.
 - Magnitude of composition effect generally smaller than scale effect, and direction varies by country
 - E.g. in China, composition increased CO₂ emissions, but decreased NO_x
 - In almost every country, the technique effect is larger than the composition effect
 - Often larger than the scale effect as well.
 - How to reconcile small net effects with the empirical studies mentioned earlier showing how environmental regulations affect trade flows
 - May be that effect of trade is statistically significant, but small magnitude
 - Competition encourages improvements in technique
 - Barrows and Ollivier ([JEEM 2018](#)) find the composition effect similar in magnitude to the technique effect in India.
 - Gutierrez and Teshima ([J Dev. Econ. 2018](#)) found that after Mexico lowered tariffs, firms selling to the local market faced more competition
 - Lead to increased energy efficiency
 - Both results suggest evolution of emissions may differ in developing and developed countries

III. Should Trade and the Environment Be Linked?

- Two questions
 - Should trade negotiations include negotiations over environmental policies and setting of environmental standards?
 - Should environmental agreements be explicitly linked to existing trade agreements?
- Political economy issues
 - In most cases, both sides (e.g. industry and environmentalists) are represented in policy debates
 - But if a good is produced in foreign countries, foreign producers receive less weight in the debate
 - As a result, environmental regulation can discriminate against foreign firms
 - Example: Europe and GMO crops
 - Note that GMO seeds were developed by US companies
 - They would have less voice in the European political process
 - Three goals of global governance
 - Globalization
 - At a minimum, desirable for economic benefits
 - Regulation
 - Desirable to regulate externalities
 - National sovereignty
 - Different countries have different needs and preferences
 - Nations take pride in political independence

- Frankel argues that these three cannot be achieved simultaneously
 - Complete laissez-faire (lower left corner of Frankel's figure 2) doesn't protect environment
 - Global regulation (lower right corner) can protect environment, but doesn't respect national sovereignty
 - Isolationism (top corner) respects sovereignty and protects environment, but without global interaction
- Possible exceptions
 - Even for national externalities, little evidence of race to the bottom
 - Countries can protect the environment even if globalized
 - International environmental problems cannot be solved without globalization
- Should environmental agreements be linked to existing trade agreements?
 - Negotiation linkage: should new negotiations on trade policy and environmental policy be combined?
 - Gains from combining make sense if issues are similar
 - But, less likely to be the case for trade and environment
 - More likely to increase the complexity of negotiations
 - Possible advantage is that can negotiate over a wider range of policy instruments, providing more opportunities for compromise and compensation
 - Enforcement linkage: Should the WTO enforce the environmental policy obligations of an existing treaty through trade concessions?
 - WTO rules on this not yet fully determined
 - Benefits
 - Encourages cooperation within the environmental agreement
 - Compensates for the lack of a supranational authority to enforce environmental agreements
 - Two studies find no enforcement gains if pollution is purely local
 - If there are transboundary concerns, case for linkage is stronger
 - Consider differences between global pollutants such as CO₂ and local pollutants such as water pollution or particulates. Should global trade agreements consider local pollution specifically?
 - E.g. should trade agreements require all participants to have minimum environmental standards?

- Should we negotiate over environmental policy?
 - Consider differences between global pollutants such as CO₂ and local pollutants such as water pollution or particulates. Should global trade agreements consider local pollution specifically?
 - E.g. should trade agreements require all participants to have minimum environmental standards?
 - Should countries have discretion in environmental policy, or should negotiations bound countries to both trade and environmental policy?
 - Arguments in favor
 - By setting policy unilaterally, a country can impose costs on foreign firms
 - For example, lowering an environmental standard for an industry that competes with imports
 - Will lower prices in the domestic market
 - Affects the importer as well as the domestic firm
 - Standards may not be efficient globally if these costs to others are not considered
 - Note that when trade agreements limit tariffs, countries can use environmental policy as a means to help domestic firms
 - Similar to the race to the bottom argument
 - Early empirical evidence of this is limited
 - Recent studies find evidence of a pollution haven effect
 - Arguments against
 - Contracting costs
 - Designing an agreement that covers every possible contingency is too costly
 - Allowing some discretion of policy instruments reduces contracting costs
 - Since using environmental policy for protection is less efficient than using trade policy directly, efficiency suggests focusing on direct trade policy first
 - But, recent evidence supporting pollution haven hypothesis suggests contracting costs may be worthwhile
 - Market access and national sovereignty
- How are trade policy and environment becoming linked?
 - World Trade Organization (WTO) rules limit environmental considerations.
 - Environmental measures should minimize effect on trade
 - Must be applied in a non-discriminatory way.
 - As a result, countries are using bilateral trade agreements to address environmental concerns.
 - The EU refuses to sign new trade deals with countries that have not ratified the Paris Agreement
 - The European Free Trade Association offers Indonesian palm-oil exporters lower tariffs if they meet certain environmental standards.
 - In 2018, China banned the import of plastic waste. Forced rich countries to take more responsibility for waste they generate.

- Should trade policy be used as an enforcement mechanism for climate change?
 - One challenge with climate policy is leakage
 - If a country reduces emissions at home, but then imports goods generating carbon emissions abroad, global emissions have not fallen
 - Moreover, countries have an incentive to free-ride by not partaking in climate agreements
 - A border tax on carbon would penalize free-riders
 - Implementation options
 - Base the tariff on the carbon content of domestic production
 - Easier to calculate
 - Taxes goods from each country uniformly
 - Because domestic carbon content lower, tariffs would be smaller
 - Base the tariff on the carbon content of imports
 - Creates a level playing field for domestic firms whose costs increase due to climate regulation
 - But, difficult to implement
 - How do we know the carbon content of each good?
 - Does it matter where the parts that make up a car come from?
 - Which emissions to include in a border tax adjustment (scope)?
 - Scope 1: only direct emissions from production of goods and services
 - Scope 2: emissions created from purchased energy
 - Scope 3: emissions created from purchased products and possibly from downstream combustion of fossil fuels
 - Calculating emissions
 - Emissions first assigned to a facility
 - Then assigned to the various products the facility produces
 - Typically only applies to products above a minimum threshold emission intensity

- What price to charge?
 - Typically related to a local carbon price or the price implied by other local policies
 - Translating non-carbon-price policies into an equivalent carbon price will be challenging
 - Tax imports or subsidize exports?
 - Import fee applied by nations where a product is sold
 - Export rebate given to producers by the home country government when exporting, so that local firms are not at a disadvantage
 - For example, the EU subsidizes producers of aluminum, cement, fertilizers and steel to compensate them for the cost of the EU-ETS
 - Will be phased out between 2025-2035, to be replaced with import fees
 - Note that this protects firms selling the EU from competition that faces weaker carbon policy, but exporters losing the subsidies will now have to compete in markets with lower carbon policy.
 - Potential for leakage if it makes goods cheaper where sold (e.g. because local producers lower price in response to competition)
 - Thus, export rebates less commonly proposed
- Benefits of a BCAM
 - Levels the playing field
 - Reduces leakage
 - Raises revenue
 - Could help encourage other countries to enact climate policy
- Costs of a BCAM
 - Difficult to implement. Administrative costs could be high
 - Requires quality data from foreign trade partners
 - Will it lead to retaliatory trade policy?
 - Poor countries at a disadvantage
 - Less likely to avoid tariffs by reducing emissions
 - Question: Are there ways to avoid the tax?
 - Could sell greenest imports to Europe and other goods elsewhere (“resource shuffling”)
 - Happened in California: power companies send greenest electricity to California
 - Could change supply chains – buy inputs from overseas that are not covered by tariffs on final goods.

- Is it legal under WTO rules?
 - If exporting to a country, that country must give your companies the same access to the market that local firms have.
 - Possible arguments
 - A BCA must have an objective methodology, cannot charge more than what domestic producers face on similar product, and the export rebate cannot exceed the domestic tax.
 - Importing nations cannot credit foreign countries that have more stringent regulations.
 - Could argue for an exemption from WTO rules by saying the lack of climate policy is an actionable subsidy
 - Must be seen as addressing leakage and not as a trade barrier
 - Thus, some importing countries will be exempt because they have satisfactory climate policy