Asia-Pacific
Economic Cooperation

The Impact of Environmental Regulation on Trade

APEC Study

APEC Committee on Trade and Investment

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Introduction

OVERVIEW OF THE TOPIC

The relationship between trade and environment is in the front line of policy debate. With trade liberalization, tremendous economic development in some regions, and the fast growing population, there has been an increasing use of natural resources and pressure on the environment. This has provoked tensions and raised questions on the way countries are developing. Increasingly, countries have tried to implement new policies that are more sustainable and environment-friendly oriented. However, it is still not clear to what extent economic growth in general and trade liberalization in particular affects the environment. In turn, it is also not straightforward to estimate the impact of environmental policies on trade. This survey intends to answer the later question.

It is now widely recognized that trade liberalization is essential to development, growth and economic prosperity. It has help countries to develop faster, to ease tensions between countries and to better communicate and cooperate with each other by creating an inter-dependency. It is also a way for countries to specialize in what they do the best and to import new innovative products they would not have produced otherwise, which in turn boosts research and innovation. It gives consumers a wide range of choices with much lower prices thanks to world competition. It is a driving force to select the best products at the best price at the world scale. Finally, it is moral duty to let two consenting individuals trade which each other freely as long as they do not interfere with anyone's freedom or property.

Problems arise however when individuals' actions have side effects on other individuals' freedom or property. The economic term is externalities. There is a negative externality when an external party to the transaction bears a cost, due to the transaction, and when the parties do not pay the full cost of their action. This is the case of pollution. An individual who pollutes the environment do not internalize this cost although it does affect other people, who do not receive any compensation for their property's degradation that is their health (or to some extent, the

environment, if one considers it as public property[1]). Hence, policies should be found to make the parties pay the real full cost of their actions or transactions.

When looking at the relationship between trade and environment, two main kinds of instruments have been widely used: the Trade-Related Environmental Measures (TREMs) and the Environment-Related Trade Measures (ERTMs). Both types have been used at the national level, through internal policy, at the bilateral level, through Free Trade Agreements (FTAs), at the multilateral level, through Multilateral Environmental Agreements (MEAs) and controlled by the WTO.

However, concerns have been raised concerning the efficiency and the appropriate use of these measures. Have they had any effect on improving environment quality? Do they make economic sense or do they act as trade barriers that dampen countries' development? The aim of this survey is to review the different TREMs and ERTMs, to analyze the way they are designed and implemented at the different levels of governance, and to assess their actual and potential consequences on trade.

METHODOLOGY

The APEC region is a dynamic and significant region in terms of population, trade and economic development. The region accounts for 40 % of world population and it has been increasing at a 0.8 % yearly average for the past ten years. From 1998 to 2008, population has increased by 200 million inhabitants. Total trade of APEC represents 45 % of world trade. Moreover, a significant number of APEC economies have adopted an export-driven strategy of development. Finally, APEC accounts for 53 % of world's GDP. All these indicators show that it is difficult to treat APEC as a region given its size. It is so big and diverse that it is difficult to consider APEC as a single entity. However, its significant dimension and the various profiles of its member economies (developed, and developing economies) make it very suitable for looking at how trade is affected by environmental policies.

The survey is originally based on questionnaires answers from State administrations and companies of APEC economies. A first set of questionnaires was mailed to the twenty one state administrations in charge of trade. A second set of questionnaires was sent to companies from different sectors within APEC member economies. Major sectors targeted are: a) Agricultural,

[1] Although it is not clear, from an economic point of view whether environment is everyone's property or no one's property.

forestry and fishery products; b) Electrical and electronic devices (other than telecommunication equipments); c) Telecommunication equipments; d) Mechanical appliances; e) Telecommunication; f) Textile and footwear; g) Automobile industry; h) Chemical products (other than pharmaceutical); i) Pharmaceutical products. The state administration questionnaire aims at understanding in a detailed way the rationale and status of formulating trade-related environmental policies in APEC members economies. It is composed of three sections: elaboration of trade-related environmental measures (TREMs), communication on TREMs, assessment and harmonization of TREMs in APEC. The companies questionnaire concentrates on understanding in a detailed way the effects of environmental measures (voluntary or mandatory) worldwide on the exports of each APEC Member Economy. It is composed of four sections: general data, market access, market effect and compliance efforts. This Questionnaire has been sent to 1779 companies[2] among 14 of the 21 APEC economies. The repartition is as follows: Australia: 25, Canada: 11, Chile: 1424, China: 11, Hong Kong, China: 12, Indonesia: 24, Japan: 8, Korea: 18, Malaysia: 27, the Philippines: 8, Singapore: 34, Chinese Taipei: 30, The United States: 40, and Viet Nam: 77.

Despite the widespread diffusion of the questionnaires, it has been proven very difficult to have a feedback from companies. Questionnaires return rate only reached 0.33 %! Consequently, the framework of the study had to be reshaped. Accordingly, the structure of the report is organized as follows: Section I analyzes the trade patterns of the APEC region, and examines the way environmental and pollution-intensive goods are treated. Section II presents and discusses the way TREMs and ERTMs are dealt with at the different level of governance, and reviews some empirical studies on the way they affect trade. Section III analyzes the questionnaires' answers from APEC states administrations and explores the way to improve the creation, the communication and the harmonization of TREMs. Finally, the Concluding section reports the different results and summarizes main policy recommendations.

MAIN CONCLUSIONS

Although the APEC region is very diverse, many member economies have based their development on an export driven model. Hence, it is all the more important to tackle any kind of protectionism. Also, intra-trade represents the most part of APEC's trade. It means that main problems can be solved from the inside. To do that, member economies should base their policies on three pillars: cooperation, communication, and harmonization. Finally, economies should also

[2] The questionnaire has been sent to 355 companies apart from Chile.

monitor the way environmental and pollution-intensive goods are traded. Incentives should be given to favor trade in environmental friendly commodities. This has to be done by fully liberalizing trade for such products rather than raising tariffs on polluting goods.

Environment concerns are now part of many agreements, both at the bilateral and multilateral levels. It ranges from vague considerations to highly restrictive measures. In this regards, economies should remain careful not to raise new barriers to trade, and make environmentalism a new non-tariff barrier. In fact, trade provisions have been proven to have low effect on the environment but to be very detrimental to trade. The WTO rightly suggests favoring incentives and cooperation instead of trade restrictions. Help should also be provided to developing economies to help them meet environmental standards; and developed economies should associate them in the standard-making process.

APEC economies are willing to develop cooperation at the APEC level through action plans, training activities for officials and by developing a TREMs database. Member economies should definitely work together to share information, improve communication and strengthen transparency on environmental and trade issues. In order to achieve it, they should favor a bottom-up approach, with preference for voluntary measures rather than mandatory requirements. Furthermore, they should associate foreign suppliers and perform impact assessments, when necessary, to maintain a fair trade environment and to facilitate communication and transparency. More generally, they should fix directions and objectives at the APEC level, and let economies adapt to best ways to implement new policies according to their development level and their economies' specificities.

Section I – Trade in the APEC Region

PRESENTATION

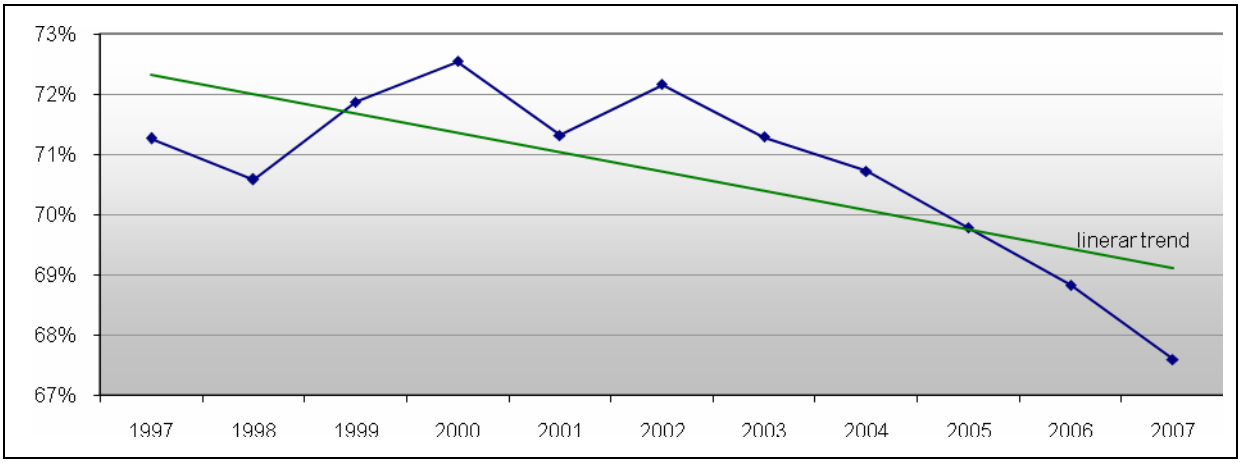
APEC represents about 45 percent of world trade in 2008. It means, on the one hand, that its role is prevailing in international trade. On the other hand, it also implies that it is too broad and too diverse to draw general conclusions and one should remain careful when looking at the global picture of the APEC region. Very often, individual situations differ widely from their aggregated results. This chapter aims to provide a summary of the trade structure of APEC. In particular, it is interesting to differentiate between environmental goods and polluting industries and have a closer look at how they are traded. We should expect, for instance, having lower tariffs on environmental-friendly products and higher tariffs on the ones that damage the environment. This section is a preliminary step before explaining how TREMs may affect trade.

APEC's total trade[3] has been increasing by 10.6 % annually over the last ten years, reaching $11'775 billion in 2007. It is a little faster than the world average, for which trade is growing at a pace of 10.0 % a year. As a comparison, the European Union's total trade[4] has been growing at 8.8 % annually during the same period. It shows two things. The region is rather dynamic compared to other parts of the world. It also illustrates a development strategy of some member economies for which growth is export-driven.

This feature is quite similar in terms of intra-trade[5] . Trade within the APEC region has been growing at 10.0 % per year between 1997 and 2007 (8.5 % for EU intra-trade during the same period). Intra-trade was equal to $7'960 billion in 2007. Intra-trade represents two thirds of APEC's total trade today. However, this share has been decreasing slightly over the years.

Chart 1: Intra-trade as a share of APEC's total trade

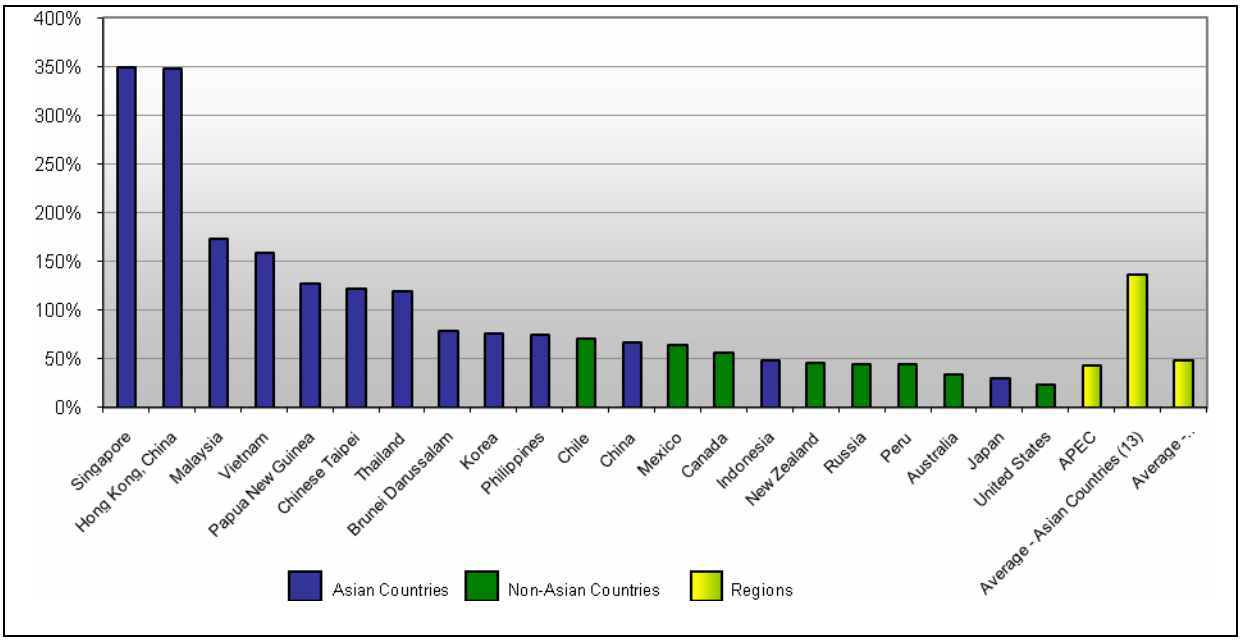
[3] Comprising both intra and extra APEC trade.
[4] Comprising both intra and extra EU trade.
[5] Viet Nam is included for intra-trade figures although it became a member in 1998.



Source: UNCOMTRADE; Own calculations
Note: Data do not include Brunei Darussalam, Indonesia and Papua New Guinea.

As a share of GDP, APEC's total trade contributes up to 43.5 % in 2007. This is misleading since situations are widely different between economies. It ranges from 23 % to 348.6 % depending on the economy. However, it is possible to group economies according to their geographical location: Asian economies on the one hand and non-Asian on the other hand. Whereas non-Asian economies have a low ratio, 47.7%, Asian economies tend to have much higher trade flows compared to their GDP: 136.4 % in average (Japan is an exception with a very low share). Again, it shows their tendency to be more export-driven and thus rely less on their domestic market.

Chart 2: Total trade as a share of GDP – 2007



Sources: IMF; WTO; Own calculations

FREEDOM TO TRADE

Economic freedom in general is determinant for a better environmental quality. According to the Economic Freedom Annual Report[6], "Environmental stresses on human health are lower and ecosystem vitality is greater in countries with more economic freedom". Authors of this report build a ranking based on different economic indicators[7] and calculate a global index ranging from 0 to 100. They compare the economic freedom indicator to the 2008 Environmental Performance Index from the Joint Research Centre (JRC) of the European Commission[8]. They show that Nations in the top quartile, have an average score of 84.8 out of 100 for environmental performance while those in the bottom quartile have an average score of 64.5.

The "Freedom to Trade Internationally" indicator, it is calculated by aggregating the following criteria:

Table 1: Freedom to Trade Internationally indicator's criteria

A Taxes on international trade
- Ai Revenues from trade taxes (% of trade sector)
- Aii Mean tariff rate
- Aiii Standard deviation of tariff rates
B Regulatory Trade Barriers
- Bi Non-tariff trade barriers
- Bii Compliance cost of importing and exporting
C Size of the trade sector relative to expected
D Black-market exchange rates
E International Capital Market Controls
- Ei Foreign ownership/investment restrictions
- Eii Capital Controls

On average, the APEC region scores 7.5 while the world average is 6.7. If one considers APEC as a single country, it is ranked 39th out of the 141 countries in the sample. Trade provisions related to Environment belong to the "regulatory trade" criterion, which covers non-tariff barriers and compliance costs. For this indicator, APEC is ranked 40th. One should notice however that economies profiles are very different. Freedom to trade in general ranges from the first place to the 114th

[6] Economic Freedom Network, 2009. "Economic Freedom of the World 2009 Annual Report"
[7] There are five indicators: 1) Size of Government; 2) Legal System & Property Rights; 3) Sound Money; 4) Freedom to Trade Internationally; 5) Regulation (5.A. Credit Market Regulation; 5.B. Labor Market Regulation; 5.C. Business Regulation).
[8] 2008 Environmental Performance Index, <http://sedac.ciesin.columbia.edu/es/epi/>.

position. For that reason, not all economies have to make the same efforts to better open their market to trade. Economic freedom and freedom to trade are preconditions to better environmental performances.

Table 2: Freedom to Trade Index by APEC economy - 2007

APEC Economies	A Taxes on international trade	B Regulatory Trade Barriers	C Size of the trade sector relative to expected	D Black-market exchange rates	E International Capital Market Controls	Freedom to Trade Internationally Score	Freedom to Trade Internationally Ranking
Australia	8.6	8.1	2.4	10.0	4.9	6.8	74
Canada	6.6	7.9	3.7	10.0	7.3	7.1	59
Chile	9.4	7.8	7.0	10.0	8.3	8.5	3
China	8.2	6.4	10.0	10.0	3.2	7.6	36
Hong Kong, China	10.0	9.4	10.0	10.0	8.5	9.6	1
Indonesia	7.9	6.9	6.4	10.0	4.3	7.1	58
Japan	6.5	7.1	2.2	10.0	5.0	6.2	106
Korea, Rep.	5.7	7.9	6.2	10.0	6.0	7.1	55
Malaysia	6.7	6.9	10.0	10.0	4.0	7.5	38
Mexico	6.6	6.8	6.4	10.0	4.6	6.9	71
New Zealand	8.8	8.7	3.6	10.0	7.6	7.7	21
Pap. New Guinea	6.4	6.2	10.0	10.0	7.7	8.0	13
Peru	8.3	6.4	4.9	10.0	8.2	7.6	33
Philippines	7.8	6.6	7.0	10.0	3.4	7.0	66
Russia	4.5	4.9	6.3	10.0	3.8	5.9	114
Singapore	10.0	9.2	10.0	10.0	7.7	9.4	2
Chinese Taipei	7.4	7.3	7.7	10.0	7.2	7.9	16
Thailand	7.4	6.7	10.0	10.0	4.1	7.7	26
United States	8.4	8.2	4.8	10.0	6.8	7.6	28
Viet Nam	5.6	5.9	10.0	10.0	3.3	7.0	68
APEC Average	7.5	7.3	6.9	10.0	5.8	7.5	39
World Average	7.2	6.3	5.4	9.7	5.0	6.7	80
APEC ranking	70	40	38	1	61	39	

Source: Economic Freedom of the World 2009 Annual Report; Own calculations

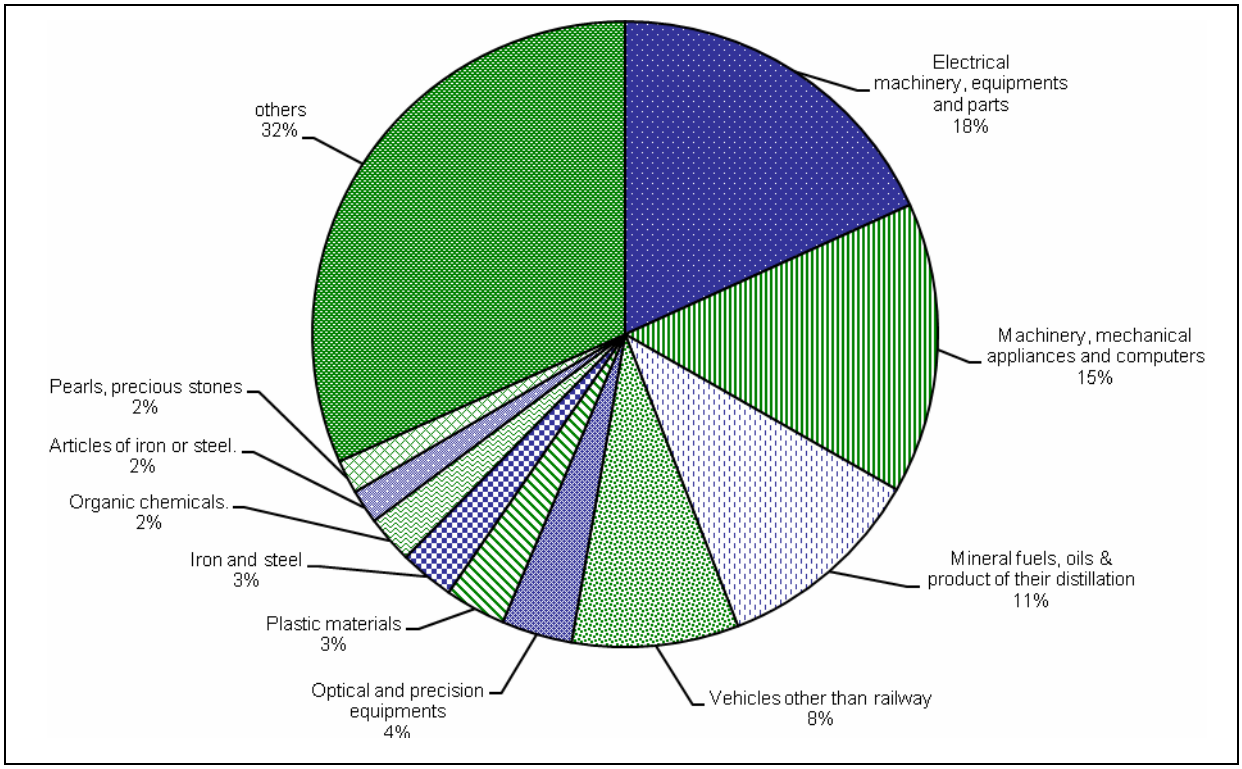
SECTORAL ANALYSIS

We first start drawing a picture of sectors highly exported by APEC economies. Sectors are reported according to the Harmonized System (HS) nomenclature.

According to the HS classification (at a 2-digit level), four sectors account for more than half (52.8 %) of APEC exports. There are:

- Electrical machinery, equipments and parts
- Machinery, mechanical appliances and computers
- Mineral fuels, oils & product of their distillation
- Vehicles other than railway

Chart 3: APEC exports by sector – 2007



Sources: UNCOMTRADE; Own calculations

In a more detailed classification (HS 4-digit level) we find:

- Petroleum oils and oils obtained from bituminous minerals: 7.8 %
- Electronic integrated circuits and microassemblies: 4.8 %
- Motor cars and other motor vehicles: 4.5 %
- Automatic data processing machines: 3.7 %
- Parts and accessories of motor vehicles: 2.2 %

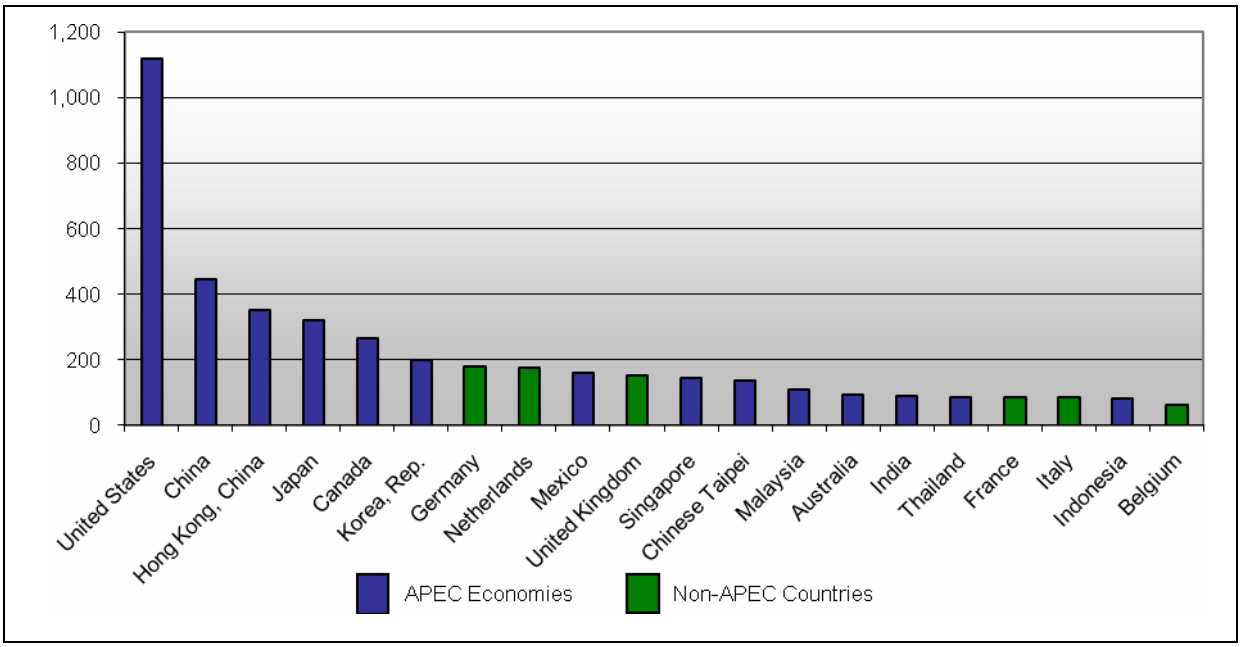
TRADING PARTNERS

Looking at trading partners allows us to focus on the markets that are of primary importance for APEC exports and thus, they should be the one we should give a particular attention to when looking at environmental norms. Nonetheless, another factor one should not forget is that for some

sectors in some economies, environmental constraints could be so high that companies could decide not to export to those markets. This would be reflected with little trade flows despite important environmental constraints.

As previously stated, intra-trade represents the biggest part of APEC's trade profile. About two third of APEC exports are directed to APEC economies. Among them, The United-States is by far the biggest destination. Alone, it receives almost 20 % of all APEC exports. It is followed by Canada; China; Hong Kong, China; Japan; and Korea. The first six are thus economies from the APEC region. Indeed, among the top-20 trading partners, only six are non-APEC members; they are European countries. On top of them Germany and Netherlands account for a bit more than 3 % each or almost 10 % each for extra-APEC trade only.

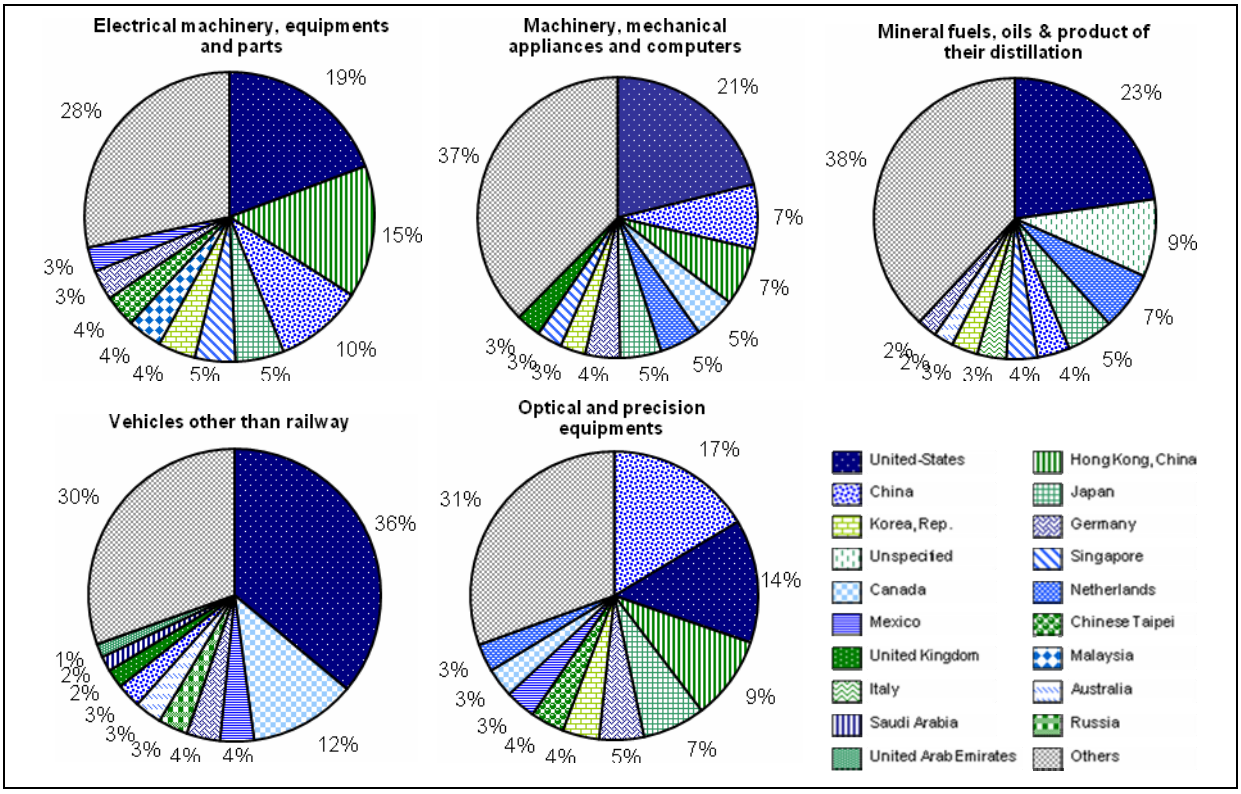
Chart 4: Top-20 trading partners for APEC exports (bn.$)



Sources: UNCOMTRADE

Therefore, particular attention should be given to intra-APEC policies. It should be the first place to provide recommendations. In particular, environmental policies in the United-states should be scrutinized. To a lesser extent, Canada; China; Hong Kong, China; Japan; and Korea are also determinant markets for APEC exports and thus of interest. Aside from the APEC members, the European Union (accounting for almost 18 % of APEC exports) is also a crucial market. Discussion and cooperation for a better harmonization of environmental norms would be of great benefit to avoid any distorting policy.

Chart 5: Top APEC trading partner for main sectors of export



Sources: UNCOMTRADE; Own calculations

POLLUTING SECTORS VERSUS ENVIRONMENTAL GOODS

POLLUTING SECTORS

When looking at the sectoral level, and particularly on the export side, it is interesting to identify sectors that are more likely to be affected by TREMs: those potentially harmful for the environment. This is not straightforward since TREMs apply differently depending on their nature. They can be applied at different levels (international, regional, domestic), be either mandatory or voluntary, be widely spread or domestic exceptions, be easy to comply with or very costly, affect the production or the consumption… As a result, one should first have a look at TREMs in details before drawing any conclusions on the potential trade-restriction in any sectors. This will be analyzed in the next section.

Nevertheless, there are some evidences based on past experiences that may give some insights regarding sectors that have encountered the highest barriers to trade caused by environmental norms. In particular, we find the so-called industry-base, including oil, chemicals, raw

materials, pulp and paper, steel etc. as to be subjected to environmental norms. According to the literature on the Environmentally Sensitive Goods (ESGs), three kinds of criteria are used for the identification of such products:

- Abatement cost criterion
- Emission intensity criterion
- Multiple criteria such as degradation of natural reserves, ecosystems and biodiversity

Tobey (1990) set up a classification of pollution-intensive commodities based on the abatement cost approach[9]. He identified the following sectors: mining, primary nonferrous metals, paper and pulp, primary Iron and steel, and chemicals. This list is far from being exhaustive. In many other areas, processing machines can be subjected to very strict environmental norms (e.g. water treatment etc.). In fact, it is hard to define polluting goods since damages to the environment can come from the good itself or from the manufacture process. In the former case, goods can be clearly recognized as pollutants; in the later, it is hard to identify them at the custom. Therefore, at this stage, we will just focus on polluting goods, as defined by Tobey.

He selected five 3-digit SITC[10] industries. After converting them into HS code, we obtain the following results:

Table 3: Tariffs (%) & Imports from APEC of Polluting Goods by economy of Destination – 2007

	Metal Mining (1)	Primary Nonferrous Metals (2)	Pulp and Paper (3)	Primary Iron and Steel (4)	Chemicals (5)	Polluting industries (1+2+3+4+5)		
Destination countries/APEC economies	Weighted Average	Weighted Average	Weighted Average	Weighted Average	Weighted Average	Weighted Average	Max. Rate	Imports (bn$)
World	0.45	2.42	1.69	3.42	4.24	2.98	270.00	741.186
APEC	0.22	2.17	1.15	3.26	4.09	2.74	270.00	523.139
China	0.11	3.61	1.66	5.79	6.21	4.27	40.00	149.637
European Union	0.00	2.06	0.00	0.44	3.14	1.68	10.00	132.222
United States	0.00	1.63	0.00	0.37	3.00	1.48	15.00	97.638
Japan	0.07	1.28	0.00	0.53	2.56	0.98	27.20	58.529
Korea, Rep.	0.13	3.34	0.00	0.35	5.05	2.12	270.00	53.451
Canada	0.00	1.25	0.00	0.34	3.17	1.53	8.00	34.923
Chinese Taipei*	0.00	0.67	0.00	0.14	1.78	0.97	20.00	31.115
Mexico**	9.75	10.99	8.78	9.03	7.75	8.79	20.00	27.864
Hong Kong, China	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.648
Thailand**	1.00	2.45	4.88	4.84	5.83	4.57	30.00	17.882
Malaysia	0.00	5.25	9.33	28.87	5.62	12.39	50.00	16.820
India	5.00	12.50	10.87	17.98	12.28	11.55	182.00	16.371
Singapore	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.260
Indonesia	0.11	4.37	3.15	7.01	4.37	5.03	30.00	11.665
Australia	0.00	2.83	3.82	4.79	2.22	3.12	5.00	7.378

Sources: Trains; Own calculations
Notes: Tariffs are expressed as weighted averages of applied tariffs
APEC Data do not include Brunei Darussalam, Indonesia and Papua New Guinea.

[9] He defines these industries as those whose direct and indirect abatement costs in the U.S. are equal to or greater than 1.85 percent of total costs.
[10] SITC: Standard International Trade Classification.

*: Imports value is reported from the year 2006
**: Both Tariffs and Imports are reported from the year 2006

Almost a third of APEC's polluting goods are exported to the EU and the US. In these two regions, ESGs have low import tariffs (about 1.5 %) compared to a world average of 3 %. Within the APEC region, tariff rates are just below the world average, at 2.74 %. Overall, these tariff duties remain low compared to some individual economies. Thus, these slight differences do not matter much.

What is interesting; however, are differences between the types of polluting products. Whereas metal mining commodities are close to a zero tariff, chemicals and primary iron and steel are more taxed: 3.42 % and 4.24 % respectively. In many economies, those two sectors are very often applied tariffs over 5 %.

ENVIRONMENTAL GOODS

There is no general consensus among countries on the definition of environmental goods. In the WTO, there is no agreed definition on such products. However, the Economic Co-operation and Development (OECD) as well as the secretariat of Asia-Pacific Economic Cooperation (APEC) developed lists of environmental goods. The OECD defines environmental goods (and services) as follows:

"The environmental goods and services industry consists of activities which produce goods and services to measure, prevent, limit, minimize or correct environmental damage to water, air and soil, as well as problems related to waste, noise and eco-systems. This includes cleaner technologies, products and services that reduce environmental risk and minimize pollution and resource use."

This definition does not include environmentally friendly goods in the sense that it does not take into account whether or not the production process has a low impact on the environment.

About three quarters of goods are common to both lists. However, the OECD and the APEC lists have different objectives, which is reflected by many differences between the two lists. The OECD list has an analytical purpose whereas the APEC list has been created for trade liberalization. They both have been used for the WTO negotiations on liberalizing trade in environmental goods and services. The APEC list is composed by the following categories:

- Air pollution control

- Heat/Energy management
- Monitoring/Analysis
- Noise/Vibration abatement
- Other recycling systems
- Portable water treatment
- Remediation/Cleanup
- Solid/Hazardous waste
- Wastewater management

Table 4: Tariffs (%) and Imports from APEC of Environmental Goods by Economy of Destination - 2007

	APEC list				OECD list	
Destination countries/APEC economies	Weighted Average	Max. Rate	Imports (bn$)	Share	Weighted Average	Max. Rate
World	2.56	60.00	176.343	100.0%	2.96	270.00
APEC	2.25	40.00	123.322	69.9%	2.56	270.00
European Union	1.56	6.50	35.651	20.2%	1.88	8.00
United States	1.05	6.70	31.019	17.6%	1.23	32.00
China	3.84	35.00	22.428	12.7%	4.18	40.00
Canada	1.93	14.00	11.478	6.5%	2.19	15.50
Mexico**	11.72	20.00	11.250	6.4%	12.05	20.00
Japan	0.36	4.90	10.722	6.1%	0.61	20.30
Chinese Taipei*	1.59	15.00	9.692	5.5%	1.89	20.00
Korea, Rep.	5.66	8.00	8.287	4.7%	5.99	270.00
Hong Kong, China	0.00	0.00	6.336	3.6%	0.00	0.00
Thailand**	8.62	30.00	5.487	3.1%	8.41	30.00
Singapore	0.00	0.00	7.106	4.0%	0.00	0.00
Australia	4.42	10.00	3.491	2.0%	4.61	10.00
Malaysia	5.21	30.00	4.698	2.7%	7.64	50.00
Indonesia	3.04	20.00	2.722	1.5%	4.22	30.00
India	10.71	30.00	2.264	1.3%	10.45	182.00

Sources: Trains; Own calculations
Notes: Tariffs are expressed as weighted averages of applied tariffs
APEC Data do not include Brunei Darussalam, Indonesia and Papua New Guinea.
*: Imports value is reported from the year 2006
**: Both Tariffs and Imports are reported from the year 2006

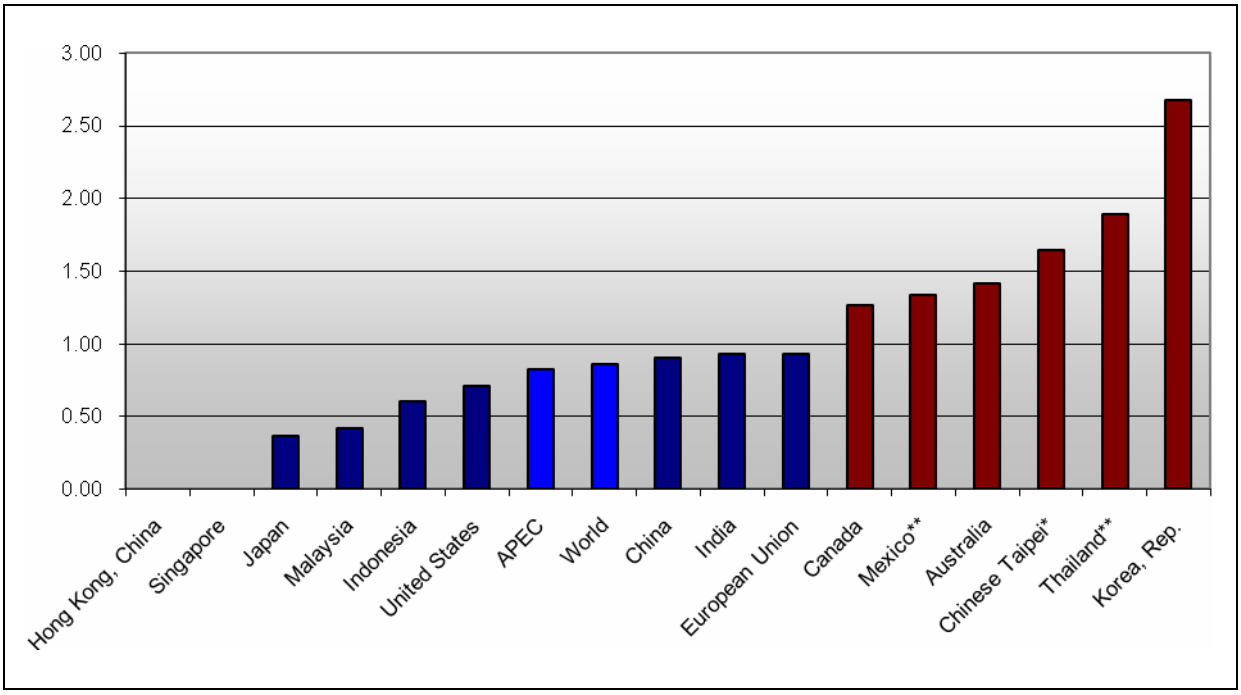
The EU, The US and China account for 50 % of APEC exports of environmental goods.

It is hard to compare trade flows of environmental and polluting goods since lists for both types are not exhaustive. Furthermore, lists referencing polluting goods include many more commodities than Tobey's list of Polluting goods. Finally, these lists do not take into account whether or not the manufacture process is environmental friendly. Nevertheless, it is still clear that goods defined as harmful to the environment are more traded than the environmental friendly ones. Polluting goods reached 13.6 % of APEC exports in 2007 whereas environmental goods (as defined by the OECD list) only amounted for 4 % the same year. It is worth noting however, that

environmental goods have been increasing more than twice as fast as total trade over the last 15 years.

When looking at tariff profiles, one should expect that tariffs on environmental goods would be lower than tariffs on polluting goods. We calculate a ratio between the tariff applied on environmental goods and the tariff applied on polluting goods. A ratio below 1 means that polluting goods are more taxed than environmental goods. A ratio exceeding 1 suggests the opposite, and thus gives bad incentives from an environmental point of view. Hong Kong, *China* and Singapore are exceptions with no tariffs at all. Overall, situations differ among economies but the World and the APEC region in particular have a rational tariff system with a ratio of 0.86 and 0.82 respectively.

Chart 6: Ratio between tariffs on polluting goods and tariffs on environmental goods



Sources: Trains; Own calculations
Notes: Tariffs are expressed as weighted averages of applied tariffs
APEC Data do not include Brunei Darussalam, Indonesia and Papua New Guinea.

CONCLUDING REMARKS

APEC economies' profiles differ widely but overall, the region is rather trade oriented. Therefore, particular attention should be given to tackle any kind of creeping protectionism. With trade liberalization, economies do not protect themselves anymore by raising tariffs but rather by implementing non-tariff barriers that can take many forms. Among them environmental

protectionism is of main concern. The best alibi for protectionism is to find a “noble cause”. Nowadays, environmentalism seems to be fashionable.

Intra-APEC trade represents the most part of APEC’s total trade. It means that most problems can be solved from the inside. Policies should be oriented around three pillars: better cooperation, better communication, and better harmonization. A better cooperation would push economies to adopt only environmental measures that are the most necessary and reject the ones that could be trade-restricting. A better communication would ease trade between economies by lowering information costs and other compliance-related costs. A better harmonization would help economies not to discriminate between domestic products and foreign products. It would also diminish compliance costs. Harmonization should always prioritize international standards or rules when it is possible. A particular emphasis should be given to the Canada; China; Hong Kong, China; Korea; and the United States since they are APEC’s top trading partners. Apart from internal negotiations, APEC should regularly maintain a close cooperation with the European Union on environmental standards.

Finally, APEC should monitor on a regular basis how environmental goods and polluting industries are traded. To do that, it would be necessary to have lists for both kinds of goods that could be comparable. Today, the tariff profiles of these goods seems giving a good incentive by taxing more polluting industries than environmental goods. However, one should remain careful not to tackle the environmental problem the wrong way. Indeed, it would be very harmful to raise tariffs on polluting industries. It would however be cleverer to reach a total liberalization of environmental-friendly commodities.

Section II – Trade Related Environmental Measures

INTRODUCTION

When linking trade with the environment, two kinds of measures are considered: the Trade-Related Environmental Measures (TREMs) and the Environment-Related Trade Measures (ERTMs). These terms are widely used in the literature by international organizations, although there are no clear-cut definitions. However, both are directed at protecting the environment. In the case of TREMs, there are environmental measures that have a significant impact on trade, as for ERTMs, there are trade measures or regulations implemented for the purpose of environment concerns.

This survey aims at observing the impact of environmental norms on trade. Therefore, only TREMs should be of relevance for the study. Nonetheless, it is worth noticing that TREMs and ERTMs can sometimes be hard to distinguish since they both intend to protect the environment. Moreover, the lack of recognized definitions makes it difficult to differentiate them since some countries may have different interpretations of these measures.

This section will provide an overview of these measures at the bilateral level through Free Trade Agreements (FTAs), at the multilateral level through Multilateral Environmental Agreements (MEAs) and by analyzing the way they are treated under the WTO. We will then review briefly some empirical analyses explaining the interconnection between environmental norms and trade from an economic perspective.

TREMS AT THE GLOBAL LEVEL

TREMS WITHIN REGIONAL AGREEMENTS AND FREE TRADE AGREEMENTS

There are close to 400 Regional Trade Agreements (RTAs) that have been notified to the WTO and which are scheduled to be implemented by 2010. Among them the vast majority is FTAs (90 %); less than 10 % are customs unions. This complex tangle of agreements has often been

described as a spaghetti bowl. Their wide diversity, and the fact that they very often go beyond multilateral agreements make them an interesting material for analyzing how countries deal with environmental issues with trade objectives.

First of all, FTAs can be very narrow focused, that is strictly trade-oriented. They can also encompass a wide range of issues among which environment has become, in some cases, of primary importance. Also, most of new agreements including one northern counterpart include environment or sustainable development concerns in their preamble. Although it is not as powerful as provisions, preamble can be used in case of dispute settlements. Finally, the US, Canada and on top of them the EU as a group, now make ex-ante assessments of the environmental impact of their trade agreements whereas most of regional and bilateral trade agreements do not perform such assessments.

Among FTAs that include some APEC economies, different cases about the way the environment is treated can be observed:

The North American Agreement on Environmental Cooperation (NAAEC), a side treaty of the North American Free Trade Agreement (NAFTA), was signed in 1994 to address environmental concerns. It states principles and objectives but also provides some concrete measures. In particular, environmental concerns, if obliged by some MEAs, should prevail over trade rules in case of conflict. This is of primary importance since it is clearly stated that the priority should be given to environment (in these specified cases). Furthermore, the NAAEC monitors the environmental effects on an ongoing basis, which is unique. At last, under the NAFTA Agreement, power is given to citizen to allege that governments are failing to enforce environmental laws. If justified, the NAAEC can then name and shame the parties responsible. This improvement has then been copied into the Canada-Chile and the US-Central American/Dominican Rep. FTAs.

The Canada-Chile, the Canada-Costa Rica, and the Mexico-Costa Rica FTAs followed the prevalence of environmental concerns over trade obligations, such as stated into the NAAEC.

The US-Jordan FTA is the first ever negotiated trade agreement that includes environmental provisions. Under Article 5, “The Parties recognize that it is inappropriate to encourage trade by relaxing domestic environmental laws.” They also agree to “provide for high level of environmental protection and to strive to continue to improve“their environmental laws. The two countries consented to use the agreement's dispute settlement procedures to make sure they meet their obligations. However, according to legal scholars, it seems hard to put into practice.

In the US-Chile agreement, there are many propositions to develop cooperation on environmental projects, such as the wild life protection and resources management. There is also a provision to diminish the use of methyl bromide (reinforcing the Montreal Protocol).

Asian FTAs in general are not so clear about environmental provisions. The proposed ASEAN+3 (China, Japan, Korea) adopt a vague position related to environmental issues, employing a regional viewpoint. The India-Thailand FTA suggests a potential cooperation but no direct management of environmental issues. As for the Singapore-Japan and the Singapore-US FTAs, they make no reference at all to environmental issues.

To finish, cooperation is often part of agreements concerning states that share a common border. If it was initially not part of the agreement, cooperation has been developed over time (e.g. ASEAN, Mercosur).

Overall, there is no standard type of FTAs. Questionnaires' responses from APEC economies also support that argument. In fact, to the question "Are there environmental commitments in previous free trade agreement (s) (FTA) / primary trade area (s) (PTA) concluded with other economies?", they replied as follows:

a) No	b) Yes, inclusion of environmental provisions in the preamble / text of agreement (s)	c) Yes, inclusion of a specific chapter of environment	d) Yes, adoption of an environmental side agreement	e) Yes, other form (s) of environmental commitments. Please specify
(1)	(4)	(5)	(4)	(3)

Source: Individual Economy's responses to the survey

FTAs including one APEC economy as a party, differ widely on their structure and on their depth for environmental concerns. It ranges from no reference at all to stringent provisions, to guiding lines in the preamble and cooperation.

TREMS WITHIN MULTILATERAL ENVIRONMENTAL AGREEMENTS

Environment is a global concern. Human activity in one country does affect other countries. For instance, pollution does not stop at the border. It is thus mutually recognized that global responses are required and that international cooperation is sometimes more appropriate than individual domestic strategies.

MEAs have become a major tool privileged by governments to tackle environmental problems. They have shown initiative and inventiveness in the way tools are designed to address the many concerns they deal with. Many are TREMs and ERTMs.

There are, very often, import and export prohibitions. Measures can adopt other forms such as process standards, subsidies, countervailing measures, sanctions… They can affect both parties and non-parties of MEAs (e.g. bans). Usually, trade measures can be used for four different objectives (Desai, 2005):

- To control international trade where such trade itself is considered to be an environmental threat.
- To control trade in environmentally harmful substances, thereby protecting the environment of the importing country.
- To control trade with non-parties to environmental agreements containing specific objectives so as to prevent free riders.
- To ensure compliance with substantive rules of the MEA.

Measures can be specific requirements and non-specific measures pursuing to objectives of MEAs.

There are today, over than 250 MEAs. According to the WTO, only 20 % contain trade provisions. We have selected here, nine of them, the most relevant and the most referred to within international organizations.

The Montreal Protocol on Substances that Depleting the Ozone Layer (Montreal Protocol)

Based on the framework of the Vienna Convention (1985)

Objective:

Protecting the ozone Layer by restricting the emission of Chlorofluorocarbons (CFCs) and other ozone-depleting substances (ODSs).

Trade measures:

Parties are required to create and implement a system for licensing the imports and exports. Thus, parties can still have restricted imports (exports) between them according to their compliance with the reduction program. However, imports (exports) are banned from (to) non-parties (unless, the later can prove its full compliance with the protocol's control measures and that a committee of parties confirm it). These restrictions cover products containing the controlled substances but also product made with, but not containing such substances. For this later case, it has been proven not feasible to apply restrictions to non-parties since it is hard to make it operational.

To face illegal trade of ODSs, the protocol has introduced a mandatory licensing system. Finally, developing countries have special provisions such as longer delays to comply with requirements.

The Convention on International Trade in Endangered Species of wild Fauna and Flora (CITES)

Objective:

Regulate trade in wildlife for conservation purposes. The Convention is focused on endangered species and non-endangered species that could become threatened if trade was not regulated.

Trade measures:

CITES' major trade provision concerns a list (Appendix I) of endangered species whose trade for "primarily commercial purpose" is prohibited. A second list (Appendix II) identifies species that can be exported only if the exporter has obtained an export permit. A third list of species requires an export permit and, depending on the country of origin, a certificate of origin must be presented. CITES also includes two quotas systems (one for leopards, one for species transferred from Appendix I to Appendix II). Trade with non-parties to the convention is possible if these countries provide documentation proving compliance with the conservation objectives of CITES.

The Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal

Objective:

The specific objectives are three-fold:

- To reduce transboundary movements of hazardous wastes.
- To minimize the generation – in terms of quantity and hazardousness – of wastes.
- To promote the environmentally sound management of hazardous and other wastes.

It also seeks to prohibit hazardous wastes from illegal transboundary trade and their inappropriate disposal.

Trade measures:

The convention allows each state "to ban the entry or disposal of foreign hazardous wastes and other wastes in its territory". Trade in such substances is allowed between parties only. The rule applied to trade in hazardous wastes is based on the principle of Prior Informed Consent (PIC). It means that a country can only export if it gets prior approval from the importing country and all transit countries. The difference between parties and non-parties is based on whether or not principles of the convention are met. Finally, the convention requires the application of some

standards dealing with packaging, labeling, transportation conformity…

Convention on Biological Diversity

Objective:

Three main goals:

- The conservation of biological diversity.
- The sustainable use of its components.
- The fair and equitable sharing of benefits arising from genetic resources.

Trade measures:

The convention does not refer directly to trade measures but can still have significant trade implications. The convention states that genetic resources remain subject to national legislation. Parties should however "create conditions to facilitate access to genetic resources for environmentally sound uses by other contracting parties and not to impose restrictions that counter to the objectives of this convention". This access should be on "mutually agreed terms" and "subject to prior informed consent of the contracting party, providing such resources".

Cartagena Protocol on Biosafety

It is a supplement to the Convention on Biological Diversity.

Objective:

It aims at protecting biological diversity from the potential risks posed by living modified organisms resulting from modern biotechnology. It specifies that the precautionary principle should be applied.

Trade measures:

The exporter has to notify the importing country and get prior authorization. It works through the advance informed agreement (AIA) procedure. Based on risk assessment, the importer can restrict or even ban imports. However, many products do not fall under this procedure:

- Pharmaceuticals addressed by other relevant international agreements or organizations.
- Genetically modified organisms (GMOs) in transit to another country.
- GMOs destined for contained use.
- GMOs intended for direct use as food or feed, or processing.
- GMOs that have been declared not likely to have adverse effects on the conservation and sustainable use of biological diversity, taking into account risks to human health by a decision of the Conference of Parties.

United Nations Framework Convention on Climate Change (UNFCCC)

Objective:

The treaty aims at stabilizing greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. It is legally non-binding but is open for update protocols that could set mandatory emission limits. Although this convention does not have any trade clause, it will have an impact on trade since reducing emission involves many sectors.

Trade measures:

The convention does not explicitly provide for trade related measures. Parties are required to develop trade related measures to achieve the objective of the convention. Parties should coordinate with each other to do so. Also, developed countries should provide financial and technical assistance to developing countries.

Kyoto Protocol

It is a supplement to the UNFCCC and shares the same principles.

Objective:

It establishes legally binding commitment for the reduction of four greenhouse gases.

Trade measures:

The Kyoto protocol does not refer to any specific trade related measure. Parties are required to take any appropriate measure to phase out greenhouse gas from emitting sectors. The system is based on a trading emission system.

Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for certain Hazardous chemicals and pesticides in international trade

Objective:

- To promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm.
- To contribute to the environmentally sound use of those hazardous chemicals, by facilitating information exchange about their characteristics, by providing for a national decision-making process on their import and export and by disseminating these decisions to Parties.

Trade measures:

Under the convention, chemicals can either be banned, severely restricted or subject to prior informed consent. Furthermore, labeling requirements is mandatory for all chemicals. Countries are free to decide which chemicals they want to ban or severely restrict. However, a country can only do so on a non-discriminatory basis. That is, it should apply to all countries and national production as well.

Stockholm Convention on Persistent Organic Pollutants (POPs)

Objective:

It aims to restrict or eliminate the release of Persistent Organic Pollutants (POPs) into the Environment. POPs are chemicals that remain intact in the environment for long periods, and become widely distributed geographically and accumulate in the fatty tissue of humans and wildlife.

Trade measures:

The convention requires states to either prohibit or take any appropriate measure to eliminate and restrict the production, use, import and export of the specified chemicals. Imports and exports are allowed between parties, only for environmentally sound disposal or purpose as permitted by the convention. This also applies to non-parties if they can prove they comply with the convention's provisions.

Table 5: Ratification status of the selected MEAs

Ratification, Acceptance, Accession, or Approval	Montreal Protocol	CITES	Basel Convention	Convention on Biological Diversity	Cartagena Protocol	UNFCCC	Kyoto Protocol	Rotterdam Convention	Stockholm Convention
Date of signature	*1987*	*1973*	*1989*	*1992*	*2003*	*1992*	*1997*	*1998*	*2001*
Entry into force	*1989*	*1975*	*1992*	*1993*	*2003*	*1994*	*2005*	*2004*	*2004*
Parties	*195*	*175*	*172*	*191*	*156*	*193*	*188*	*130*	*165*
Australia	1989	1976	1993	1993	/	1992	2007	2004	2004
Brunei	1993	1996	2002	2008	/	2007	2009	/	/
Canada	1988	1975	1992	1992	/	1992	2002	2002	2001
Chile	1990	1975	1992	1994	/	1994	2002	2005	2005
China	1991	1981	1991	1993	2005	1993	2002	2005	2004
Hong Kong, China	2006	1976	1991	/	/	2003	2003	2008	2004
Indonesia	1992	1978	1993	1994	2005	1994	2004	/	/
Japan	1988	1980	1993	1993	2004	1993	2002	2004	2002
Korea, Rep.	1992	1993	1994	1994	2008	1993	2002	2003	2007
Malaysia	1989	1977	1993	1994	2003	1994	2002	2002	/
Mexico	1988	1991	1991	1993	2003	1993	2000	2005	2003
New Zealand	1988	1989	1989	1993	2005	1993	2002	2003	2004
Papua New Guinea	1992	1975	1995	1993	2006	1993	2002	/	2003
Peru	1993	1975	1993	1993	2004	1993	2002	2005	2005
Philippines	1991	1981	1989	1993	2007	1994	2003	2006	2004

Russia	1988	1992	1995	1995	/	1994	2004	/	/
Singapore	1989	1986	1996	1995	/	1997	2006	2005	2005
Chinese Taipei	/	/	/	/	/	/	/	/	/
Thailand	1989	1983	1997	2004	2006	1994	2002	2002	2005
United States	1988	1974	1990	/	/	1992	/	/	/
Viet Nam	1994	1994	1995	1994	2004	1994	2002	2007	2002

Sources: MEAs' official websites and individual economy responses to the survey

Each MEA has its own set of specific tools designed to effectively achieving its environmental objectives. Trade measures are tailored to achieve the goals of the agreement among parties but they also try to give incentive to non-parties to sign the agreement, by preventing them to be *free riders*.

We frequently find total bans or restricted exports/imports very often accompanied with the phase-out of certain substances. In some cases, exporters are subject to prior informed consents. Countries need to notify the importing country, and gets approval before starting exporting its products. This procedure has shown to be time consuming and very cumbersome with the amount of information to provide. Other measures can include: licensing, labeling requirements, quotas system, and trading permits. Finally, some MEAs, do not provide for any trade measure at all. They only state that countries should take appropriate measures to pursue the agreement's objectives.

Generally, agreements distinguish between parties and non-parties. However, non-parties can be covered by the agreement if they prove their compliance with MEAs' principles.

A last, some agreements specify that developed countries should provide financial and technical assistance to developing countries. And some MEAs provide for less stringent measures or longer compliance timeframes for developing countries.

TREMS AND THE WTO

PRESENTATION

The Marrakesh Agreement establishing the WTO in 1994 states in its preamble that:

"The Parties, Recognizing that their relations in the field of trade and economic endeavor should be conducted with a view to raising standards of living, ensuring full employment and a large and steadily growing volume of real income and effective demand, and expanding the production of and trade in goods and services, while allowing for the optimal use of the world's resources in accordance with the objective of sustainable development, seeking both to protect and preserve the environment

and to enhance the means for doing so in a manner consistent with their respective needs and concerns at different levels of economic development."

Environment preservation and sustainable development are thus part of WTO's objectives. However, there is a conflict to know whether the WTO should directly rule on environmental issues or should it set trade rules that do not enter into conflict with the environment. The question is whether its role should be active or passive. Environmental concerns are the subject of intense debate at the WTO. Some argue that trade has provoked degradation of global environment health; some others claim that the WTO should keep with strict trade rules and that trade can play a positive role in the management of natural resources. The WTO reminds that its role is limited to trade policies and those trade-related aspects of environmental policies which may result into significant trade effects to its member. In any case, it is not mandated to set standards or to develop any kind of environmental policy recommendation.

One of the main problem is that some countries have been using environmental justification to impose non-tariff barriers. Developing countries in particular, have raised concerns that environmentalism has become, in some sectors, the pretext for disguised protectionism. Several cases of imports bans for environmental reasons have been struck down by the WTO. Advocates of liberalization support these decisions by arguing that these problems should not be addressed by trade measures but rather by environmental incentive measures such as eco-labeling.

In 1994, a Ministerial Decision on Trade and Environment was adopted, calling for the establishment of a Committee on Trade and Environment (CTE). It is composed of all WTO members and some observers from inter-governmental organizations. This committee is in charge of covering issues dealing with trade and environment. Its mandate is two-fold:

- "to identify the relationship between trade measures and environmental measures in order to promote sustainable development";
- "to make appropriate recommendations on whether any modifications of the provisions of the multilateral trading system are required, compatible with the open, equitable and non-discriminatory nature of the system."

Its role encompasses trade in goods, trade in services and trade-related intellectual property matters.

In its first report in 1996, the CTE recognized that trade and environment should be mutually supportive. It also mentioned that the multilateral trading system has the capacity to promote sustainable development without undermining its open, non-discriminatory, and equitable

character. The WTO stresses that its role is to continue to liberalize trade, as well as to ensure that environmental policies do not act as obstacles to trade, and that trade rules do not stand in the way of adequate domestic environmental protection.

The WTO also believes that market access is essential for developing countries. Many of them are strongly export dependent and rely heavily on natural resources. This is why WTO members recognize that it is recommended to help developing countries by providing them technical and financial assistance. Indeed, many environmental standards set-up in developed countries are inappropriate and of high cost for developing countries (particularly for small and medium enterprises). Therefore, rather than penalizing these economies, it is better helping them meeting these standards. Another problem arises from the fact that standards are the initiative of developed countries and thus it is even harder for developing countries to comply. Thus, the WTO recommends to associate developing countries at the early-stage of the standard-setting process.

MARKET ACCESS

Eco-labeling:

Eco-labeling has also become an issue of particular focus for the CTE. It consists in voluntary method of environmental performance certification and it is based on life-cycle analysis (production, product use, product disposal). Its use has been increasing recently and eco-labeling seems to be an appropriate tool to tackle environmental problems. Indeed, eco-labeling is often less restrictive than other trade instruments. However, it also can be misused and employed as protectionist measures. Complaints often say that it tends to be focused on local concerns and does not address the views of foreign suppliers. Therefore, eco-labeling should be non-discriminatory for being an efficient economic tool.

Handling requirements:

Handling requirements are other kind of standards that can be considered as barriers to trade. Handling requirements include packaging, recovery, re-use, recycling, and disposal requirements. These measures can represent substantial additional costs to exporters, even if they apply to both domestic and foreign products, since they will have to comply to requirements that are different from their own.

Processes and production methods:

Another concern deals with Processes and Production Methods (PPMs). Whereas countries agree that it is WTO consistent for countries to set criteria for the way products are produced if there is trace of this production method in the final product; they disagree however on the consistency of the so-called unincorporated PPMs. That is when PPMs leave no trace in the final product. The Technical Barriers to Trade (TBT) Agreement allows the use of unincorporated PPMs. But the increasing use of process-based (as opposed to product-based) measures raises concerns and reflection is required to find responses to overcome this issue.

Environmental charges and taxes:

Environmental charges and taxes are of increasing interest. Countries more and more try to internalize domestic environmental costs. This raises many concerns in view of current discussions about new instruments such as carbon taxes. However, when applied at the border, only product taxes are consistent with WTO rules; process taxes are not.

Mutual recognition:

Under the TBT agreement, there is provisions for mutual recognition. That is, a country is urged to recognize trading partners' standards, even if different, if they achieve the same final objective. It has been argued that the TBT principles of equivalence and mutual recognition could be transposed into the labeling area. It is thus not clear about which of the TBT Committee or the CTE should be the appropriate forum to discuss about environmental labeling.

THE WTO AND MEAS

It is now widely recognized that multilateral solutions are better than unilateral measures that can be discriminatory and the playing field for protectionism. According to this view, MEAs seem to be adapted to tackle environmental issues. However, trade measures contained in MEAs may be at risk of being ruled WTO-inconsistent. They can act against the WTO's non-discrimination principle and the Most Favored Nation (MFN) clause. In particular, problems may arise when trade measures contained in MEAs affect parties and non-parties to the agreement differently. Article XX of the GATT tries to balance trade rules with non-commercial goals that make exceptions, such as human health and environment. Also, in case of conflict due to MEAs trade provisions, the CTE position is that international law is sufficient to settle any conflicting overlapping competency between WTO provisions and MEAs trade measures. Furthermore, there is general agreement that the dispute settlement procedure of the MEA should be preferred if the two parties are signatories

of the MEA. Otherwise, if one is a non-party, the WTO dispute settlement body would be the appropriate forum. So far, no dispute has been raised. At the Doha Ministerial Conference, WTO members agreed to clarify the relationship between the WTO and MEAs, but the scope of discussions has been limited and little has been done so far.

HOW DO TREMS AFFECT TRADE?

Most of empirical studies related to trade and environment have focused on the environmental impact of trade. Very few have centered their analysis on the opposite relation that is the impact of environmental norms on trade. We intend to provide here the main results of some selected studies.

It is admitted that compliance costs to environmental regulation has increased sharply. For instance, the US Environmental Protection Agency estimated that environmental compliance costs represented 2.6% of US GNP in 2000, for the private sector only. Also, it has often been claimed that trade between two countries with different levels of regulation will lead the country with poor environmental norms to specialize in pollution-intensive productions. Baumol and Oates (1988) argue that since developing countries have less stringent regulations, they have a comparative advantage in the production of polluting goods. Therefore, a phenomenon of relocation of polluting industries takes place from developed to developing countries. This is known as the “pollution haven“hypothesis. This argument has been supported by empirical analyses from Lucas et al. (1992), Birdsall and Wheeler (1992), and Whalley (1996) but opposed by Tobey (1990), Grossman and Krueger (1993), Jaffe et al. (1995), and Dean (1996).

Cole and Elliott (2003) use two different approaches to assess the impact of environmental norms on trade. On the one hand they apply the Heckscher-Ohlin-Vanek (HOV) model where comparative advantages are based on factor endowments to test whether the stringency of a country’s environmental norms affects its net exports of polluting goods. On the other hand, they employ the new trade theory of intra-industry trade to test whether environmental regulations affect trade patterns. They show that the stringency of regulations have a significant influence on bilateral trade patterns between two countries. However, it seems (according to the HOV) model that tough environmental regulations have no significant effect on net exports of polluting goods. One explanation is that polluting goods generally come from capital intensive industries, which are located in developed countries. Thus, it may explain why they are not relocating in developing countries with more flexible regulations.

Ederington and Minier (2003) also try to assess the impact of environmental regulations on trade flows. But they criticize previous research studies that took regulation as an exogenous factor. On the contrary, they apply an endogenous approach, taking into account the fact that the influence between trade and environmental regulation works both ways. This hypothesis is also supported by Trefler (1993) who says that preceding studies were biased because they disregarded the theory of endogenous protection which says that stronger import intensity will raise the demand for protection (through lobbying) and thus will lead to stricter regulations. They find that environmental regulations have a strong impact on net imports. Furthermore, they find that there is a tendency to over-regulate export industries and have less stringent regulations on import sectors.

Unteroberdoetster (2003) analyses the impact of environmental regulations in the liberalizing context of the APEC region. He tests the opposite question to see whether trade policies are appropriate to reduce pollution and improve environment quality and welfare. He uses a static multi-country trade approach in a Computational General Equilibrium (CGE) model. He takes into account environmental regulations by measuring abatement costs borne by producers and consumers depending on required abatement levels and sectors' pollution intensities. In turn, these costs affect outputs and trade patterns. Overall, he finds that radical changes in trade policies have barely no effect on environmental quality improvement. Furthermore, even when there are possible shifts of production toward more pollution intensive industries, the constancy of consumption has a stabilizing effect, and thus, overall pollution levels do not change substantially. What is more, once APEC economies can trade more freely, lax environmental policies are not necessarily associated with higher pollution levels. At last, although the author recognizes some imperfections in the modeling it is still true to say that environmental domestic regulations are much more effective and efficient than trade barriers.

CONCLUDING REMARKS

Trade provisions for environmental purposes have been integrated in many agreements both at the bilateral and multilateral level.

There is a wide diversity of FTAs, ranging from pure trade concerns to broad objectives among which, environment has been of increasing use. Most of the time, FTAs that include TREMs or ERTMs are found where a developed country is a party to the agreement. Also, cooperation has been proven to be more efficient than trade measures.

MEAs seem to be the preferred way to address environmental concerns. About one fifth contain trade provisions and most APEC economies have ratified them (Exceptions are Chinese Taipei and the United States). Principal measures include imports / exports prohibitions, restricted trade very often associated with a phasing-out scheme, standards, licensing requirements, and prior informed consent procedures. Furthermore, many MEAs associate non-parties by giving them incentives to comply with the agreement's objectives. Sometimes, MEAs also provide for less stringent requirements for developing countries and support developed countries to provide technical and financial assistance to developing countries. It is indeed more efficient to encourage them to meet environmental requirements rather than constrain them by limiting their trade.

Since trade liberalization has brought countries to reduce import tariffs substantially, concerns have been raising concerning non-tariff barriers as a new tool to restrict trade. In this context, many economies have used the environment as a pretext to favor national producers over competing imports. It is a new form of disguised protectionism. In this regards, the WTO recommends environmental incentives, such as eco-labeling, rather than direct trade measures. It also emphases that support should be provided to developing countries to help them meet environmental standards. In order to do that, developed countries should give technical and financial assistance to developing countries, and should associate them to the standards-setting process.

Many empirical studies have tried to assess the impact of environmental norms on trade and to see whether trade measures are the best way to address environmental problems. Overall, it has been observed that compliance costs to environmental standards have been increasing sharply. Also, many have argued that lax regulations in developing countries would lead to a "race to the bottom" and that pollution-intensive industries would relocate to countries with less stringent environmental constraints. It seems however that this assumption is far to be verified and many argue that this is not what has happened at all. It seems that trade provisions only have low effects on environment quality in general and pollution-intensive sectors in particular. Furthermore, trade provisions have been proven to be very trade restrictive and have a strong negative impact on net exports. Not surprisingly, it has also been shown that there is a tendency of over-regulation in sectors of exports industries. This supports the argument of trade provisions seen and used as protectionist measures. This tends to correlate the WTO recommendation stating that environmental problems should not be address by trade measures, but rather by environment incentives and cooperation.

Section III – APEC Economies' Position to TREMs

INTRODUCTION

This section is based on the replies from the questionnaires sent to state administrations of APEC economies. We have collected 10 questionnaires out of the 21 that have been sent. There are: Brunei; Chile; Hong Kong, China; Japan; the Republic of Korea; Malaysia; Singapore; Chinese Taipei; Thailand; and Viet Nam. It is thus essential to keep in mind that results and analyses are based on this sample and that some important economies are missing, such as the United States.

Questionnaires have been filled in by the most appropriate state administration regarding the issue involved. Depending on the economy, it can be the Ministry of Foreign Affairs, the Ministry of Commerce/Trade, the Ministry of Environment/Natural Resources etc. Therefore, depending on the administration in charge, approaches may be different as for what to value the most between environment and trade.

Questionnaires are composed of nineteen questions divided into three sections: 1) Elaboration of trade-related environmental measures (TREMs), 2) Communication on TREMs, 3) Assessment and harmonization of TREMs in APEC. Furthermore, it is specified that this survey only focuses on recent environmental standards that are less than three years old[11].

This section will first give an outlook of TREMs adopted by APEC economies. In a second sub-section, we will focus on transparency and the way APEC economies communicate on TREMs. Then, another sub-section will analyses the inter-relationship between economies, the way they cooperate and deal with other economies' environmental standards. Finally, based on these responses and previous sections, we will provide some recommendations to better address environment issues without affecting trade and development and make trade and environment mutually supportive.

[11] Despite this indication, many responses are related to older measures and thus some answers could not be used at all.

ECONOMIES PROFILES

At the economy level, two types of compulsory measures can be implemented to address environmental problems: direct administrative tools (e.g. rules that limit discharge of given pollutants by regulating production process, restricting the consumption of products etc.) and environmental economic instruments (e.g. environmental taxes, tradable permits, deposit / refund systems and financial incentives etc.).

For the last three years, very few direct administrative tools have been adopted by APEC economies to address environmental problems. Most of these instruments are older than three years old. Overall, measures that have been adopted pursue two main objectives: they are directed to lower the use of pollutants or to improve energy efficiency. To achieve these objectives, they target either the production process or the product consumption stage. As for environmental economic instruments, they are also very scarce. They mostly consist in financial incentives for environmental-friendly products, such as lower interest rates for loans, or lower tax rate. Some others include trading schemes and import permits. It is therefore hard to generalize on the type of measure used by APEC economies. What is common however is that most of APEC members have not implemented any new measures for the last three years.

➔ Since we have seen that most problems encountered between trade and environment can be solved within the APEC, it is thus hardly recommended to establish a listing of new measures, constantly updated.

APEC economies have also implemented a set of voluntary standards in the recent years. Most of them concern energy-saving schemes as it seems to be of primary concern for economies. Indeed, seven economies out of ten that compose our sample have recently adopted a least one energy-saving labeling scheme. Other types of voluntary standards are rather balanced and marking requirements are the least used.

Table 6: Type of voluntary standards recently adopted by APEC economies

	Packaging labeling	Recycling labeling	Energy-saving labeling	Organic food labeling	Carbon footprint labeling	Marking requirements
COUNT	6	9	47	6	4	1
OCCURRENCES	2	3	7	3	3	1

(number of economies with least one)						

Source: Individual economy's responses to the survey

Although it appears that, in the recent years, economies have used more voluntary standards than mandatory requirements such as direct administrative tools and environmental economic instruments, it is difficult to draw any conclusion regarding the type of measures governments prefer and the potential impact on trade. Firstly, mandatory requirements and economic tools are generally broader than voluntary schemes. They cover a wider range of products. Secondly, they go much deeper in terms of market regulation and thus are expected to be much more market distorting.

➔ Though sometimes they are complementary, it is highly recommended to favor voluntary standards. Indeed, rather than distorting the market by a top-down approach, they give right incentives to companies to comply and are more education-oriented since the ultimate choice remains consumers' decision whether or not to buy a product. It improves transparency and lower transaction costs[12] while not distorting the market. Very often, economic instruments have side effects and create additional problems, sometimes without solving the ones they were initially intended to. A bottom-up approach based on individual initiatives is therefore preferred.

When implementing voluntary schemes, two-third of APEC economies claim not to give priority between "home-made" and international standards, while the other third favors international standards. No economy prefers having its own system of standard as a general rule; international standards are always considered when setting new schemes. This is indeed economically rational since national standards are costly in two ways: it increases the information cost and the compliance cost. For instance if a economy A has its own system of standards while economy B has adopted international ones, companies in economy B will first need to identify country A's standards requirements and then will have to comply to those standards that are different than the one they have been using so far. Nonetheless, standards diversity is sometimes necessary when international standards do not select the best ones.

[12] Transaction costs are costs that are identifiable as related to the specific transaction. They encompass searching costs and information costs; see Coase (1937) and Coase (1960).

➔ APEC economies should, when most appropriate, adopt international standards. This guideline should be complemented with mutual recognition agreements. It would give economies, more freedom to implement some national standards when international ones can be improved or when "home-made" standards better fit national environment conditions.

Overall, when considering both mandatory and voluntary standards, APEC economies seem to follow a balanced approach as for targeting the product life cycle. When asked what stage most of their environmental measures are related to[13], responses were as follows:

Table 7: Product life cycle stage of Environmental measures by APEC economies

Production process	Product use / consumption	Product disposal
(5)	(5)	(5)

Source: Individual economy's responses to the survey

A rational approach should be to target the stage that is likely to have the most impact on the environment. Also, the appropriate targeted stage will shift depending on the field of environmental concern. Hence, this has to be put together with APEC economies' environmental priorities.

Table 8: Environmental priorities for APEC economies[14]

Limiting air pollution	Limiting water pollution	Increasing solid waste recycling	Preserving biodiversity	Limiting global warming	Stopping deforestation	Other(s)
(6)	(7)	(6)	(2)	(5)	(0)	(1) (Limiting Toxic and hazardous wastes)

Source: Individual economy's responses to the survey

First, it is worth keeping in mind that each economy might have different targets since environment is not affected the same way in every economy (an economy with large forest areas is more likely to willing to stop deforestation than an economy composed of desert regions). Second, it would be needed to see whether APEC economies' concerns are supported by scientific worries regarding environment priorities. In this regards, science is a place of debate where no results are

[13] Each economy could tick up to 2 choices.
[14] Each economy could tick up to 3 choices.

definitive. Therefore, arguments on different sides need to be listened to with consideration. Furthermore, science is constantly evolving and priorities of yesterday can become less important compared to other problems arising today.

This being said, we see four main environmental areas that appear to be APEC economies' top priorities. There are: Limiting water pollution, Limiting air pollution, Increasing solid waste recycling, and limiting global warming. Limiting air pollution and global warming are both concerns that can be addressed at the production and consumption level; limiting water pollution is an issue that is more related to the production process; and increase solid waste recycling has to do with products disposal. This makes "production process" the level that should be targeted in priority, followed by product consumption and at last, product disposal. One should keep in mind, however that consumers concerns about the environment can have an impact on the way products are produced and thus, environmental measures focused on product consumption can also address problems at the production level.

➔ Therefore, environmental measures should primarily focus on both production process and product consumption rather than product disposal. Furthermore, APEC economies' major environmental concerns should be correlated to scientific research in terms of priority to environmental protection.

The quasi-unanimity of economies claim not to prioritize between trade and environment impacts when adopting environmental measures. This means, first, that economies always consider possible trade distorting effects when setting environment regulations. Second, it also implies that the very aim of the measure adopted is as important as side effects on trade. This position is hard to verify since this would imply a scrutinized analysis of every environmental measures for every APEC economy. However, this balanced position is favorable in two ways. It shows that there is room to reform environmental concern while taking into account the fact that free trade is a principle that should not be jeopardized. Second, the quasi-consensus between economies make negotiations easier and faster than it would have been with diverging positions on that matter.

➔ APEC economies should always, when appropriate, perform impact assessments of both trade and environment when adopting new environmental measures. This would help to avoid implementing any inefficient measure that has low effect on environment and

measures that are harmful to international trade. It would also benefit the negotiation process between economies, avoid any potential trade dispute and help to maintain their balanced consensus between trade and environment.

COMMUNICATION AND TRANSPARENCY

Communication and transparency on TREMs are essential conditions to sound policies. It helps making transaction costs the lowest possible and contribute to select best practices. When economies are asked if foreign suppliers are allowed to participate in the design and preparation of environmental measures that might have significant impacts on trade, responses are as follows:

Table 9: Participation of foreign suppliers to environmental measures that might have important trade impacts

No	Yes, but only few of them participate in comparison with local producers	Yes, foreign suppliers as well as local producers participate in the design and preparation of these schemes
(1)	(2)	(6)

Source: Individual economy's responses to the survey

Most APEC economies tend to associate foreign suppliers to the preparation of environmental schemes potentially trade distorting. Indeed, if foreign suppliers are not associated, it is likely that national producers will capture governments to set up policies that are in their favor. Hence, it is good policy to associate them since it will have lower distortion on international competition. Nonetheless, it can as well be very time consuming and very cumbersome to consistently associate foreign suppliers on every schemes.

➔ Therefore, good balance shall be found between efficiency and avoiding trade distortion. As a general rule it is always better to associate, rather than not, all parties, local and foreign, to the design and preparation of these schemes.

Upstream sound creation of environmental schemes is essential but not sufficient to assure good results. Indeed, if there is a lack of communication about newly adopted regulations, it will take more time for foreign suppliers to change their production process. They will, in turn, lose

competitiveness compared to national producers and it will make compliance costs much more costly. To the question to know whether economies notify other APEC economies in advance when they adopt new environmental measures that will have significant impacts on bilateral trade with them, more than 50% answered that they do notify them from one to six months before enforcing new environmental measure. About 20% do so more than six months in advance and another 20 % do not notify them at all. In fact, this is essential to have foreign trading partners aware of new regulations to maintain international trade competition.

➔ The best way to spread information to trading partners is by using the international forum designed for international trade, that is the WTO.

As for the manner APEC members communicate about TREMs within their own economy, they tend to prefer two main ways: Official government websites and Chambers of Commerce and Industry. It is followed by international forums among which is the WTO.

➔ There is no best practice in this regard since it depends on each economy's habit. It would be good however to know from the companies' side, what sources they primarily use to get the information from and see whether communication strategy by state governments can be improved.

There is many way to improve communication and transparency and each APEC economy has its own position. However, the APEC could help in this regard, as being a forum where communication and transparency are facilitated. It could act as a supplement to the WTO where members could easily get and share information about TREMs. Concerning the role APEC should play in this regard to improve transparency on TREMS, responses are as follows:

Table 10: APEC economies position to improve transparency on TREMs

a) Make catalogues of trade and environment measures	b) Notify new and revised laws and measures to other APEC member economies in due course	c) Hold more training activities so that officials who work with environment and trade development departments can gain accurate information in timely manner	d) Improve databases	e) Improve consultation mechanisms to facilitate mutual understanding and consensus building between trade and environmental sectors	f) Increase cooperation on environment
(3)	(3)	(7)	(3)	(5)	(4)

Source: Individual economy's responses to the survey

Most APEC economies suggest APEC should provide training to officials whose work is related to trade and environment. It would indeed help them working closely with companies and other organizations involved in those issues. It would provide better information sharing directly at the top decision level with awareness of concerns at the bottom. Overall, all the above solutions can improve transparency. They can be classified into two types: cooperation measures (c, e, f) and informational measures (a, b, d). Both types would be beneficial.

➔ Therefore, APEC should facilitate cooperation, either through training or other consultation mechanisms. It should also build a user-friendly and an easy-to-access database of trade and environment measures that would be constantly kept updated, so that APEC economies and companies could easily access information to comply with new regulations in trading partner economies.

There are already many regional consultation bodies for trade and environment issues. Apart from APEC, the biggest are OECD, ASEAN, MERCOSUR… It sometimes creates overlaps and have double competencies. What is good with APEC is its big size that will confer it wider scope for cooperation. It would also make it pioneering for having a TREMs database. APEC economies were asked if they were participating in any regional consultation body to facilitate mutual understanding and consensus between trade and environmental sectors. Half of them are not part of any.

➔ It is thus all the more important to create conditions that will make it easier for APEC economies to get and share information, keep it up to date and cooperate on TREMs. Due to its large size and its diversity, APEC would be a perfect regional forum for such a cooperation and would work as a supplement to the WTO.

COOPERATION, HARMONIZATION AND MUTUAL RECOGNITION

As previously stated, impact assessment of new environmental measures on foreign suppliers is determinant to sound policies and essential in order to avoid potential trade distorting effects. It allows actors to anticipate changes of regulations and gives materials for bilateral or multilateral negotiations. It seems that, regarding that matter, most APEC economies of our sample perform such impact assessments. In facts, only one economy out of the ten claims not to perform

estimation of the impact of its environmental measures. Apart from it, the overwhelming majority performs assessments unevenly depending on each measure, and two economies always do so, whatever the measure. Although it is often difficult to estimate *ex ante* the potential effects of any policy, it still gives insight of potential damaging effects on trade.

➔ In this regard, it seems that most APEC economies have adopted the right strategy by performing such impact assessments, only for some measures. Most of the time, common sense should prevail over economic studies. However, when political conflicts related to trade may arise or when effects are ambiguous, such studies may be desirable.

Over all, what makes regulations cumbersome is when there are wide differences between economies. To overcome this problem, economies can either adopt similar regulations or recognizing a partner's regulation as compatible through a mutual recognition agreement. To this problem, most APEC economies declare having difficulties for some of their certification systems to be recognized as equivalent by other APEC members. This leads in the best case to long discussions for recognition or worse, if not recognized as equivalents, creates double conformity assessments for suppliers. This is very often one of the main concerns for companies. It creates additional costs that make their product less competitive in foreign markets. It also takes additional time for them to enter a market and thus lose market shares[15].

➔ Economies should, when possible, conform to international standards. If for economy specific reasons, it is more relevant having national standards, it is then strongly recommended to favor mutual recognition agreements when there is equivalency of standards or when they target the same goal.

If economies want to have equivalency in their environmental policy and want to avoid any discrimination and barrier to trade, it implies that their environmental policy should have the same level of stringency. Of course, developed and developing economies do not have the same leeway when fixing environmental objectives. However, economies with similar development level should follow the same path and try to work as much closely as possible to adopt similar and equivalent environmental regulations. The quasi-majority of APEC economies (seven economies) see

[15] This is all the more important when being the first to enter a market. The initial producer often takes the biggest market share and keeps its leading position even after competitors have entered.

themselves as having equivalent environmental policy on trade compared to other APEC members. Only one sees itself as less stringent while two other do not have any official positions on this question. Although it is hard to figure out if one economy's policy is more or less stringent overall, it still provides some evidence that economies try to move forward at the same pace than their counterparts. It also shows that there is no free rider in one way or another and thus that they consider environment as something that should be address at the supranational level.

➔ APEC economies should continue working for homogenous level of stringency according to their development level. Developed economies should provide technical and financial help to developing economies to help them reaching higher standards. This strategy is more likely to succeed than discriminating them because of lower environmental standards. In return, developing economies should show proof of willingness to attain higher environmental objectives as they are developing.

APEC has definitely a role to play for better cooperation. Its impact could have strong effects on global environmental concerns since it encompasses many developed and developing economies that are among top polluters. It could also show the way to how developed and developing economies can agree together for actions to take. Very often, developed economies are reluctant to go further as long as developing economies do not adopt higher standards. On the other hand, developing economies justify their reluctance by arguing that developed economies were not having these constrains while developing and therefore, they should not hamper their growth by adopting stringent policies. This is a dead-end cycle economies should circumvent. As previously stated, there is a win-win strategy: helping developing economies to meet these standards rather than imposing them. This will work through cooperation and APEC would therefore be an appropriate forum. economies were asked whether APEC's environmental action plans to promote regional cooperation in environmental protection was a good idea or not. Responses are as follows:

Table 11: APEC economies' position regarding APEC's environmental action plans to promote regional cooperation in environmental protection

Useful	A good idea, that still needs to be really implemented	Useless, because environmental concerns are too different among APEC member economies
(3)	(7)	(0)

Source: Individual economy's responses to the survey

All economies of the sample approve the idea of having such action plans even though the majority are skeptical to see implemented.

➔ Therefore, actions should be made to create this cooperation on environmental protection at the APEC level. However, economies should keep in mind that most efficient measures are taken on a bottom-up approach rather than big plans set up from the top. Cooperation should not mean taking mandatory stringent measures without taking into account of economies differences and individual cases specificities. APEC's cooperation should rather focus on objectives and guidelines to be use as a framework.

CONCLUDING REMARKS

Because of its size and its geographical and economic diversity, APEC seems to be an appropriate forum to discuss, cooperate and go further in the way to address the environment and trade confrontational relationship.

APEC economies support the idea to create such an action plan to promote general cooperation in environmental protection. Although there are other forums in which economies take part to tackle these problems, APEC can play a fundamental role in straightening the debate and providing new solutions to make environmental and trade concerns mutually supportive.

The overall approach should push for voluntary standards in lieu of mandatory requirements. Although the later are sometimes preferable, voluntary standards have been proven to be more efficient because they are less trade distorting, more flexible and easier to comply with. Also, economies should move toward more harmonization between them. When possible, it is strongly advised to adopt international standards rather than creating national specific requirements. Home-made standards can be very cumbersome and costly for companies since it raises transaction costs and it is time consuming. Sometimes however, a certain degree of competition between standards setting is necessary to select the best ones. An alternative approach consists in mutual recognition agreements. Furthermore, it is sometimes more recommended to prefer mutual recognition over harmonization since standards are not appropriate everywhere. What is important is the convergence in principles rather than a rigid harmonization of standards. In

addition, TREMs should focus both on production process and product consumption, with a preference for the later, rather than product disposal. That way, measures are more likely to be effective to solve primary environmental problems. Finally, foreign suppliers should be associated to the preparation of environmental schemes in order to prevent the creation of new non-tariff barriers and to maintain a fair competition in international trade.

Apart from the kind of TREMs economies should implement, they should also perform, when appropriate, impact assessments. Their objective should be twofold: they should assess to what extent they are going to have any impact on improving the environmental problem they intend to solve. They should also see how they are likely to distort trade, both at the economy level and on foreign suppliers. Impact assessment can assist in choosing best measures and reject inefficient ones. It can also help avoiding conflict and provide materials to ease cooperation.

In order to straighten transparency and communication, economies should first rely on the WTO since it is the most widely used source covering most economies. APEC, on its part, could be complementary by creating a database of TREMs adopted by APEC economies and by providing training activities for official and reinforce communication between decision makers and companies.

Cooperation at the APEC level should lead to develop more support from developed to developing economies to help them meeting environmental requirements. Developed economies should provide technical and financial support to developing economies rather than sanctioning them for not being able to comply or adopting similar requirements than theirs. This strategy is more likely to help them changing faster and it is also less trade distorting since it tends to avoid trade sanctions to those economies. More generally, cooperation should not mean imposing higher mandatory standards to everyone. The race for better environmental control will not be successful if it is imposed by force. Rather, it is advised to favor voluntary approaches based on common agreed principles decided at the APEC level. Fixing goals and objectives should be APEC's mission rather than imposing the method. A bottom-up approach based on individual initiatives and responsibilities will be more efficient and more sustainable than mandatory requirements.

Conclusion and Recommendations

The relationship between environment and trade has been confrontational and has raised concerns on both sides. Environmentalists often see trade as expanding pollution throughout the planet and the cause of many environmental concerns. They want to impose more restrictive regulations over international trade of polluting goods and their position favor strong environmental control, with low concerns about the impact on trade. On the other side, defenders of trade and most economists argue that economies should not hamper their growth by implementing TREMs, otherwise they will lose international competitiveness compared to countries with less stringent environmental standards. There is actually many ways to make environment and trade mutually supportive.

More generally, raising concerns about the environment have brought a new kind of problem. Indeed, over the last decades, economies have lowered drastically their tariff barriers. In doing so, economies have tried to find other ways to distort trade, by using non-tariff barriers. This creeping protectionism is particularly complicated to solve since it is far less transparent than are import tariff duties. In particular, environment has been the alibi of many measures, whose only effect was to prevent import from foreign countries to the benefit of national producers. This new form of disguised protectionism has been confirmed through many studies. In particular, it has been shown that there is a tendency of over-regulation in sectors of exports industries. Furthermore, many empirical studies have tried to assess the impact of environmental norms on trade and to see whether trade measures are appropriate to address environmental problems. Overall, it has been proven that compliance costs to environmental standards have been increasing sharply and that the "race to the bottom" argument is not verified.

Therefore, economies should remain careful in the way they intend to address environment concerns and monitor how environmental policies affect trade. APEC could, in this regards, have a determinant role to play. Indeed, intra-APEC trade represents the most part of APEC's total trade. That means that most problems can be solved from the inside. In addition, because of its size and its geographical and economic diversity, APEC seems to be an appropriate forum for cooperation in the way to address the environment and trade confrontational relationship.

This should be based on three pillars: cooperation, communication, and harmonization. A better cooperation would push economies to adopt only environmental measures that are the most necessary and reject the ones that could be trade-restricting. A better communication would ease trade between economies by lowering information costs and other compliance related costs. A better harmonization would help economies not to discriminate between domestic and foreign products and would diminish compliance costs.

In order to straighten transparency and communication, economies should first rely on the WTO. APEC could, on its part, be complementary by creating a database of TREMs adopted by APEC economies and by providing training activities for officials in order to reinforce communication between decision makers and companies.

As for cooperation, the APEC should monitor, on a regular basis, how environmental goods and polluting industries are traded. This point has a good linkage to the APEC ongoing initiative on APEC Environmental Goods and Services Information Exchange (EGSIE) website. APEC member economies can consider sharing information on the trading of environmental goods and services on that website as a learning exercise before going a step further by sharing information on polluting industries. It would be necessary to have lists for both kinds of goods that could be comparable. It seems that, today, tax profiles of APEC economies are rational since environmental goods are, in average, less taxed than polluting ones. However, one should remain careful not to tackle the environmental problem the wrong way: that is, progress has to be made by lowering tariffs on environmental-friendly goods rather than taxing more pollution-intensive products. In addition, financial and technical support should be given to developing countries to reach environmental standards. Developed economies should also associate them to the standard-setting process. It is indeed much efficient to encourage them to meet environmental requirements rather than constrain them by limiting their trade. We have learnt that there is significant progress in the APEC Energy Working Group (EWG) to promote energy efficiency goods and energy standards. We, therefore, suggest that this work needs to be complemented by capacity building for developing economies in APEC in order meet these requirements and standards.

Furthermore, foreign suppliers should also be associated to the preparation of environmental schemes in order to prevent the creation of new non-tariff barriers and to maintain a fair competition in international trade. Finally, APEC economies should perform, when appropriate, impact assessments of TREMs. Impact assessments can assist economies to select the best measures and to rejects the inefficient ones. It can also help avoiding conflict and provide materials to ease cooperation.

Concerning the harmonization pillar, economies should always prioritize international standards or rules when possible rather than creating economy specific requirements. Home-made standards can be very cumbersome and costly for companies since they raise transaction costs and are time consuming. Sometimes however, a certain degree of competition and standards setting is necessary to select the best ones. An alternative approach consists in mutual recognition agreements. Furthermore, it is sometimes more recommended to prefer mutual recognition over

harmonization since standards are not appropriate everywhere. What is important is the convergence in principles rather than a rigid harmonization of standards.

Overall, TREMs should focus on production process and product consumption, with a preference for the later, rather than product disposal. However, many studies point out the fact that trade provisions only have low effects on environmental quality in general and pollution intensive sectors in particular. Furthermore, trade provisions have been proven to be very trade restrictive and have a strong negative impact on net exports. As a consequence, APEC economies should push for voluntary standards in lieu of mandatory requirements. Although, the later are sometimes preferable, voluntary standards have been proven to be more efficient because they are less trade distorting, more flexible, and easier to comply with.

Therefore, it is advised to favor voluntary approaches based on common agreed principles decided at the APEC level. Fixing goals and objectives should be APEC's mission rather than imposing the method. Overall, APEC can play a fundamental role in straightening the debate and providing new solutions to make environment and trade mutually supportive.

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