Economic Analysis of Environmental Laws and Regulations

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ABSTRACT. In the past century there has been a great deal of deliberation and research regarding the state of the environmental degradation which has been a steady and ever increasing phenomenon enhanced by the industrial revolution which has spread across the length and breadth of this planet. Majorly irresponsible human actions have been held responsible for the destruction of the environment. Thus, the countries are now trying to improve this situation by entering into multi-lateral agreements and so on, which are aimed at reducing pollution. However, this paper has tried to analyse how truly efficient these laws and regulations are and tries to point out their inefficiencies and deficiencies. This paper by means of using economic theories and tools shows how the international laws and regulations are economically inefficient as well as inefficient in terms of regulating the degradation that is caused to the environment. Thus basically, the aim of the paper is to point out the flaws and laxes in the international regulations and show the resulting economic losses by means of tax fraud, carbon credit recycling and so on and finally suggesting certain changes in the structure of the laws which will make them more efficient and sound.

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INTRODUCTION

In the past century, there has been a great deal of deliberation and research regarding the state of environmental degradation which has been a steady and ever increasing phenomenon enhanced by the industrial revolution which has spread wide across the length and breadth of this planet. Scientific evidence has always pointed to the irresponsible human activities and industrial pollution and waste as a primary reason of this degradation. The field of modern international environmental law has its origins in a dispute between the United States and Canada over air pollution damages in Washington State from an ore smelter in Trail, British Columbia.[2] The resolution of this dispute established the norm of customary international law that it is the State's duty to avoid letting its activities produce harm in other States. Failing that duty, a State is liable to compensate for environmental damages. International environmental law in the 1950s and 1960s proceeded almost exclusively in the form of such customary laws. In the 1970s, treaties began to codify the customary norms of international environmental law. The 1980s and 1990s witnessed a proliferation in the magnitude, complexity, and scope of international environmental law treaties. No longer content to merely codify existing norms, these new treaties imposed new duties and standards on States and other actors.[3] In response to this scientific evidence, the global community agreed in 1992 to an international treaty, the United Nations Framework Convention on Climate Change (UNFCCC). The treaty requires countries to cooperatively consider what they could do to limit average global temperature increases and the resulting climate change and to cope with whatever impacts were, by then, inevitable. As at June 2013, the treaty has been ratified by 195 parties.[4]

A system of carbon credits was established. A very clear record of this carbon credit trade transaction is maintained by the United Nations Climate Change Secretariat, in Bonn, Germany for not only keeping records but also for checking whether these transactions are following the procedures prescribed by the Kyoto Protocol. In spite of the regulatory procedures which are followed in the "carbon market" to maintain the legality of the trade, several counterfeiting methods are being used by potential traders in this market to increase their profits exponentially and thus enhancing the environmental degradation procedure. INTERPOL, through its Environmental Crime Programme and the Economic and Financial Crimes sub-Directorate, recognized that emerging carbon markets, like any market, are at risk of exploitation through criminal means and therefore require proper monitoring and enforcement to ensure environmental and financial integrity.[5] Thus, we see that linkages between the international trading regime and efforts to address

2 3 Trail Smelter Arbitration (*United States v. Can.*), 3 R.I.A.A. 1905 (1941), reprinted in 35 Am. J. Int'l L. 684 (1941).
3 Huang, Peter H. "International Environmental Law and Emotional Rational Choice." *The Journal of Legal Studies*: S237-258.
4 Status of Ratification of the Convention, UNFCCC <http://unfccc.int/essential_background/convention/status_of_ratification/items/2631.php>, Last accessed on 10th September 2014.
5 INTERPOL GUIDE TO CARBON TRADING CRIME (2013).

climate change require governments and policy makers in each area to take account of the other. Trade rules may both constrain and facilitate action to address climate change, while actions taken to address climate change will in some cases have important implications for trading relationships.

Thus to address several problems which are arising in the carbon market we have to begin by knowing the kind of problems which are existing and then try to find out methods of solving these problems. Moreover, in this paper we are also going to deal with the flaws in the environmental rules and regulations and thus try to point out the basic deficiencies which are present in them and try to find ways to amend these flaws.

INCOME EFFECT AND DEMAND FOR ENVIRONMENTAL QUALITY

The answer to the question as to why developing countries tend to have more lax environmental regulations than rich countries, comes from the very basic effect that income seems to have on the demand for environmental regulations and quality. As people become wealthier, they seem to demand more and more environmental protection. Conversely, at any point in time, the poor seem to demand less protection than the rich.[6]

We know that environmental quality is not a homogeneous good, for example we have different requirements of these goods like quality of water, ambient air quality, and global climate and so on. However, the major question that is to be scrutinised and answered is, how does the demand for these goods increase with an increase in the income. As the world becomes wealthier, the extent to which environmental protection is to be provided becomes more or less dependent on the income elasticity of demand for the environmental quality. Thus we can clearly explain the differences in pollution levels in the various countries of the world by means of the differences which are existing in their income.

This is because of the simple reason that individual demand for the environmental quality will depend upon their own income. If a person does not have a high income, he will demand for goods which are cheaper so that he can afford them. An aggregate of these individual demands will represent the demand from the particular society. The government will act upon such demands and if the government is democratically elected, such demand will be the basis of the government's regulations. Thus, we can see how income is implicitly interlinked with the regulations which a particular government applies on its industries. Thus, it is logically assumed from the above information that the countries which are developing or are poor are not interested in their environmental quality and pollution, because their economic condition is not such that they can sustain a society which has stringent economic regulations which will not be favourable for the industries which are providing the economic opportunities to their society.

6 Kolstad, Charles D. *Environmental Economics*. New York: Oxford University Press, 2000. 246.

Thus, their primary aim is to sustain and improve their economic condition rather than improve the quality of the surrounding environment.

The Kyoto protocol also recognises the plight of these developing countries. Simon Kuznets developed curves showing how income inequality changed as per capita income of the country increases. He found that income inequality initially increased and then decreased. Because of the similarity, curves showing how environmental quality or pollution change with changes in income in a country are known as **environmental Kuznets curves.**[7] This helps to determine policy questions which deal with improvement of environmental quality in poor countries.[8]

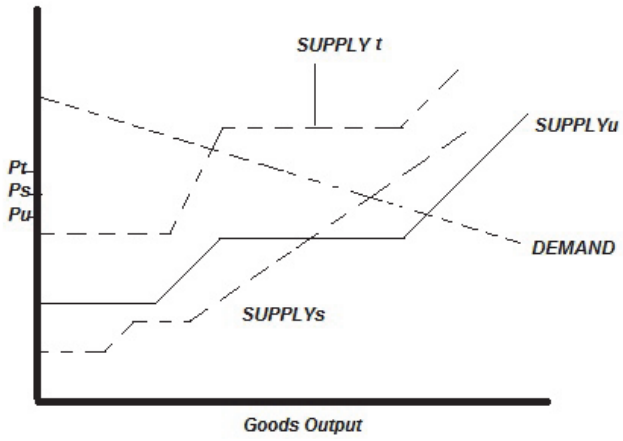
The competitive aspect in a market economy is of vital importance. Just as firms compete against each other by providing better goods, cheaper prices and so on, the Governments also compete against each other by providing incentives to the industries in order to attract these industries to establish their factories in the jurisdiction of the Government. They do this in a number of ways such as, providing tax reductions, cheap land for building the factories and so on. The governments have their own incentives in providing such amenities, like job opportunities for its citizens, economic boost and so on. However, one of the most important problems arising out of this is that of environmental degradation. Though this process is economically efficient at the first glance, in the long run, it has severe detrimental effects on the environment. Thus at the international level regulations vary substantially from one country to another. A simple reason for this is that environmental quality is a normal good, the wealthier people are, the more environmental quality they demand. Thus we would expect the citizens of a rich country to demand more environmental quality than citizens of a poor country. However, one negative impact of such process is the creation of "pollution Havens', which are countries that are full of polluting factories and industries because such countries have extremely relaxed environmental regulations and so on.

According to Coase Theorem[9] it makes no difference whether the polluter must compensate the victim of the pollution or the victim must pay the polluter not to pollute. There is an analogous issue in the context of Pigovian fees, which can be defined as a fee paid by the polluter per unit of pollution exactly equal to the aggregate marginal damage caused by the pollution when evaluated at the efficient level of pollution. The fee is generally paid to the government.[10] Thus a major question which arises out of this context is, whether the outcome of subsidizing firms is the same as the outcome obtained by imposing fees or taxes? This is an important question since subsidies are usually much more politically popular than taxes or fees[11]

7 *Ibid.* at pg. 248.
8 *Ibid.* At pg. 249.
9 *Ibid.* at pg. 124.
10 *Ibid.*
11 *Ibid.*

We are determining what the market price of the good might be under these three regimes that is, taxes, subsidies and unregulated. The figure (figure A) illustrated below traces out the short-run supply functions for an industry for three cases, unregulated, Pigovian taxes and subsidies. Also shown is a typical demand function for the good. Recall that firms will operate on the portion of their marginal cost curve that lies above the variable cost. We can see that with both the unregulated and subsidy cases, both types of firms are operating, yielding product prices of Pu and Ps, respectively. In the case of Pigovian tax, only the newer firms operate, yielding product price Pt. Thus, from the graph it can be interpreted and can be concluded that taxes and subsidies have different effects in the short run. A subsidy may allow firms to continue operating which would not have happened in the case of tax. The subsidy requires a lump-sum transfer, which has to be obtained from somewhere. More importantly, the subsidy involves the operation of firms that are really losing money. This is not efficient.[12] Thus, from the above analysis it can easily be concluded that though the theoretical concept of Coase theorem tells us that subsidies and taxes have the same impact upon efficiency, we see that in case of practical application, as illustrated above, it has a detrimental effect, not only on the economy but more importantly on the environment by allowing the loss making and polluting firms to continue.

Figure A[13]:



The aspect of subsidy is undesirable because it does not allow the market to communicate the true costs of the product being consumed to the consumer. Thus suppose there are two factories, one of which makes goods from recycled materials, while the other is the polluting industry. Now, subsidies would basically require giving money to the polluting industry to enable it to clean up. This, would

12 *Ibid.* at pg. 127.
13 *Ibid.*

however create an interest or incentive in investing in those polluting industries rather than industries which are using the recycled materials. Moreover as stated above we would want the consumers to see the full costs associated with producing the product so that the consumers know, what to buy and how much of it to buy.

To summarize, we could clearly suggest that, if jurisdictions/countries offer foreign firms tax-free status, it would not be in the best interest of these jurisdictions to loosen environmental regulations to attract capital. If, on the other hand, conditions are such that the jurisdiction must tax capital, we might see the complementary use of weak environmental regulations to make up for the capital taxation. In reality, we might expect positive capital taxation to exist in countries that are not excessively worried about attracting capital. It seems logical that such countries would not feel strongly enough about attracting capital that they would resort to substantial weakening of environmental regulations. This is just speculation, however; what happens in reality is an empirical question.

REGULATORY APPROACHES AND ITS DEFFICIENCY

The regulatory approach seeks to reach a given quality target for the environmental system by regulating individual behaviour. The general kinds of permits used to control environmental pollution or to regulate such pollution, are the pollution permits that are issued by the states which want to use such a mechanism. Now, these pollution permits are issued till the specified level of pollution that is pre-decided as the maximum level of pollution is reached. After that no further pollution permits are issued. However, caps on the amount of pollution produced by the individual countries or within them the individual industries are also a way of reaching a specified level of pollution and thus under the ambit of a regulatory approach. Thus, in several countries this approach gets widely used in environmental policy. Thus, water and air quality management in the United States is based on a permit system. Air-quality policy is also based on a permit system in Europe and Japan.

However, though the regulatory approach finds wide application in making of the environmental policy, the approach is at the very core faulty and inefficient. This is because in this approach the same set of emission rules applies to all emitters of a specific pollutant. The policy maker plans the economic subsystems by using a general approach, and thus he is not able to take into account particular differences. Thus this approach is inefficient. Now let us take into consideration the situation of two industries A and B which are emitters of the same kind of pollutants and as a result they are being subjected to the same set of rules in that regulatory approach. Now to reduce the pollution levels by say X percent the abatement cost which will be incurred by the industries will be different, because though the industries may be producing the same kind of pollution, there will be specific differences between them. Thus, it is inefficient for the industry which incurs a higher abatement cost while undergoing the abatement procedure. Moreover, inefficiency means that the resources are being wasted, and thus the opportunity costs will be too high. Since the costs of environmental policy will have an effect on the target level, inefficient

abatement implies less environmental quality. Therefore, the regulatory approach reduces the chances for effective environmental policy.[14]

One of the major problems faced as a result of the regulatory approach which is used by several countries, is that the regulatory approach views economy as a static entity. Thus as a result of this, since there is a pre-decided level of pollution and since a proportionate amount of permits are issued, once those permits run out the new industries cannot come up and moreover the dynamic industries which are existing cannot expand. We have already seen that this method gives protection to industries which are pre-existing and this can be inefficient because such old existing industries have old technology compared to the new industries as well as the dynamic industries and thus the utilisation of the resources will be less and inefficient and as a result the opportunity cost will be high. Closing off of a region to a newcomer reduces mobility and implies efficiency losses. All these phenomena reduce productivity or result in a slowdown of increase in productivity. Thus the regulatory process as already proved is inefficient. It is also disadvantageous to labour as the new industries are not able to locate in the region although they may provide interesting and improved employment opportunities.

INTERNATIONAL TRADE

Environmental regulations cost polluters money. Firms subject to tighter environmental regulations will incur higher costs than firms subject to weaker or non-existent environmental regulations. Thus, we can infer that economic theory would indicate that in the countries where there are relaxed environmental regulations there would be a concentration of polluting industries. Every industry would naturally (due to reasons of apparent economic efficiency) like to shift to a country where there are less environmental regulations because it would enable the industry to produce goods without investing a substantial amount of capital on either using cleaner technology or paying penalty for the pollution generated by those industries. Thus, this leads to the development of areas/countries which have only pollution-intensive industries due to its weak environmental regulations and areas/countries which specialize in clean industries due to its strong environmental regulations. Moreover, if we have significant amount of such specialization, the establishment of free trade areas would be of major concern to the environmental groups. In fact, the environment was a major issue in the debate in the United States over the North American Free Trade Agreement.[15] The issue was whether a free trade zone involving Canada, the United States, and Mexico, would result in a significant number of Canadian and U.S. Industries moving to Mexico, seeking out weaker environmental regulations. Similarly, should Eastern Europe join European Union, will firms migrate to the East where environmental regulations may be more relaxed? Furthermore, tight environmental regulations tend to drive the industries

14 Siebert, Horst, and Heinz Nixdolf. *Economics of the Environment*. 7th ed. New York: Springer, 2008. 133.

15 *Supra*. n at 6, pg. 254.

elsewhere to places where they can find more relaxed regulations and weak government monitoring of the industries present.

Thus we can see that certain countries/ specific areas specialize in certain industries, depending upon the assimilative capacity of the area. One of the primary models of explaining international specialisation is the Heckscher-Ohlin model of International Trade.[16] The Heckscher–Ohlin Theorem states that countries export those commodities which require, for their production, relatively intensive use of those productive factors found locally in relative abundance. The twin concepts of relative factor intensity and relative factor abundance are most easily defined in the small dimensional context in which the basic theory is usually developed. Thus there are two basic things that determine the Environmental regulations of a particular country, first being the assimilative capacity of the area. For example a country with stringent environmental regulations will have clean industries, while a country having weak environmental regulations like pollution intensive industries, a country with plentiful labour will specialize in labour-intensive markets and so on. Second aspect on which the environmental regulations of a region depends on is the income of individuals[17] residing in the region. The more the income of the residents, the more stringent are the laws. This has been illustrated before.

One problem with finding evidence that differential environmental regulations influence International Trade is that the effect is probably small. Because of this, some authors have focused on the margin most likely to be sensitive to the effect: international flows of capital.[18] The logic is that, the nature of the capital stock in any country and thus that country's specialisation in a particular industry, is the result of investments made over many decades. Movement of capital from one country to another for investing in the industry of the other country is called Foreign Direct Investment (FDI).[19] If lax environmental regulations tend to attract dirty industries, then we should expect to see FDI for dirty industries concentrated in countries with lax environmental regulations, *ceteris paribus*.

Now we shall discuss one of the most pertinent problems that arises as a result of the creation of pollution havens: that is the problem of transfer mispricing.[20] It is possible that companies that need to purchase carbon credits to offset their emissions may also have investments in derivatives trading and in businesses responsible for generating carbon credits. This raises the potential for those related companies to engage in transfer mispricing. Transfer mispricing, also known as transfer pricing manipulation, refers to trades between two related parties at artificial prices for the purposes of tax avoidance.[21]

If two unrelated companies trade with each other, it is generally accepted that they will deal with each at the market price for the transaction because it is the

16 "Heckscher–Ohlin Theory | Online References | Cyclopaedia.net." Accessed October 11, 2014.
17 *Supra*. n at 6, pg. 256.
18 *Supra*. n at 5.
19 *Ibid*.
20 "Transfer Pricing - Tax Justice Network." Tax Justice Network. Accessed October 11, 2014.
21 *Supra*. n at 5.

product of genuine negotiation in a market. But when two related companies – that is, a parent company and a subsidiary, or two subsidiaries controlled by a common parent – trade with each other, they may artificially distort the price at which the trade is recorded, to minimise the overall tax bill. This might, for example, help the company record as much of its profit as possible in a tax haven with low or zero taxes.[22]

In the case of the carbon market, for example, a company (the "parent company") may need to purchase carbon credits to offset its own emissions. It may invest in an offset project in Africa to generate those carbon credits. But first it establishes a trading company in a tax haven (with zero taxes). The subsidiary company in Africa sells its carbon credits (at a very low price) to the trading company, who then sells those carbon credits (at a very high price) to the parent company. In this case the subsidiary company in Africa receives an artificially low price for the carbon credits, resulting in low profits – and consequently an artificially low tax bill in Africa. The company in the tax haven sells the credits at a high price – artificially transferring all of the profits there, but being a tax haven, no tax is paid.[23]

Thus, as a result of the above phenomenon, we see that there has been complete avoidance of payment of taxes in the country in which the offset project was set-up, the polluting industry in the main country can produce unlimited pollution but it can save itself from any adverse effect, because they have an unlimited source of production of carbon-credits which will meet their requirement. Thus, we see that such tax havens or pollution havens which are developed at specific countries due to their lax environmental regulations have an extremely negative effect upon the environment. We have to remember that the basic reason why the environmental regulations were enacted in the first place was to protect the environment from degradation and overall welfare of the society as a whole. Thus, when one industry can generate immense amount of pollution, not caring about the carbon-cap because it has an unlimited supply of carbon credits, it is extremely detrimental to the overall environment. This leads to the loss of the very reason for which such carbon caps were incorporated in the system in the very first place. If the environmental pollution is not reduced and the polluting industries continue to carry out their detrimental procedures, then the institution of carbon credits and the carbon-related regulations is of no use. Moreover from the economic perspective, such transfer mispricing also leads to tax fraud in the country (say Africa, in the example stated above) in which the set off industry is set up to produce carbon credit, because the set off industry sold off the carbon credits at an extremely low price and as a result the regulatory authorities could not charge the normal taxes or charged zero taxes for such transaction because of the extremely low financial amount involved in the transaction. Thus we see that the economic benefit that the country (Africa in the above example) should be receiving from the taxes are lost because of the fraud. Thus, this situation is not Pareto efficient because Pareto efficiency requires that one

22 *Ibid.*
23 *Ibid.*

person should be better off (in his own estimation) and no other person may be made worse off (again in his own estimation). Thus, clearly from the above situation we can see that the polluting industry is made better off as a result of the entire set up of the tax haven/ or pollution haven (this is apparent from the first glance), however, the country in which the set off industry is situated is made worse off due to the tax fraud and the overall society is made worse off as a result of the environmental degradation. Thus, we see that the set up as a whole is inefficient on the whole from both the economic as well as the environmental prospective.

TAX FRAUD IN INTERNATIONAL TRADE

Carbon trading in the European Union has already been hit by a particular form of tax fraud involving the theft of Value Added Tax ("VAT") (also known as carousel fraud or Missing Trader Intra-Community fraud).[24] This type of fraud exploits how VAT is treated in multi-jurisdictional trading in Europe. In this type of fraud the criminal utilises the fact that VAT is not charged when a good is traded across the boundary between member states of the European Union, thus a good say from Country A is traded to a Country B and since the countries are member states of the European Union such a transfer of that good is VAT-free. Now the person 1 who obtained that good by means of the trans-boundary trade will sell it to another person within his country and such a sale will include both sale price and VAT. Now the person 2 who obtains this good is supposed to pass on the VAT to the relevant government to whom this is owed, however in the situation where there is a tax fraud such a person usually disappears without paying the relevant tax and subsequently the goods and the VAT may then be sold on through a number of companies, passing across a number of borders, with each additional layer of transactions making it more difficult to trace the link between the final VAT that is owed to the relevant government authority and the original importer, who by this time has disappeared without paying the tax.

In 2009 authorities began to observe high volumes of trade on France's BlueNext carbon exchange. Subsequent investigations revealed the sudden spike in trading was the result of highly organised criminals trading large volumes of carbon credits as part of a carousel fraud scheme. The European police agency, Europol, subsequently estimated that up to 90% of all carbon trading in some countries was a result of these fraudulent activities.[25] This fraud was estimated to have resulted in losses to several governments of around 5 billion euros in just over 18 months.

Morevover, in the case of *R* v. *Dosanjh, Chahal and Gill* [2012], in June 2012, at Southwark Crown Court in the United Kingdom, three defendants were found guilty of carbon trading carousel fraud and jailed for a combined total of 35 years.

24 *Supra* at 5.

25 Mason, Rowena. "Copenhagen Climate Summit: Carbon Trading Fraudsters in Europe Pocket €5bn." THE TELEGRAPH, December 10, 2009. http://www.telegraph.co.uk/earth/copenhagen-climate-change-confe/6778003/Copenhagen-climate-summit-Carbon-trading-fraudsters-in-Europe-pocket-5bn.html.

The three VAT fraudsters had established a number of bogus companies to import the carbon credits into the UK, and when those credits were sold on the original companies were dissolved. The credits were sold on again between three further 'buffer' companies – also run by the gang – to make the trading chain appear legitimate, before the credits were finally sold to legitimate companies, charging VAT which was never paid back to the government. During the 69 days of trading, the total turnover was 276 million euros, of which 41 million Euros was due in VAT. The trades were made in a matter of minutes via a computer system, and the stolen VAT was transferred to offshore bank accounts in the United Arab Emirates to 'clean' the stolen cash which the gang then spent.[26]

Thus, we see as a result of such tax fraud by not paying the VAT to the required authorities there has been an immense amount of economic loss to the respective countries and as a result we see that such processes are basically inefficient and cause widespread economic loss. Now, if we look into the background as to why frauds in general take place, we will see that while committing such offences the major thought process of such violators is that even if they get caught the penalty which they will have to pay or the loss which is suffered is less than the total profit that is generated as a result of this violation. Now, this is efficient according to Potential Pareto Improvements or Kaldor-Hicks efficiency.[27] Now this theory of efficiency was developed by economists who wanted to overcome the restriction which was laid down by the Pareto criterion, which is, to achieve Pareto efficiency, one person must be made better off while no other person can be made worse-off. However, economists wanted to develop a more practical approach and as a result they developed the Potential Pareto Improvements or Kaldor-Hicks efficiency which said that in a situation there can be both persons, one who has obtained a profit and another who has suffered a loss however the person who has obtained a gain must be better off than the person who has suffered a loss, i.e., the gainer's gain must be more than the loser's loss and as a result even after compensating the loser the gainer must have surplus left as a result of which such a situation is efficient.

However, the situation which is being dealt with in the present scenario is not efficient according to Kaldor-Hicks efficiency. Here, the loss of the loser is greater than the gainer's gain, which is very evident from the reports that specify that around 90% of trade in carbon credit is as result of fraudulent activities (in certain countries) and moreover there is no instance of payment of compensation by the violator to the person who has suffered the loss as these people do not pay compensation for the VAT fraud as it is extremely difficult to locate such violators due to the presence of a number of transactions and foreign exchanges and the

26 Alllen, Emily. "Fraud Mastermind Cheated Taxpayer out of £39million in Just 69 DAYS and Spent the Money on £1million Home and a Rolls Royce Is Jailed for 15 Years." *Mail Online*, June 19, 2012. Accessed October 11, 2014. http://www.dailymail.co.uk/news/article-2161520/Fraud-mastermind-cheated-taxpayer-39million-just-69-DAYS-spent-money-1million-home-Rolls-Royce-jailed-15-years.html#ixzz29O6SfXtp.

27 Cooter, Robert, and Thomas Ulen. *Law and Economics*. 4th ed. Delhi: Pearson, 2004. 48.

relaxation in regulation and cross checking in these foreign exchanges. As a result such a situation is not efficient and is highly detrimental to the global economy.

CONCLUSION AND SUGGESTIONS

Thus, we see that when we go on to analyse International Trade or the provisions on the basis of which regulations (legislations) are made in countries, there are severe defaults in the practical application of theoretically successful provisions. As illustrated above, we have already seen that income and assimilative capacities are two major aspects which influence the making of laws. Economic benefits have been the only drive which has influenced the countries and Industries. It is true the developing or under-developed countries cannot afford to implement stringent environmental regulations because they need the development of industries for their economic development, but this factor has been exploited by several factories, and thus has resulted in areas specializing in polluting industries giving rise to pollution havens. Thus we see that there is an overall detrimental effect on the environment, because on one hand there are countries, which have implemented strong environmental laws to improve the quality of the environment and on the other hand there are these countries with weak environmental regulations which are polluting the environment. Since, environment is a public good and can be used in equal amounts by all the countries, individuals or groups can take the position of a free rider not contributing to the cost of environmental quality. Constitutional mechanisms have to be developed which ensure that free-rider behaviour in evaluating environmental quality is reduced.

Now, coming to the concept of whether subsidies or penalties should be made applicable for such environmental pollution, although we have seen that the Coase theorem says that penalties and subsidies have the same effect on efficiency, practical application has shown that providing subsidies is inefficient. Thus, we can say that practical application of certain laws should be reconsidered in terms of its environmental implication and if such laws are not consistent with the environment/or have a detrimental impact on the environment, such laws should be removed because Environmental laws should not only be economically efficient but also promote the betterment of the environment (in its practical application) because that is the basic reason of the institution of such laws.

We have already seen the problems associated with International Trade. Thus, let us see the provisions which may help to improve the situation. One of such provisions is the implementation of sanctions against such polluting countries. Trade is one of the several aspects that controls international relation, however, there are several other aspects that govern international relations, like the fact that countries deal with each other on a multitude of issues, not only economic but political and cultural as well. It may be that the victim country has little ability to coerce the polluter to reduce emissions; however, the victim country may have a great deal of power on a totally unrelated issue, such as involvement in a joint defence treaty. By withholding agreement on the joint defence treaty, the victim

country may be able to force the polluter to reduce pollution levels. In essence, the victim country can threaten sanction of one sort or another against the polluter country if it does not adopt pollution regulations to achieve the efficient amount of pollution. Another means of controlling the pollution situation is by having a stringent multinational Agreement which involves as many countries as possible so that the deviance from the agreement is not in the scope of events, because it is only when majority of the countries are not subject to a uniform law that problems like pollution haven and tax haven arise. The basic problem in designing an effective international environmental agreement is that there is no super-national organization to enforce such an agreement. In effect, the agreement must not only be self-enforcing but it must be sufficiently appealing to all parties involved for them to agree to it in the first place. Thus there are three desirable characteristics of an international environmental agreement:

(1) the agreement should be self-enforcing;

(2) each country should be better off as part of the agreement than not; and

(3) pollution levels obtained by the agreement should be Pareto improvement over the status quo and, ideally, a Pareto optimum.

It is easy to contemplate an international agreement that meets the first two of these three criteria; it is quite another thing to design an agreement that meets all three conditions.[28]

There are several principles which have been proved to be economically efficient and may be applied or taken into consideration when policies are made so that not only they benefit the environment but also are efficient economically. The polluter-pays principle of environmental policy is an institutional manifestation of the opportunity cost principle.[29] It can be applied once environmental targets are established. Now, this system ideally expects a global target to be established, in such a situation that no country should be left out of its ambit and as a result this principle helps in circumventing the free-rider problem because in such cases the absence of a global law or target allows certain countries to ignore the requirements of the environment while other countries are being bound by stringent environmental regulations. This principle helps in allocating the opportunity costs of the environmental protection in a reasonable way. The individual polluter has an incentive to reduce pollutants (as the pollution which will result from his actions needs to be compensated by him), the divergence or gap between the private costs and social costs are abolished and as a result of this the commodity price includes all the factors, i.e. the price of production of the good and the environmental cost. This enables the consumer to see the true price of the commodity and thus the consumer will decide the consumption accordingly. The polluter-pays principle can take many forms such as emission taxes, compensation procedures as in Japan's environmental

28 *Supra*. n at 6 pg. 264.
29 *Supra*. note at 14, pg. 164.

policy, or liability rules.[30] The polluter-pays approach is the documentation of the more general question of an appropriate institutional setting for allocating the opportunity costs of the environmental protection to the subsystems. It may be interpreted as a solution to an incentive problem.

However, there are several constraints to the polluter pays principle,[31] the primary one being the identification of the polluter which is the most important part for the execution of this principal. Second constraint is the vote-maximisation intention of the policy maker. Thus, this one constraint will become a disincentive for the policy maker from making policies which will induce the polluters to pay for the pollution caused by them. And, the third constraint is the fact that if the country or region is located in an upstream or upwind position then they will have an incentive in asking for compensation or application of the pollutee-pays principle rather than application of the polluter-pays principle.

Now, this brings us to the concept of pollutee-pays principle[32] which is the counter principle of the polluter pays principle and this principle talks about the notion in which the pollutee has to compensate the polluter in order to induce him to reduce or avoid pollution. This arises from the context of the Coase-theorem. This principle may be applied in the case of global media when high income countries place a higher value on preventing climate, risks and compensate the lower income countries through payments in order to induce them to avoid pollutants.

Another important consideration which needs to be taken care of is the *Principle of Interdependence*[33] which talks about how all the environmental systems are interdependent and represent a complex system or network of interaction. It flows naturally that since the environmental systems means the interdependence of pollutants due to the fact that pollutants are linked through environmental systems and diffusion between them. For example, the pollutants ambient in the air can be deposited into water systems, and pollutants ambient in the river and other water bodies reach the air by means of the process of evaporation. Pollutants may also be linked by means of emission technology.

Environmental policy must take these interdependencies between environmental media, between abatement, emission and production technologies, and between pollutants into account. If environmental policy addresses itself to only a particular media, a particular pollutant, or a particular abatement or production technology, it is likely to fail in the long run. Very quickly, new problems will pop up. Consequently, environmental policy has to be integrative and encompass all environmental media and pollutants.

30 *Ibid.* at pg. 165.
31 *Ibid.*
32 *Ibid.* at pg. 166.
33 *Ibid.* at pg. 167.