Master Thesis

Does international trade liberalization constraint (international and) domestic environmental regulation?

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CONTENTS

ABSTRACT

Does international trade liberalization constraint (international and) domestic environmental regulation?

In this thesis, our objective is to present the connection and the dependence that exists between trade and environment. We firstly mention the importance of trade liberalization to different sectors and mainly the interaction of trade with the environment. There is a remarkable connection between trade and environment that has impelled economists to investigate this interdependence intensively. We present the effects of free trade to the environment and also the positive and negative consequences of this connection. Is there a need for cooperation among nations in order to face environmental problems? That is a main question discussed in this thesis. We discuss the relation among trade, growth and environment analyzing the environmental Kuznets curve (EKC) hypothesis from the aspect of scale, composition and technique effect. After having discussed the trade-environment nexus, we refer to some effective instruments in order to face domestic and transnational pollution.

CHAPTER 1: *INTRODUCTION*

Is trade liberalization beneficial for the environment and in which way trade and environment are connected? What is the current trade regulation and which are the consequences of trade-environment linkage? Is there a need for cooperation among nations in order to face environmental degradation? These are some crucial questions discussed in the current bibliography related to the trade-environment nexus.

OECD, an organization whose aim among others, is to provide solutions in environmental problems related to trade, had firstly showed the trade-environment linkage in the early 1970s. Nowadays, there is World Trade Organization (WTO) where member governments try to sort out the trade-environment problems they face with each other.

The aim of this thesis is to depict the relation between trade and environment. There are researchers who support that these two policies must be connected and other who contradict the above notion. We will try to clear this debate in chapter three. What is commonly accepted is that trade liberalization affects environment not only with a positive way, but also with a negative, too. So we present an argumentation to examine if cooperation among nations is needed to face negative consequences and to gain from the positives.

Another important issue examined in the thesis is the Environmental Kuznets Curve hypothesis (EKC). According to the EKC hypothesis, as the economy of a country develops the degradation of the environment increases, but when the economy reaches a specific level of income per capita, known as turning point, pollution starts to decline.

Sustainable development is a concept supported by environmentalists who believe that economic growth can lead to environmental improvement if managed with the right way. That is why nations must take the necessary precautions in order to connect trade, environment and growth in such a way, so as to reduce pollution and economic degradation in the long term.

It is necessary that policy measures must be taken by nations for the protection of the environment. These measures include WTO agreements such as Agreement on sanitary and phytosanitary (SPS) and Agreement on Technical Barriers to Trade (TBT). There are also trade and environmental barriers, such as Environmental regulations and standards, environmental labeling and Economic instruments.

The structure of the thesis is the following: Chapter 2 underlines the importance of trade liberalization and its benefits, Chapter 3 refers to the connection between trade and environment and presents the positive and the negative consequences of this relationship, in Chapter 4 the EKC hypothesis and its theory is analyzed, Chapter 5 deals with environmental or trade policies that nations should adopt in order to reduce pollution and Chapter 6 concludes.

CHAPTER 2: *TRADE LIBERALIZATION*

In this chapter we will discuss about trade liberalization, giving its background and its definition. We are showing the benefits of free trade and finally the importance of trade liberalization to different sectors. One of those sectors is the environment, and its connection with free trade will be the main subject of the thesis.

2.1 Definition and theory

Trade liberalization refers to the removal of government incentives and restrictions from trade between nations. Economists in particular have debated the advantages and disadvantages of trade liberalization for centuries. Classical economists such as David Ricardo and Adam Smith were supporters of free trade, believing that it led to the economic prosperity of civilizations. They pointed to examples of civilizations that had flourished as a result of increased trade liberalization, such as Egypt, Greece, and the Roman Empire, as well as the more modern example of the Netherlands. On the other hand, those who argue against rapid trade liberalization cite statistical evidence that free trade can harm the ecology of the marketplace and have negative effects on poor countries.

Under trade liberalization or free trade, prices reflect true supply and demand. Free trade differs from other forms of trade policy where the allocation of goods and services among trading countries are determined by artificial prices that may or may not reflect the true nature of supply and demand. These artificial prices are the result of protectionist trade policies, whereby governments intervene in the market through price adjustments and supply restrictions, so as to increase or decrease the cost of goods and services. The governments' intervention includes subsidies, taxes or tariffs and non-tariff barriers, such as products standards, environmental labeling and marketable permits which are specifically cited in chapter 5 of the thesis. Respectively, there can be international trade agreements such as North

American Free Trade Agreement (NAFTA) or Central America Free Trade Agreement (CAFTA) which depict cooperation between nations in order to reduce interventions and to raise trade. Besides, most countries in the world are members of World Trade Organization (WTO). WTO is an organization which had replaced General Agreements on Tariffs and Trade (GATT) on January 1, 1995 under the Marrakech Agreement and has been created so as to advance trade between nations, to deplete trade barriers and tariffs, and to keep services markets open.

One ordinary example is the elimination of Canada's trade barriers. Trade barriers between Canada and the rest of the world have been steadily declining over the last two decades, first with the Kennedy round in the 1970s and then with the Tokyo round in the 1980s. Starting in 1989, two major changes occurred in the trading environment facing Canadian manufacturers that led to deep cuts in trade barriers. First, the Canada-United States free trade agreement committed the two countries to gradually eliminating all manufacturing trade barriers. Second, the North American free trade agreement (NAFTA) brought together Canada Mexico and United states. Enumerating the benefits that accrued to Canadian manufacturing producers as they adjusted to trade liberalization provides valuable lessons for other countries as they contemplate wider trade partnerships. As trade barriers fell, more Canadian plants -one of the several sectors that had been affected by trade liberalization-entered the export market and exporters increased the share of shipments sold abroad. So, trade liberalization was a key factor behind the strong export growth of the Canadian manufacturing sector.

2.2 Benefits of free trade

a. Trade liberalization enhances growth

Classical economic analysis shows that free trade increases the global level of output because free trade permits specialization among countries. Specialization allows nations to devote their scarce resources

to the production of the particular goods and services for which that nation has a comparative advantage. The benefits of specialization shift outward the global production possibility frontier. This shift in the global production possibility frontier indicates that the absolute quantity of goods and services produced is highest under free trade. Not only are the absolute quantity of goods and services higher, but the particular combination of goods and services actually produced will yield the highest possible utility to global consumers. Trade allows for learning about superior technologies, different products and new forms of organization. Exposure to this knowledge leads firms to experiment with new strategies and to reap the benefits thereof. And in a world where there is a lack of competition trade has the additional effect of increasing competitive pressures (Licandro and Navas Ruiz, 2010).

One of the major purposes of trade liberalization is to promote economic growth by capturing the static and dynamic gains from trade through a more efficient allocation of resources, greater competition, increase in the flow of knowledge and investment and, finally, a faster rate of technological progress. Barriers to trade and anti-export measures will reduce export growth below potential and that will eliminate the benefits achieved through trade. (Santos-Paulino and Thirlwall, 2004)

b. <u>Increasing commerce makes war less likely</u>

War is made less likely as a function of economic interdependence, a key feature of Liberalism. Liberalism suggests that nations who share strong mutually-beneficial trading relationships will be far less likely to wage war with one another. This is because Liberalism does not stipulate that states are unitary actors, that is, the state does not function as a single human would. Quite to the contrary, states are composed of a variety of competing actors, and international institutions, such as trade agreements, WTO, etc. (Morrow 1999, Griswold 1998).

c. <u>Free trade reduces poverty</u>

There are plenty of "moral" and "economic" arguments in bibliography which underpin that increased trade is one of the best ways to relieve extreme poverty throughout the world (Cline 2004, Roemer and Gugerty 1997). Opposing free trade is tantamount to supporting economic injustice. The sum of this point is that economic and moral issues cannot properly be separated, and that any other particular socioeconomic problems can be combated most effectively through rising living standards. There is the opinion that reducing subsidies and tariffs would improve the well-being of the global poor more than any agricultural, political, or environmental program (Hassoun, 2008). WTO is an organization that can take responsibility to reduce poverty through compensatory trade or environmental measures. Perry is an economist who supports that free trade is a crucial factor for reducing poverty. He used a parametric method to estimate the income distribution for 191 countries between 1970 and 2006, comparing trade's evolvement with poverty and ended up that poverty rates have fallen by 80% in that period.

d. <u>Free trade enriches cultures</u>

Concepts such as cultural conservatism and nationalism are premised on the notion that a given culture is both valuable and endangered. Attempts to erect trade and investment barriers deprive cultures of the positive influences that keep it from stagnating. This argument focuses on the fact that every culture evolves and that free trade supports cultural exchange, as cultural products can be traded freely. Coyne and Williamson (2010) found that free trade has a positive and highly significant impact on culture. In other words, the more open a country is to the trade, the more willingly it is to the exchange of ideas, beliefs and values.

e. Free trade enhances national security

Free trade can enhance national security, on the condition that a nation does not trade with its enemies. Free trade increases a nation's relative power vis-à-vis its rivals, because free trade gives optimal economic advantages, which are translated into more economic and military power and more technological innovation. A clear example is the US, which enjoys to a certain degree free trade. Without this quite liberal trade the military burden (i.e. its military expenditures of about $500 billion) would weigh heavy on its economy. The closed-economy Soviet Union would have had to spend 15-20% of its GDP if it wanted to equal the US (which now spends almost 4% of its GDP). Surely, this argument contradicts the above one that increasing trade makes war less likely, but it must be understood that every government is free to use trade regulation according to the way they would prefer to. So, a nation that has national security as a priority can use gains from trade for military and defense purposes (Sohn and Dong Yeo, 2005).

Given the above arguments someone could support that trade liberalization is one way, on the way for prosperity. However we could use as a counter-argument some studies that have identified no association, or even a negative association between trade liberalization and economic growth. Some of the reasons why the literature is inconclusive relate to the fact that different analysts use different proxies for liberalization and rely on different methodologies. In addition, of course, a given sample will include liberalizations of differing intensities and durations. A substantial literature on the effects of trade liberalization on a range of macroeconomic aggregates and microeconomic adjustment processes has developed, in parallel with the proliferation of trade reform programs. The evolution of thinking on trade orientation and growth has been charted by Krueger (1997). She emphasizes the accumulation of evidence of a positive correlation between growth of exports and growth of GDP, pointing that, countries with a more open trade orientation appearing to grow faster through time. Edwards (1998) has argued that the positive association between

trade and openness is robust to the measure of openness used, though Rodriquez and Rodrik (1999) challenge this conclusion, arguing that although there is little systematic evidence linking inward oriented trade policies and growth, the evidence linking outward orientation and growth overstates the relationship between the two (Edwards 1998, Krueger 1997, Rodrik 1997, Rodriguez and Rodrik 1999).

All the above arguments are presented just to depict the importance of trade liberalization to different sectors. However there is great interaction between trade and other factors, with the same importance as trade. I refer to the interaction between trade and environment, which is the main theme of this thesis. There is a remarkable interdependence between trade and environment; and this relation has engaged many economists, who try to find the roots, the advantages and the consequences of this connection. Free trade has many beneficial effects on different sectors, and surely on the environment, but sometimes can cause environmental degradation. So, we are going to clarify this connection, discussing about the negative and positive consequences of this relationship, beginning from the next chapter.

CHAPTER 3: *TRADE AND ENVIRONMENT*

In this chapter we will present the relationship between trade and environmental policy and we will discuss the idea of connection or separation of these two policies. There are many consequences -positive and negative- resulting from this linkage, so we will try to explain if cooperation among nations can offer solutions in order to face environmental problems.

3.1 The background

Initial concerns about the effect that increased trade would have on the environment emerged at the beginning of the 1970s, the same time the environmental movement in the industrialized states begins gaining strength. At that time, Organization for Cooperation and Development (OECD) - a multilateral organization composed of members from the industrialized nations- was concerned about consequences of environmental regulations on economy. OECD members' concerns focused on the issue of "competitiveness", and how the new wave of environmental laws requiring corporations to invest in pollution reduction equipment, might harm their competitiveness in the trade arena.

However, trade and environment issues started being important in the beginning of the 1990s, after the establishment of General Agreement on Tariffs and Trade (GATT) and its decision on the tuna/dolphin case. In this particular case - according to the GATT article XI which limits the use of import prohibitions or restrictions- the WTO ruled the US policy of banning imports of tuna from states that used purse seine fishing techniques to catch tuna, and subsequently kill dolphins, violated the terms of GATT. In the same way, WTO in 1998 ruled against a US ban on shrimp imports caught without Turtle Excluder Devices (TEDs), equipment developed to help save endangered sea turtles. The above incidents brought the issues associated with trade

and the environment to national attention (Nordström and Vaughan, 1999).

3.2 Current regulation

The current rules of the game in the international trading arena are problematic with respect to many international environmental treaties. Environmentalists express concern that years of work negotiating environmental treaties could be disrupted if WTO rules of trade are used to nullify those environmental enforcement measures under the assumptions that they violate free trade principles. The need for more clarity about the relationship between trade and environment regimes builds on the fact that the WTO has a formal dispute mechanism built into the system for member states with trade conflicts. When these conflicts are related to an existing environmental agreement that also is related to trade, the legal issue becomes one of assigning weight to each set of laws in a dispute settlement procedure. Generally dispute settlement procedures can be weighted to either trade considerations, environmental considerations or a combination of both.

The most recent list presented by the Trade and Environment Committee of the WTO, presents fourteen environment agreements in which trade is intensively discussed:

- international convention for the conservation of international plant protection convention

- Atlantic tunas

- convention on international trade in endangered species of wild fauna and flora

- Montreal protocol on substances that deplete the ozone layer

- Basel convention on the control of transboundary movements of hazardous wastes and their disposal

- convention on biological diversity

- Cartagena protocol on biosafety

- United Nations Framework Convention on climate change

- Kyoto protocol

- international tropical timber agreement

- United Nations fish stocks agreement

- Rotterdam convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade

- Stockholm convention on persistent organic pollutants

Besides, the most recent legislation that holds in order to solve the conflicts between trade and environment consists of four basic principles, mutual supportiveness, no subordination, deference and transparency.

(a) Mutual supportiveness: Under WTO rules, no country shall be prevented from taking measures for the protection of human, animal life, plant life or of the environment, ensuring the level of protection it considers appropriate. Efforts to safeguard the non-discriminatory multilateral trading system must go hand-in-hand with the commitment to sustainable development.

(b) No subordination: Both MEAs (multinational environmental agreements) and WTO Agreement constitute legitimate bodies of international law of equal standing. Due respect must be accorded to each.

(c) Deference: MEAs and the WTO have distinct competences within a mutually supportive multilateral governance framework. Their

respective expertise in environment and trade matters shall be valued and utilized.

(d) Transparency: with a view to enhancing the mutual supportiveness of trade and the environment, a mechanism for regular information exchange between the WTO and MEAs shall be implemented.

3.3 Trade-Environment policies: Connected or separated policies?

Taking under consideration the above issues, the crucial question arising is whether trade and environmental policies should be connected or separated. In the past, the two issues have tended to be dealt with separately. Trade agreements, such as the General Agreement on Tariffs on Trade (GATT), dealt with trade issues; while environmental policy was dealt with either domestically or in separate multilateral environmental agreements, in the case of transboundary pollution.

Daly and Goodland (1994) have argued that free trade and environmental policies should not be linked, because there are concerns that liberalization may lead to a 'race to the bottom' in environmental policy. Namely, governments could fail to enforce or implement proper environmental standards because of fears that they will place local firms at a competitive disadvantage.

Those who wish to separate trade and environmental policy-making also fear that high-income countries will impose stringent environmental standards on low-income countries, removing their natural comparative advantage and subjecting them to trade barriers if they fail to perform up to developed country standards. For example emission limits, waste management and disposal rules, recycling regulations and labeling policies that will be imposed in low-income countries may shape the trade flows and create conflicts between nations and trade-environment policies. (Bhagwati, 1999)

Moreover, it is generally agreed that while trade liberalization may seem relatively straightforward -especially if there is a clear focal point, such as free trade- environmental negotiations are represented by more complicated issues. Especially if there are serious disputes about the importance of environmental problems like the determination of

emission levels or abatement cost. Thus, it is clear that international negotiations on trade and environmental policy have often proceeded independently and the optimum solution is to deal with environmental and trade problems separately. That is why supporters of separation of trade-environment policies, such as Bhagwati and Srinivasan, 1996 appeal that efficiency would occur only if trade problems are dealt with using trade policy instruments, and environmental problems with environmental policy instruments. But also, prudence follows from concerns that linkage may slow down trade negotiations or create new avenues through which special interest groups can block imports to protect their profits at the expense of consumers.

On the other hand, Grossman and Krueger (1993) have argued that fears of a race to the bottom are unsupported by empirical evidence and that trade may be good for the environment because it will raise real incomes, allowing countries to afford better environmental policy. These were some crucial reasons that have led to the creation of a working group in the World Trade Organization (WTO).

Besides, transboundary pollution spillovers make trade-environment linkage a necessity. There are lots of activities of nations that can lead to environmental degradation, thus the need to control transboundary externalities makes trade-environment linkages essential from the point of view of good economic policy-making. In this respect, linkage is unavoidable because changes in trade barriers will shift pollution reaction functions and affect global pollution. Conversely, restrictions on global pollution will affect the volume and possibly the pattern of trade.

Another argument that shows that trade and environment should be connected is that free traders must take environmental issues seriously and that is a political necessity. Erasing environmental concerns generates unnecessary and avoidable political resistance to liberalized trade. Many environmentalists believe in "sustainable development" and will support freer trade if they feel that pollution and natural resource management concerns are being taken seriously. (Bergsten, 1992 and Esty, 1998)

3.4 Consequences of linking trade with environmental issues

3.4.1 Positive consequences

a. Raise competitiveness

Competitiveness, among other things, refers to regulatory pressure that encourages industrial innovations and often results in new commercially valuable products or industrial processes. A tightening on environmental regulation stimulates technological innovation and has positive effects on both the economy and the environment – for example, saving money by saving energy.

All the above belong to the "Porter Hypothesis" (Porter, 1991) that has been lately the subject of a great deal of empirical research. For example, Jaffe and Palmer (1997) examine the statistical relationship between pollution-control expenditures and innovative activity across US industries. The authors find that pollution-abatement expenditures may induce additional R&D, but seemingly of a limited commercial value beyond helping firms comply with the regulations. While the result is not strong enough to give unambiguous support to the Porter hypothesis, the authors conclude that there is at least no systematic evidence that a good environmental performance comes at the expense of reduced profitability. We could underline Repetto's (1995) research which has reached the same conclusion. Using data and pairing them on the financial and environmental performance of thousands of large manufacturing plants in the United States, he concludes that "there is no overall tendency for plants with superior environmental performance to be less profitable."

Competitiveness concerns seem to have been overstated in the public debate (Jaffe, 1995 and Levinson, 1996). For example, abatement costs in the United States, while perhaps higher than in most other countries, still only account for a few percentage points of the production costs (OECD, 1997). Competitiveness problem is determined by other factors such us wages, payroll taxes, capital costs, import tariffs on intermediate inputs, corporate taxes, and so on. Surely, this is not an

argument for ignoring concerns about pollution-abatement costs. But if the costs can be reduced without compromising the environmental objective by employing modern market-based instruments instead of traditional command-and-control regulations, so much better.

The reason why the "Porter Hypothesis" may hold for some industries but not for others could be that some industries are regulated in a more efficient manner than others (Repetto, 1995). Some industries are able to adopt more stringent environmental or trade regulation than others, and that can lead to growth expansions and further economic development. Berman and Bui (1998) examined the effects of US air-quality regulations on the productivity of oil refineries from 1977 to 1993, a period marked by a gradual tightening of standards. They found that oil refineries located in areas with stringent regulations, such as southern California, recorded faster productivity growth than oil refineries operating under less stringent regulations, because the former were forced to advance their investment plans in new technologies. Moreover, studies that focus on the profitability of firms have not been able to detect that superior environmental performance comes at the expense of reduced profitability (Cohen and Fenn, 1997 and Repetto, 1995).

b. Eco labels and Iso

The continuously increasing environmental concern has pushed many countries to introduce green or eco labels which provide valuable information to consumers about the features of the product and how much harmful or friendly is for the environment. Eco label is some kind of uniform standards whose goal is the presentation of technical barriers to trade and it was first put on the map in the Uruguay's round which was launched in 1986.

A representative example is the dominance of Netherlands in horticultural exports such as cut flowers. However, Dutch dominance on world markets has been recently eroded by the emergence of horticultural production originating in developing economies. It is true

that the flower industry is chemical and energy-intensive since most production occurs in greenhouses. However the Dutch horticultural sector has been differentiated from the others because of introduction of green labels (for example environmental standards defined by flower auction houses). In 1995, the independent environmental foundation "Milieukeur" awarded an independent eco-label for cut flowers considering five production stages and eight environmental dimensions. Besides, producers of developing countries had not been represented on the "Milieukeur" panels and had not involved in the definition of the label. Thus, it is clear that some comparative advantage of developing countries' producers can be diluted.

Another indication of environmental concern is the rapid adoption of voluntary environmental management standards like ISO 14000 which is published by the International Organization for Standardization (ISO). The first standards were published in mid-1996, and some 5,000 certificates had been awarded in 55 countries by the end of 1997. The ISO 14000 standards provides companies, of any size or type, with a common framework for analyzing and managing the environmental impact of goods and services, including performance evaluations, life cycle assessments and environmental labeling. ISO certification is increasingly becoming a commercial necessity and some of the advantages include reduced costs of liability insurance and bank loans, less regulatory oversight, and increased access to international markets. Finally, as Lally (1998) noted ISO 14000 certification is becoming "the gateway to the global market place".

c. <u>Wealthy environmental profile</u>

A wealthy environmental profile for an industry has positive effects not only for the environment, but also for capital markets. Share prices fall significantly when unfavorable environmental news is published, such as oil spills or violations of emissions levels. However, capital markets tend to react positively to favorable environmental coverage, such as reports of investments in clean technologies. Studies by Repetto (1995) and Cohen and Fenn (1997) have shown that poor

environmental performance is associated with poor management, but when a number of ecological funds are invested in industries as a result of superior management then profits are going to be expected. The reason is that the investment of these funds, if they become large enough, will give an extra boost to the share prices of qualifying firms, which will not go unnoticed by other firms and their owners. Moreover, market forces in recent days reward good environmental performance rather than cost savings at any price. One reason is the efforts of non-governmental organizations that have made consumers sensitive to the environmental profile of both products and producers. When consumers care, producers care. A good environmental profile is perhaps more of an asset than a liability in the international marketplace, notwithstanding somewhat higher production costs.

d. Liberalizing environmental goods and services

Liberalization of environmental goods and services can be succeeded with elimination of trade barriers and tariffs. In fact, WTO members expect to benefit environment, facilitating access to products and services. This action can improve energy efficiency, reduce greenhouse gas emissions and have a positive impact on air quality, water, soil and natural resources conservation. Thus, it is commonly accepted that a successful outcome of the negotiations on environmental goods and services could deliver a triple-win for WTO members: a win for the environment, a win for trade and a win for development.

Environmental goods usually are accompanied by technological innovations that can affect positively the environment. Reducing import tariffs and trade barriers in these types of products will reduce their price and make them more accessible. Increased competition will foster technological innovation in areas related to protection of the environment and combating climate change. Many countries move in this direction, as a consequence of increasingly demanding environmental regulations and have gained in prominence both from an environmental and economic point of view.

The above results could be considered as gains from trade. As we said before trade allows countries to attain more of what they want, which includes environmental goods and additional output which can be used as export. Openness can have a positive effect on environmental quality, only if upgrades environmental standards, using technological and managerial innovation.

3.4.2 Negative Consequences

a. Race to the bottom hypothesis

It is a common fear that increased pressures of globalization and liberalization of trade may lead to a "race to the bottom" in environmental policy, as governments fail to implement proper environmental standards because of fears that they will place local firms at a competitive disadvantage. Thus, "race to the bottom hypothesis" says that countries that are open to international trade and investment will adopt looser standards of environmental regulation, out of fear of a loss in international competitiveness. However there are economists such as Grossman and Krueger (1993), who argue that liberalization of trade may raise real incomes allowing countries to afford better environmental policy. They appeal the Kuznets curve hypothesis -we will present in chapter 4- which is an inverted-U relationship that shows that environmental conditions tend to deteriorate in the early stages of industrialization and then improve as nations hit middle-income levels. So fears of a race to the bottom are unsupported, according to them.

Race to the bottom hypothesis was firstly faced as a local problem around competitiveness and investments, but lately has become an increasing problem at the supranational level. A case in point is the United States. Before 1970, individual states were free to define their own standards, so there was diversity in environmental regulation. What was right for one state was not necessarily right for another, and so on, because of the huge differences in climate, ecological conditions, population density, and per capita incomes. However, the failure of the

system to suppress pollution spilling over from one state to another and the inability of governments to regulate mobile industries that could defeat the measures by relocating, expanded the problem of pollution in federal level. Starting in 1969, a series of laws was passed—among them the National Environmental Protection Act (1969), the Clean Air Act (1970), the Clean Water Act (1972) and the Endangered Species Act (1973)—which gradually shifted the initiative and regulatory authority from the local level to the federal level.

The same arguments can be made with pollution problems which transcend national borders, such as depletion of the ozone layer and global warming. Capital mobilization and increasing foreign direct investment (FDI) were two crucial factors which amplified transboundary pollution. The tremendous growth in FDI has been underpinned by the removal of investment barriers, especially since the mid-1980s. Virtually all developing countries today are open to FDI, and increasingly also the least-developed countries. This removal has increased the location options for multinational firms, which in turn has reduced the environmental policy autonomy of individual nations.

The particular concern of environmentalists is that governments will sell out their environment rather than offering a tax break in order to attract capital. Indeed, some evidence such as the research of Kim and Wilson (1997) or Kanbur (1995), suggest that environmental regulation is put aside so as not to cost investment and jobs. There are many countries which prefer to degrade environmental standards in the face of vocal criticism from affected industries and workers. An ordinary example is India where economic development has led to forest and agricultural degradation of land mainly because of uncontrolled urbanization and industrialization.

Another factor that may induce a race-to-the-bottom is a biased political process. A race-to-the-bottom could emerge if the industrial lobby gets the upper hand over the green lobby. But even if green lobby had the upper hand, environmental standards would have been bid up to levels that are higher than what the median voter is willing to pay for.

In other words, a democratic process in which all interested parties have equal access to the political process is the best policy.

In addition, a race-to-the-bottom may emerge in a case that governments have to finance a certain amount of public expenditures. If capital taxes are decreased to attract investments, labor taxes may have to be raised instead, which in turn raises the cost of production. That is a policy dilemma which forces governments to relax environmental standards. Thus, as long as the equilibrium level of environmental standards will be low if governments commit themselves to abstain from reducing environmental standards for the purpose of attracting capital, the prisoners' dilemma has a sub-optimal outcome for everyone.

These findings make it difficult for countries of unequal size to cooperate and harmonize their environmental standards. So, that gives some indirect support to the proposition of "common but differential responsibilities", a principle adopted by Kyoto Protocol, which holds that developing countries should not be asked to undertake the same commitments as developed countries so as to provide room for economic development.

b. Pollution haven hypothesis

To the extent that countries are open to trade and investment, some will adopt lax environmental standards in order to attract investments and export pollution-intensive goods while some will adopt stringent standards and import pollution intensive goods. Empirical research supports that developing countries adopt laxer environmental standards and specialize in dirty industries. Lucas and Wheeler (1992) and Hettige (1992) find that pollution intensity is higher in low-income countries, which is consistent with specialization in pollution-intensive activities where absorptive capacity is economically abundant. Thus, the fear which has been voiced is that "dirty" industries tend to shift their operation to countries with low environmental standards. That is the pollution haven hypothesis.

However, there are some interesting ways to face the migration of polluted industries in countries with low environmental standards. First, survey evidence from developing countries shows that local communities can exert effective pressure on firms to clean up their activities, even without the backing of formal regulations and laws (Pargal and Wheeler, 1996). Socio-economic structure of the community in which the plant is located plays an important role in this. For the case of Indonesia for example, it is found a significant difference in pollution intensity between plants in the same industry located in communities with relatively high educational and income levels and plants located in communities with low educational and income levels. This finding suggests that communities with educated population face environmental problems with more responsibility than poorer and uneducated communities.

Second, even if no regulations are imposed, some firms are interested in making efforts to control pollution so as to safeguard their reputation, to avoid consumer boycotts in environmentally conscious markets, and to reduce the risk of legal liabilities.

However, there are studies that do not find strong evidence that environmental regulation influence investments and competitiveness (Walter, 1975; Pearson, 1985, 1987; Leonard, 1988). On average, the price effects of environmental regulations appear to be limited. Although there is a large amount of overseas production in pollution-intensive industries, there is little evidence that it has been influenced by differing environmental control costs and basically by lenient standards. In other words, there are many other crucial factors which affect the choice of the relocation on an industry, such as labor costs, market size, and corporate taxes.

So, the absence of systematic patterns of foreign direct investment in polluting industries, which is documented in Leonard (1988), is not surprising given the difficulty of estimating the impact of regulations on investment decisions. It may also reflect the fact that weak environmental standards often go in hand with political instability,

uncertainty about future regulation, and corruption. The costs associated with the latter may cancel out any possible gains from low environmental costs.

c. Effect of trade on transport

Liberalization of trade means that countries with comparative advantage in production of specific goods may export these goods to other countries which produce them in lower scale. So, international trade expansion may increase the use of transportation services. Petroleum supplies 95 per cent of the total energy used by world transport, making it a significant source of greenhouse gas emissions. Life cycle of the products, including production methods, also plays a big part in local and global pollution increase.

It is commonly admitted that trade is a contributor factor to pollution, and specifically to global warming through the carbon dioxide and fossil fuels emitted when goods are shipped between different parts of the world. The first best policy to face the pollution problem is a tax on fossil fuels to curtail excessively long shipments of goods among countries. This tax is called "Pigouvian" and it can achieve the optimal Pareto efficiency, internalizing the global externalities (Hoel, 1992). On the other hand, there are second-best trade measures which could possibly be used to reduce transport emissions. Such measures would be only partially effective since they would not address emissions from domestic shipping. International emission permits is an example of second best policy and as Chichilnisky (1996) showed, a finite number of initially-allocated permits can lead to Pareto efficient outcomes. However, the effective policy would be one that does not discriminate between international trade and trade within national boundaries (Nordstrom and Vaughan, 1999).

Nordstrom and Vaughan (1999) observed that trade measures are necessary to ensure that the Kyoto Protocol's agreement is not defeated by a relocation of energy-intensive industries to non-signatory countries— the "carbon-leakage" problem. A tax or another trade

measure on the carbon or energy content of imports from non-signatory countries must be implemented to countervail any competitive advantage that may otherwise accrue.

d. Market and policy Failures

The root causes of environmental degradation can be traced back to various market or policy failures. There are plenty of explanations about "market failures". Market failures may occur when producers and consumers do not take into account the full cost of their actions, such as pollution inflicted on third parties. Undefined property rights over natural resources are another cause. If anyone, without restriction, can harvest the riches of the seas, extract the resources of forests, tap water legally from municipal wells, the result is often overexploitation, a phenomenon known as the "tragedy of the commons". To conclude, "market failures" refer to situations in which the normal market forces of supply and demand fail to deliver an optimal outcome for society as a whole.

A common example has to do with agriculture, which is one area where environmental problems abound and tend to become worse. The underlying problem is the continuously increasing output in order to be fed the world's growing population. There is a huge demand which results in pressure to convert marginal land to farmland, through intensive irrigation and use of agro-chemicals. The case is that there are economic incentives to farmers so as to produce additional outcome, like subsidies, low taxes and elimination of trade barriers. All these may not only contribute to food shortages in some countries and conspicuous surpluses in others, but may also accelerate environmental degradation.

The most efficient action which seems as a solution to the above problems, is tax the specific inputs in order to persuade farmers to cut back on the inputs and to change to more environmentally friendly production methods. For example a tax in specific fertilizers may induce farmers to use environmentally friendlier fertilizer. The optimal tax

would ensure that the private cost of agro-chemicals is equal to the social cost.

Another policy would be to tax either production or consumption of food. Both kinds of taxes would result a decrease in demand, and also outcome depletion. However such policies have unwanted side effects. The problem is not specifically production or consumption, but the use of specific inputs that in large doses harm the environment (Fullerton, Hong and Metcalf, 1999).

On the other hand, there are specific liberalization policies like devaluation of domestic currency which could affect the environment. Devaluation should increase the producer price for export goods, and import-competing goods, and cause substitution away from imported products. Markandya and Richardson (1990), using crops as an export product, suggest that devaluation can lead to a rise in the output of export crops and this may imply increased land clearing and extensive use of fertilizers. There may also be an increase in the rate of soil erosion or in the incentive to invest in land improving equipment or techniques. The reaction of farmers is likely to be heavily influenced by the land tenure system, as this influences the degree to which changes in price incentives actually affect production decisions.

Markandya and Richardson (1990) and Barrett (1990) support that policies like removal of tariffs and quantitative restrictions give rise to the same potential impacts as devaluation. Definitely an increase on the producer price for export goods. Simultaneous removal of subsidies on agricultural inputs could result in a number of outcomes. Removal of pesticide subsidies, for example, could imply use of more traditional methods which are less environmentally damaging. Thus, if they are less effective, productivity falls. To counteract this, farmers may cultivate land more intensively.

One typical example of policy failures is deforestation of tropical forest in Indonesia and Brazil. Deforestation is often led not by external markets but by itinerant agriculture. Institutional failures and market

imperfections are the major sources of deforestation externalities. Domestic consumption claims most of the timber production in developing economies. Trade bans, devaluation and other export restrictions aimed at increasing domestic value, have often had negative environmental effects. These trade impediments depress domestic prices of logs and increase the log content of domestic products. Recent EC and OECD proposals to fix import quotas of tropical wood and wood products would have the same qualitative effect and would foster inefficiency in wood product industries in developing economies (Barbier, 1994; Gillis, 1988a; and Braga, 1992). That is why, in order to be effective such a measure in controlling deforestation for the wood products trade, all importing nations would have to participate. Some nations may not want to take the risk of altering their regulation in regard to their forestry system. As with the tariffs mentioned before, it is doubtful that all importing nations would agree to a system of determining and overseeing the quota system (Griffith, 1993).

3.4.3 Summing up so far

To sum up, taking under consideration the above effects of trade on the environment we can conclude that this impact is separated into three independent effects: scale, composition and technique.

The "scale effect" refers to the impact of increased output to the environment. Trade liberalization will increase economic activity and hence energy use. This increase can lead to higher levels of emissions and harm the environment.

The "composition effect" arises from trade-induced specialization in the world. To be more specific, it refers to the way that trade liberalization changes the mix of a country's production into products that has a comparative advantage. So, this re-allocation of resources in a country is how trade improves economic efficiency. Since one country's exports are another country's imports, all countries cannot specialize in cleaner industries. International trade will therefore redistribute local

pollution problems in the world from countries that have a comparative advantage in industries that are less polluting, to countries that have a comparative advantage in industries that are more polluting. The composition effect will result in fewer emissions if the expanding sectors are less energy intensive than the contracting sectors.

Finally, there is the "technique effect" which refers to the income-induced reduction in pollution per unit of output. The willingness to pay for environmentally friendly goods is bigger, when there are stricter environmental standards and is increased with income. Thus, as it is stated, trade liberalization lowers the cost of environmentally-friendly goods, services and technologies and increases income which can lead society to demand better environmental quality with result fewer emissions. These are the two contributed factors which refer to the "technique effect".

What matters for the environment is the net result of the scale, composition and technique effects, not the individual components. Scale and technique effects tend to work in opposite directions, and the composition effect depends on the comparative advantage of countries. So, it is difficult to calculate the overall impact of trade to environment because it depends on the magnitude or strength of each of the three effects.

Having so far tried to show the consequences of trade on the environment and vice-versa, it is now time to discuss the necessity of cooperation among nations. There are countries which prefer to adopt a common environmental or trade regulation, and others which prefer to move on their own. On the next section there is an argumentation of these two opposing sides.

3.4.4 Is there a need for cooperation?

The general aim of environmental trade policies should be the internalization of externalities without creating any market failures. It is

clear that environmental regulation differs from country to country and that can be a plausible reason of trade. However, many researchers support that countries should cooperate in order to face environmental problems and believe that harmonization of environmental standards is a way of cooperation. On the other hand, some environmentalists fear that free trade may result in the lowering of domestic environmental standards in order to meet foreign competition. That is why industries often consider that lower environmental standards in competing countries provide unfair trade advantages.

Supporters of cooperation assume that international treaties, which would bind all signatories to reductions in levels of emissions, are necessary to deal with problems such as global warming or transboundary pollution. Moral commitment to emission reduction would hopefully be sufficient to implement the treaty. And since one's country's decision to reduce emissions confers benefits on all other countries, it seems profitable for a country to accept the treaty.

The instrument which is most commonly suggested for reducing emissions is trade threats. For example, a global treaty on carbon emission reduction could specify a penalty system which would allow other countries to deviate from carbon emission reduction targets if particular countries did not meet their own commitments. These threats are usually used by large and developed countries against countries which do not comply with global environmental goals.

In addition, environmental advocates and labor unions have pressured governments to expand trade agreements, such as GATT/WTO or NAFTA, to include cooperation over domestic policies such as environmental or labor standards. The first is the "level played field" argument: the idea that it is unfair for countries to gain a comparative advantage in trade through lax environmental standards. However, economists such as Charnovitz (1992a, b), Pearce et al. (1992), Maler (1990), oppose to this argument, supporting that there are many rational reasons for diversity in environmental regulations across

countries. Every country is unique, with different social-economic conditions and climatic features.

Another argument for expanding cooperation is that, as countries through multilateral agreements constrain their ability to pursue trade goals through trade policy, there will be unilateral incentives for governments to distort domestic policies as a secondary means of protection. One example of secondary means is to relax environmental standards in an industry. However, while lax regulatory standards may be unilaterally optimal, they are inefficient for the world economy, since they lead to a lower scale of trade.

Many economists contradict the above means of protection, stating that international cooperation is necessary to control global pollution, but this cannot justify uniform environmental standards that might reduce welfare and distort trade (d'Arge and Kneese, 1972 and Charnovitz, 1992). It is very difficult to set a uniform standard that will be optimal to all countries, basically because a cooperative imposition of environmental standards will not guarantee Pareto efficiency (Markusen, 1975b). Every nation has a unique structure and differs from the others to crucial factors, such as scale of economy, technology and politics, so it is difficult for an efficient solution to be found.

In the cause of inefficiency that can be incurred after the imposition of wrong policies, industries often appeal to competitiveness concerns when lobbing successively against environmental regulations and that is called the "regulatory chill". Some examples are cited by Esty and Geradin (1998), who pointed to the failure of major industrialized countries (EU, US, Japan, and Australia) to adopt energy taxes for addressing climate change. Indeed, in 1992 the European Commission made a proposal for taxing carbon dioxide and the energy content of products. However the industrial lobby in United States, Japan and Australia responded negative in this perspective, arguing that it would harm their competitiveness. Another example is the UK coating industry's victory over legislation in 1995 that would have forced them to reduce their emissions of volatile organic compounds (VOCs), which

caused many health problems on the citizens. However, the argument was again that the industry would lose in international competition if faced with such regulations. So, as a general observation, Esty and Geradin claimed that in almost every political debate over environmental policy competitiveness concerns are cited as a reason not to move to tougher standards.

After having discussed the connection between trade and environment and the issues arising from this linkage, in the next chapter we are moving into the relationship among trade, environment and growth. The trade-environment interdependence with growth is an important issue in the bibliography, so it should be cited in this thesis.

CHAPTER 4: *RELATION AMONG TRADE, GROWTH AND ENVIRONMENT*

In this chapter we will discuss about the Environmental Kuznets Curve (Kuznets, 1955) which is the most representative hypothesis that shows the connection among trade, growth and environment. We will show the shape of the EKC and the factors that affect this shape. Finally, we will analyze the EKC hypothesis from the aspect of scale, composition and technique effect.

4.1 Environmental Kuznets Curve (EKC)

Many environmentalists support the concept of "sustainable development" and believe that economic growth can support environmental improvement if managed with the right way. However, there is a significant number of environmental advocates who support the "limits to growth" notion in which trade liberalization contributes to more pollution and unsustainable consumption of natural resources (Meadows et al., 1972 and Daly, 1993).

Sustainable development has proven hard to define and even harder to put into practice. It is clear that poverty can push people to make short-term choices that degrade the environment. But the hope that trade liberalization will lead in long-term to economic growth that will alleviate poverty and generate resources for environmental investments, sometimes seems to rely on a sequence of events which are difficult to be actualized under real-world conditions.

Moreover, it is true that economic growth without the necessary precautions is not sustainable in the longer term. One reason for this is the difficulty of many countries with low incomes, to afford to set aside resources for pollution abatement. Also, it is difficult for many poor countries to sacrifice their growth prospects in order to help solving environmental problems which have been caused mainly by the consuming lifestyle of richer countries.

So, taking under consideration that poverty is at the core of the problem, we can refer that economic growth is part of the solution, as it allows countries to shift gear from more immediate concerns to long run sustainability issues. Indeed, empirical evidence suggests that pollution increases at the early stages of development but decreases after a certain income level has been reached (Kuznets, 1955). This observation can be depicted by the environmental Kuznets curve (EKC), which shows the relationship between income per capita and some kinds of pollution.

The environmental Kuznets curve is an empirical relationship that is hypothesized to trace the pollution path followed by economies as their per capita gross domestic product (GDP) grows, and describes the relationship between per capita income and indicators of environmental degradation. At early stages of development, pollution is increased when the income increase, however, environmental degradation seems to be decreased, at higher levels of development, when the income increases. These results give rise to an inverted U-shaped curve relating economic growth to environmental degradation, deriving its name from the work of Kuznets (1955) who postulated a similar relationship between income inequality and economic development. To conclude, the EKC concept emerged in the early 1990s with Grossman and Krueger's (1991) study of the potential impacts of NAFTA and they have been mainly inspired by Kuznets's work.

The reason which led to the plot of EKC was the increasing threat of global warming, maybe one of the major environmental problems the last decades. The impact of global warming on economy is crucial, that is why many organizations were forced to reduce the adverse impacts through binding agreements. The Kyoto protocol was an agreement having the goal to reduce greenhouse gases (*GHG*) that cause climate change. So, in order to prevent global warming several countries have signed the Kyoto Protocol and promised to decrease their emission levels.

Before 1970 there was a belief that consumption of natural resources grows almost at the same rate as economy grows. But in the

early 1970s, the "limits to growth" view was forwarded about the concern for availability of natural resource of the earth. Environmental economists of the Club of Rome argued that the finiteness of environmental resources would prevent economic growth and urged for a steady-state economy with zero growth to avoid dramatic ecological scenarios in the future. This view mainly induced to examine the relationship between the intensity of natural resources use and income, and an inverted-U curve was found.

According to the environmental Kuznets curve hypothesis, when a country develops, pollution increases until reaching a level of development where additional growth leads to decrease of pollution. This turning point shows that environmental degradation is something unavoidable, and a developing country must reach and pass this point in order to develop.
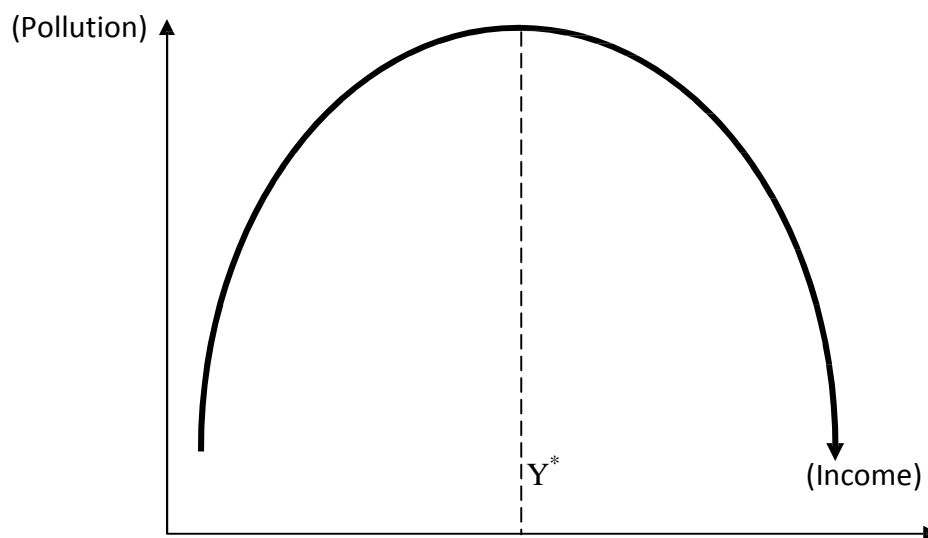

Figure 1: The Environmental Kuznets Curve (EKC)

The shape of the EKC is related with the history of the developing countries and the path they have followed in order to become developed. But also is related with the shift on the income and the impact of this shift on the environment. When income grows, people

presumably become more willing to sacrifice some consumption to protect the environment.

Looking back in history, economies of developed countries were based in agriculture in the first stage of their existence. The degradation of an agrarian economy on the environment was of no importance. However, industrial revolution has changed the economies of developed countries, which became more damaging for the environment. The two main reasons of this degradation were the increased production of harmful products and the extensive use of natural resources. Nowadays the majority of developed countries are based to service and information economy. As a result a reduction of the pollution of the environment was observed. During this phase it seems that developed countries pass the turning point we have mentioned before and a possible explanation for this is that in a service-based economy many 'dirty' economic activities are moved elsewhere.
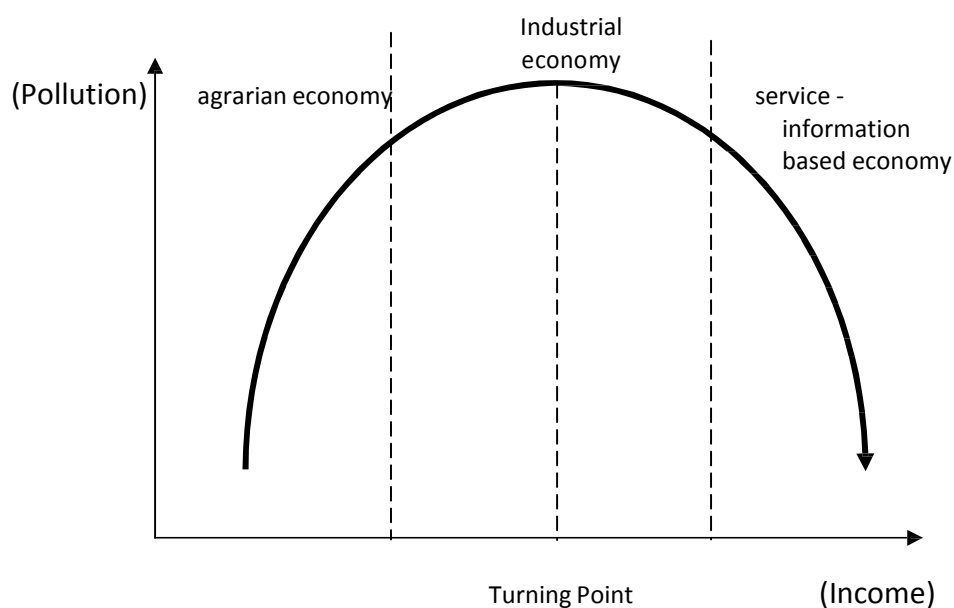

Figure 2: The evolution of the EKC through different stage of economic development

Structural changes play an important role on the shape of the EKC and they are driven by trade liberalization that induces specialization according to comparative advantages. Trade liberalization can change

the pattern of production with the specialization to clean industries. Thus, the local environment will benefit if expanding export sectors are less polluting on average than contracting import competing sectors, and suffer otherwise. And since one country's exports are another country's imports, all countries cannot specialize in clean industries. That is why there will be -through international trade- redistribution of pollution problems from countries that have a comparative advantage in industries that are inherently less polluting to countries that have a comparative advantage in industries that are inherently more polluting.

We have referred before that the shape of the EKC is related to changing preferences for environmental quality and is altered as income per capita rises. When income rises, demand for better environmental quality rises. This increasing demand is told "income effect". As economy passes the turning point the preferences of consumers change and these new preferences are expressed through political pressure on governments.

Another indicator of the shape and form of the EKC is the technology of pollution abatement. As Andreoni and Levinson (1998) argued, to explain the role of technology on pollution abatement they assume that the demand for environmental quality is independent of income. Given this hypothesis, it works out that EKC will take the inverted U-shape form only if abatement technologies exhibit increasing returns to scale, that is, if the unit cost of abatement falls with the scale of production. With decreasing returns to scale the EKC will be U-shape, and with constant returns to scale the EKC will have upward slope.

The shape of the EKC may also reflect different possibilities of "defensive" actions in order to face pollution. For example, households with higher income can help to face urban pollution, by moving to suburban communities. As we have said before, environmental preferences are expressed through political pressure, so the above action may in turn reduce the political pressure from influential social groups on governments.

Generally, the policies chosen by the social planner generate an inverted U-shaped EKC. When a country is poor, growth concerns are of greater importance than environmental considerations. However, as the economy grows there exist environmental concerns, so taxes, subsidies or other regulation is introduced in order to face pollution. And as income grows, regulation can be more stringent, so as to encourage investments in clean production technologies.

To conclude the discussion for the EKC, we could underpin that income growth through economic development is a necessary condition for changing the focus from more immediate economic and social concerns to longer-term sustainability issues, but is not sufficient to reverse environmental degradation. What complicates the long-term analysis is that comparative advantages through specialization are not static, but dynamic. And that means that the pollution composition of national output will change over time, independently of the shift on domestic and international trade barriers and taxes.

Torras and Boyce (1998) compare countries with similar per capita incomes. They show that pollution levels tend to be significantly higher in countries with a skewed income distribution, a high level of illiteracy, and few political and civil liberties. This suggests that the EKC relationship is not only dependent on income levels but also on democratic reforms, which play an important role on preferences for environmental quality and also influence the political decision-making process.

Arrow (1995) argued that economic growth is not a panacea for environmental quality. What only matters is the content of growth, including the inputs and outputs. This content must be determined by institutions designed to provide the right incentives for protecting the consistency of ecological systems. This would assure a sustainable scale of economic activity within the ecological life-support system. Protecting the capacity of ecological systems to sustain welfare is of as much of importance to poor countries as it is to those that are rich.

4.2 EKC and the scale-composition-technique effect

It would be very interesting to analyze the EKC hypothesis from the aspect of scale, composition and technique effect which we have also mentioned in section 3.4.3 of the thesis. Panayotou (2003) suggests that when a country begins industrialization, the scale effect takes place and pollution increases. In the composition effect firms switch to less polluting industries and therefore pollution is leveled. Finally, the technique effect takes part when mature companies invest in pollution abatement equipment and technology, which reduces pollution.
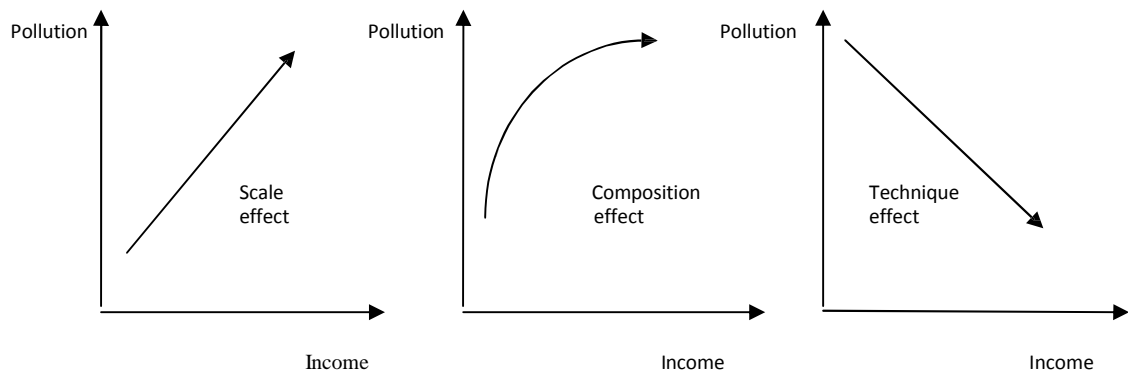

Figure 3: Scale, Composition and Technique effects

As we can see in figure 3 the scale effect simply states that the more a nation's economy produces, the greater will be the degradation of the environment. So, the impact of the scale effect on the environment is negative. In contrast, the composition effect could have a positive impact on the environment. It refers to the changes on the structure of the economy through time. At the first stage of the economic development, when agriculture plays important role, pollution increases as the economic structure changes from agricultural to industrial. However, after industrialization the structure of the economy moves towards and pollution is decreased step by step. The third effect, the technique effect refers to the invention of new technologies which

are environmental friendly and to the application of these new technologies in production, which in turn lead to the reduction of the pollution of the environment. The impact of the technique effect is only positive.

Given the above analysis we could underpin what effect dominates the others. At the beginning of the economic development scale effect is expected to dominate the other two effects. However, composition and technique effects are expected to dominate in the following stage of economic development and specifically when the turning point is reached.

We have mentioned that the more a country produces, the greater will be the environmental pollution. That is why every country adopts trade and environmental measures. In the next chapter we are looking at the measures created in order to protect the environment.

CHAPTER 5: *INSTRUMENTS FOR THE PROTECTION OF THE ENVIRONMENT*

In this chapter we will discuss about the environmental or trade policies that governments should adopt in order to face degradation of the environment. Some of them are WTO agreements, such as Agreement on sanitary and phytosanitary (SPS) and Agreement on Technical Barriers to Trade (TBT). There are also trade and environmental barriers, such as Environmental regulations and standards, environmental labeling and Economic instruments. Finally, we will refer to transnational pollution and some measures so as to solve this global problem.

5.1 Environmental policies

A number of different environmental policies are considered as trade barriers by many countries, and their goal is to achieve a sustainable development by keeping a balance between economic growth and resource exploitation. In this section, we are going to present some crucial environmental and trade measures which play a discriminatory role on trade-environment linkage.

Environmental issues came firstly into negotiations in WTO's agenda at the Doha Ministerial Meeting in November 2001, and they affected market access of developed and least developed countries (LDC).

Paragraphs 32(i) and (iii) of the Doha Ministerial Declaration in paragraph 32 describe that:

"We instruct the Committee on Trade and Environment, in pursuing work on all items on its agenda within its current terms of reference, to give particular attention to:

(i) *The effect of environmental measures on market access, especially in relation to developing countries, in particular the least-developed countries among them, and those situations in which the elimination or*

reduction of trade restrictions and distortions would benefit trade, the environment and development;

(iii) Labeling requirements for environmental purposes."

As mentioned before, trade liberalisation can lead to development, as more resources are available for the protection of the environment. Also, the willingness among citizens to pay for environmental improvement is expected to rise with the increased income gained through the trade liberalisation process. As a result, the transfer of cleaner technology through international trade makes environment friendly production and consumption possible.

On the other hand, we have noticed that trade liberalization may be responsible for environmental degradation. Economic growth requires more resources and energy and this results to introduction of new pollutants. Increased demand means bigger production and consumption as well, which could be harmful to the environment, human health, and the long-run development prospects of the importing country. So, lots of times social and environmental costs may outweigh the advantages of trade liberalization (Daly and Cobb, 1989).

5.2 <u>WTO agreements on environmental measures</u>

Agreement on sanitary and phytosanitary (SPS) and Agreement Technical Barriers to Trade (TBT) are the two standard related agreements. These two agreements lead countries to adopt international standards even if they give more flexibility or more rigidity to each different country.

SPS measures are control measures, which focuses on protecting human, animal and plant life and saving country from risks arising from the entry of pests, toxins, diseases and additives. Contrary, the agreement on TBT refers to the application of technical regulations or standards such as testing requirements, labeling requirements, packaging requirements, marketing standards, certification

requirements, origin marking requirements, and health and safety regulations.

5.3 <u>Trade and environmental barriers</u>

Environment related trade measures which may pose to be trade barriers and can have impact on market access are mainly of the following types: (i) Environmental regulations and standards (ii) Environmental labeling, and (iii) Economic instruments.

i. Environmental regulation and standards

There are two types of standards related to products. ***Products standards*** which refer to characteristics that product must posses, and ***production standards*** which refer to conditions under which products are made. These conditions refer to the composition of products, the quality of the product, the performance of the product.

Also, there are ***trade bans on products.*** These bans are used on products in the export sector of developing countries, such as textiles, leather and footwear. Due to the increasing public concern over hazardous products trade bans are also increased. The aim of these bans is the protection of the environment and of the public health of the importing country. WTO rules allow countries to impose bans as long as such bans apply equally to domestic products.

Another measure refers to ***Admission and registration procedures.*** Certain substances like pharmaceuticals, fertilizers and pesticides, require a specific authorization before they are made available in the market.

Finally, there are the ***take back obligations***, which refer to an agreement between producers and retailers to take back and dispose used products, like waste oil, cars, batteries, cans and consumer electronics.

ii.   Environmental labeling

Environmental labeling provides information about a product's characteristics and depicts the impact of the product on health and environment. These labels may give negative warning such as flammable and eco-toxic or indicate positive environmental characteristics such as biodegradable. We must underpin that disciplines on labeling are provided for both in the TBT Agreement and in the SPS Agreement. So reporting on labeling may have implications for both the SPS and TBT Committees.

Labeling that based on a process or production method (PPM) is separated in two categories: (a) product related PPMs, and (b) non product related PPMs.

a) Product related PPMs refer to production methods which affect the nature, properties or qualities of the product itself and its ability to have direct impact on the environment. This type of PPM is mainly found in the case of industrial process requirements to ensure a product's quality or fitness for use.

b) Non-product related PPMs refer to production method which does not affect or change the nature, properties or qualities of a product. Examples of non-product related process and production methods not related to the environment include labor standards or the welfare of animals in farming practices for agricultural products.

iii.   Economic instruments

There are also economic instruments, such as ***product taxes and charges*** that can be used as trade barriers in order to protect the environment. Product taxes can be based on some characteristics of the product, for example, on the sulphur content in mineral oil. Likewise, product charges may be imposed in order to increase revenues and to discourage the production and consumption of products on which the tax is implemented.

Taxes can be used to reduce polluting activities or to raise revenue in support of research into environmentally preferred technologies. For example, nowadays taxes on chemical use in agriculture are gaining in popularity, although some studies suggest that rates must be set very high to significantly reduce pollution in vulnerable areas. When taxes are implemented, the country is said to be following a "polluter- pays" approach.

Subsidies are another economic instrument. Subsidies provide support to produce fewer pollutants or to employ environmentally "friendly" technologies. Taxes and subsidies can have different effects on total output and pollution. A tax raises the costs of doing business for a firm and discourages the polluting activity. A subsidy encourages environmentally "friendly" inputs and, therefore, discourages the polluting activity of a firm.

Finally, a **marketable permit** is a policy instrument that provides more flexibility among firms in meeting environmental regulation implemented by governments. In contrast to producer taxes, marketable permits allow for a no uniform distribution of costs of compliance to government standards. For example, when a tax policy targets a group of producers whose activities create pollution, each producer pays a fixed marginal tax rate based on the level of inputs used or output produced, even though some producers may pollute at higher rates than others. However, if all firms were issued equal permits to pollute, those with a higher rate of pollution could purchase permits from the "cleaner" producers. The result is that heavier polluters pay higher costs to produce. Thus, marketable permits theoretically can achieve the same end as taxes, with lower costs to producers and consumers.

5.4 Measures for facing transnational pollution

A main question in trade-environment area refers to the optimal policy instrument that must be followed in cases of transnational pollution. Baumol and Oates (1988) argue that an internationally optimal

tax on emissions is required as an optimal policy response to transnational externalities. And this is one which is equal to the marginal damage generated in all countries taken together. We must point that International cooperation is the most efficient way to address transnational environmental problems. Policies can be designed as if the world was a single country.

However, this policy is difficult to be implemented. For example consider three countries, A, B, and C, where A is the polluter, and B and C are the victims of transnational pollution. A may establish an emission tax equal to its marginal cost. B and C might establish tariffs equal to the marginal damage suffered by their own nationals. The prices and allocation of resources which result will deviate from the optimal outcome. That is because prices in A are not directly affected by the tariffs of B and C. Therefore, prices in A will not fully reflect the social costs of A's production. Similarly, the duties set in B and C will not account for the full social cost of their consumption. Baumol and Oates conclude that there is no set of tariffs capable of sustaining the Pareto optimum which would be yielded by the optimal tax.

As a solution to the above problem Baumol and Oates argue that there is a quasi-optimal tariff that can be used as a second best policy. Provided the importing country is the victim of the pollution, a quasi-optimal tariff incorporates the costs of the damage in the victims' country into the victims' domestic price. However, the tariff which would maximize the importing country's welfare exceeds the quasi-optimal tariff. Finally, they argue that through second-best policy, there can be a chance for tariffs to move the global economy towards a "quasi-optimum," or to be used as a threat to achieve the targets that countries have posed.

However, the problem with international agreements and cooperation is the willingness of countries to join. The major problem of non-cooperation is the free-riding agreements. For example, maybe there will be some countries that have little incentives to participate in an agreement to reduce global warming through uniform carbon taxes,

as they cannot afford the cost of this action. This problem can be faced through trade sanctions that can be used to discourage free riding and to enforce co-operation. For instance, the Montreal agreement contains a clause which permits trade sanctions against non-complying countries and provide strong incentives in countries, in order to cooperate.

To conclude with this chapter, it is generally agreed through bibliography, that the key to increasing environmental protection in developing nations is to increase economic growth. Through economic liberalization a country's standard of living raises and its citizens have more income in order to discriminate between environmentally "friendly" products and polluting products. Full liberalization of the economy, beginning with an open trade policy, is the most effective environmental preservation strategy because economic liberalization, including free trade, leads directly to increased economic growth.

Specifically, the evidence demonstrates that, wealthier societies can afford easier the costs of environmental protection policies than poor countries. Also, they can show a proven desire for such protection that increases as income grows. This relationship is supported by extensive evidence published by the National Bureau of Economic Research (Grossman and Krueger, 1991).

The United States is a classic example of economic liberalization's beneficial impact on the environment. America has been a champion of economic freedom for decades but also maintains one of the world's cleanest environments (Eiras and Schaefer, 2001). Countries with more open trade and investment policies generally have higher levels of environmental sustainability. Free trade and the investment that typically follows it are two important sources of economic growth. Therefore, an open trade policy and a business-friendly environment will not only increase growth, but also provide the means to protect the environment.

CHAPTER 6: CONCLUSIONS

The aim of this Master thesis was to investigate the connection between trade liberalization and environment. We tried to show, not only the positive and negative consequences but also the effects of this interdependence through scale, composition and technique effect. Many researchers support that cooperation is needed, in order to face the environmental degradation, but there is also the different choice of no cooperation.

There are many efficient policies for the protection of the environment and we refer to the most appropriate and up to date instruments in this thesis. Indicating the Environmental Kuznets Curve Hypothesis (EKC) we depict an efficient way to face pollution. EKC supports the view that at the early stages of development the pollution of the environment is something unavoidable but there is a turning point where the degradation of the environment begins to decline as income per capita continues to rise. In this way economic growth which is responsible for the pollution could be seen as solution of the environmental problems.

The main conclusion that should be drawn from this study is that environmental protection should be taken under serious consideration by nations. There are so many global threats that could lead to environmental degradation, so as nations must search for the optimal trade and environmental policies. These policies demonstrate the need of cooperation even though there are economists who support that countries should solve environmental problems on their own. In every way it must be understood that the consecutive climate change could have catastrophic consequences on the environment, so relation of trade and environmental policy could play a critical role to the confrontation of environmental debasement.

REFERENCES

Josh Ederington, Jenny Minier, (2000), "Environmental Regulation and Trade Flows", University of Miami

Daniel C. Esty, (2001), "Bridging the Trade-Environment Divide" The Journal of Economic Perspectives, 113-130

John Beghin, David Roland-Holst and Dominique van der Mensbrugghe, (1994), "A survey of the trade and environment nexus: global dimensions" OECD Economic Studies No. 23

Brian R. Copeland, (2000), "Trade and environment: policy linkages" Department of Economics, University of British Columbia, Vancouver, 405-432

Judith M. Dean, (1992), "Trade and the Environment: A survey of the literature", The World Bank

Centre for Policy Dialogue, (2009), "Environment Related Trade Barriers and the WTO", paper 77

Ravishankar Jayadevappa, Sumedha Chatre, (1999), "International trade and environmental quality: a survey University of Pennsylvania, Ecological Economics, 175-194

 Håkan Nordström, Scott Vaughan, (1999) "Trade and environment", WTO Publications

Jeffrey A. Frankel, Andrew K. Rose, (2002), "Is trade good or bad for the environment? Sorting out the causality" National Bureau of Economic Research, NBER Working Paper No. 9201

Harmen Verbruggen, Onno Kuik, Martijn Bennis, (1995), "Environmental Regulations as Trade Barriers for Developing Countries: Eco-Labeling and the Dutch Cut Flower Industry" CREED Working Paper No 2

Lissandro Abrego, Carlo Perroni, John Whalley, Randall M. Wigle, (1997), "Trade and environment: Bargaining outcomes from linked negotiations" National Bureau of economic research

Jennifer Lynn Griffith, (1993), Deforestation: Policies toward a more sustainable tropical industry, Massachusetts Institute of Technology

Michael B. Devereux, (1997), Growth, Specialization, and Trade Liberalization, University of British Columbia, Canada, International Economic Review Vol. 38, No. 3

David Greenaway, Wyn Morgan, Peter Wright, (2001), Trade liberalisation and growth in developing countries, School of Economics, University of Nottingham, Journal of Development Economics Vol. 67 229–244

Christopher J. Coyne and Claudia R. Williamson, (2007), Culture Eroded or Enriched? The Impact of Trade Openness on Culture, West Virginia University, Appalachian State University, Department of Economics

Amelia Santos-Paulino and A. P. Thirlwall, (2004), The impact of trade liberalisation on exports, imports and the balance of payments of developing countries, The Economic Journal, 114, pp.

Nicole Hassoun, (2008), Free Trade, Poverty, and the Environment, Public Affairs Quarterly Volume 22, Number 4, pp.

Kiyoun Sohn and Taek Dong Yeo, (2005), Does the international trade help to enhance national security, University of Seattle

Jan De Loecker, (2007), Product differentiation, Multi-product firms and estimating the impact of Trade Liberalization on productivity, National Bureau of Economic Research 1050 Massachusetts Avenue, Working Paper 13155

W.A. Dymond and Michael M. Hart, (2006), Abundant Paradox: The Trade and Culture debate, Carleton University

James D. Morrow, (1999), Assessing the Role of Trade as a Source of Costly Signals, University of Michigan

Barry Krissoff, Nicole Ballenger, John Dunmore, and Denice Gray, (1996), Exploring Linkages among Agriculture, Trade, and the Environment: Issues for the next century, U.S. Department of Agriculture, Agricultural Economic Report no.738

WTO, The multilateral trading system and climate change

John Whalley, (2011), The Interface Between Environmental and Trade Policies, The Economic Journal, Vol. 101, No. 405, 180-189

John R. Baldwin, Wulong Gu, (2004), Trade Liberalization: Export-market participation, Productivity Growth and Innovation, Oxford review of economic policy vol. 20 no. 3, Canada

WEB

http:// greennature.com/article2618.html

http://en.wikipedia.org/wiki/Free_trade_debate

http://en.wikipedia.org/wiki/Free_trade

http://www.wto.org/