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The U.S. Proposed Carbon Tariffs, WTO Scrutiny and China's Responses[1]

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Abstract

With countries from around the world set to meet in Copenhagen to try to hammer out a post-2012 climate change agreement, no one would disagree that a U.S. commitment to cut greenhouse gas emissions is essential to such a global pact. However, despite U.S. president Obama's recent announcement that he will push for a commitment to cut U.S. greenhouse gas emissions by 17% by 2020, in reality it is questionable whether U.S. Congress will agree to specific emissions cuts, although are not ambitious at all from the perspectives of both the EU and developing countries, without imposing carbon tariffs on Chinese products to the U.S. market, even given China's own recent announcement to voluntarily seek to reduce its carbon intensity by 40-45% over the same period.

This dilemma is partly attributed to flaws in current international climate negotiations, which have been focused on commitments on the two targeted dates of 2020 and 2050. However, if the international climate change negotiations continue their current course without extending the commitment period to 2030, which would really open the possibility for the U.S. and China to make the commitments that each wants from the other side, the inclusion of border carbon adjustment measures seems essential to secure passage of any U.S. legislation capping its greenhouse gas emissions. Moreover, the joint WTO-UNEP report indicates that border carbon adjustment measures might be allowed under the existing WTO rules, depending on their specific design features and the specific conditions for implementing them.

Against this background, this paper argues that, on the U.S. side, there is a need to minimize the potential conflicts with WTO provisions in designing such border carbon adjustment measures. The U.S. also needs to explore with its trading partners cooperative sectoral approaches to advancing low-carbon technologies and/or concerted mitigation efforts in a given sector at an international level. Moreover, to increase the prospects for a successful WTO defence of the Waxman-Markey type of border adjustment provision, 1) there should be a period of good faith efforts to reach agreements among the countries concerned before imposing such trade measures; 2) WTO consistency also requires considering alternatives to trade provisions that could be reasonably expected to fulfill

the same function but are not inconsistent or less inconsistent with the relevant WTO provisions; and 3) trade provisions should allow importers to submit equivalent emission reduction units that are recognized by international treaties to cover the carbon contents of imported products.

Meanwhile, being targeted by such border carbon adjustment measures, China needs to, at a right time, indicate a serious commitment to address climate change issues to challenge the legitimacy of the U.S. imposing the carbon tariffs by signaling well ahead that it will take on binding absolute emission caps around the year 2030, and needs the three transitional periods of increasing climate obligations before taking on absolute emissions caps. The paper argues that there is a clear need within a climate regime to define comparable efforts towards climate mitigation and adaptation to discipline the use of unilateral trade measures at the international level. As exemplified by export tariffs that China applied on its own during 2006-08, the paper shows that defining the comparability of climate efforts can be to China's advantage. Furthermore, given the fact that, in volume terms, energy-intensive manufacturing in China values 7-8 times that of India, and thus carbon tariffs impact much more on China than on India, the paper questions whether China should hold the same stance on this issue as India as it does now, although the two largest developing countries should continue to take a common position on other key issues in international climate change negotiations.

JEL classification: F18; Q48; Q54; Q56; Q58

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I. Introduction

There is a growing consensus that climate change has the potential to seriously damage our natural environment and affect the global economy and thus represents the world's most pressing long-term threat to future prosperity and security. With greenhouse gas emissions embodied in virtually all products produced and traded in every conceivable economic sector, effectively addressing climate change will require a fundamental transformation of our economy and the ways energy is produced and used. This will certainly have a bearing on world trade because it will affect the costs of production of traded products and therefore their competitive positions in the world market. This climate-trade nexus has become the focus of an academic debate (e.g., Bhagwati and Mavroidis, 2007; Charnovitz, 2003; Ismer and Neuhoff, 2007; Swedish National Board of Trade, 2004; The World Bank, 2007; Zhang, 1998, 2004 and 2007a; Zhang and Assunção, 2004), and gains increasing attention as governments are taking great efforts to implement the Kyoto Protocol and forge a post-2012 climate change regime to succeed it.

The Intergovernmental Panel on Climate Change calls for developed countries to cut their greenhouse gas emissions by 25-40% by 2020 and by 80% by 2050 relative to their 1990 levels, in order to avoid dangerous climate change impacts. In the meantime, under the United Nations Framework Convention on Climate Change (UNFCCC) principle of "common but differentiated responsibilities", developing countries are allowed to move different speeds as do their developed counterparts. This principle is clearly reflected in the Bali roadmap, which requires developing countries to take "nationally appropriate mitigation actions … in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner". Understandably, the U.S. and other industrialized countries would like to see developing countries, in particular large developing economies, go beyond that because of concerns about their own competitiveness and growing greenhouse gas emissions in developing countries. They are considering unilateral trade measures to "induce" developing countries to do so. This has been a case in the course of debating and voting the U.S. congressional climate bills capping U.S. greenhouse gas emissions.

U.S. legislators have pushed for major emerging economies, such as China and India, and require these countries to take comparable climate actions as U.S. does. Otherwise, their products sold on the U.S. market will have to purchase and surrender emissions allowances to cover their carbon contents. This kind of border carbon adjustment measures has raised great concerns about whether they are WTO-consistent and has received heavy criticisms from developing countries.

To date, border adjustment measures in the form of emissions allowance requirements (EAR) under the U.S. proposed cap-and-trade regime are the most concrete unilateral trade measure put forward on the table to level the carbon playing field. If improperly implemented, such measures could disturb the world trade order and trigger trade war. Because of these potentially far-reaching impacts, this paper will focus on this type of unilateral border adjustment. It requires importers to acquire and surrender emissions allowances corresponding to the embedded carbon contents in their goods from countries that have not taken climate actions comparable to that of home country. Our discussion is mainly on the legality of unilateral EAR under the WTO rules.[3] Section 2 briefly describes the border carbon adjustment measures proposed in the U.S. legislations. Section 3 deals with the WTO scrutiny of EAR proposed in the U.S. congressional climate bills and methodological challenges in implementing EAR. With current international climate negotiations flawed with a focus on commitments on the two targeted dates of 2020 and 2050, the inclusion of border carbon adjustment measures seems essential to secure passage of any U.S. climate legislation. Given this, Section 4 discuses how China should respond to the U.S. proposed carbon tariffs. The paper ends with some concluding remarks on the needs on the U.S. side to minimize the potential conflicts with WTO provisions in designing such border carbon adjustment measures, and with suggestion for China being targeted by such border measures to effectively deal with the proposed border adjustment measures to its advantage.

[3] See Reinaud (2008) for an excellent review of practical issues involved in implementing unilateral EAR.

2. Proposed border adjustment measures in the U.S. legislations

The notion of border carbon adjustments (BCA) is not an American invention. The idea of using BCA to address the competitiveness concerns as a result of differing climate policy was first floated in the EU, in response to the U.S. withdrawal from the Kyoto Protocol. Dominique de Villepin, the then French prime minister, proposed in November 2006 for carbon tariffs on goods from countries that have not ratified the Kyoto Protocol. He clearly had the U.S. in mind when contemplating such proposals aimed to get the U.S. to the table of climate negotiations. However, Peter Mandelson, the then EU trade commissioner dismissed the French proposal as not only a probable breach of trade rules but also "not good politics" (Bounds, 2006). As a balanced reflection of the divergent views on this issue, the European Commission has suggested that it could implement a "carbon equalization system … with a view to putting EU and non-EU producers on a comparable footing". "Such a system could apply to importers of goods requirements similar to those applicable to installations within the European Union, by requiring the surrender of allowances." (European Commission, 2008). In light of this, various proposals about carbon equalization systems at the border have been put forward, the most recent one linked to French president Nicolas Sarkozy's proposal for "a carbon tax at the borders of Europe". France will become the largest economy to levy a carbon tax at €17 per ton of CO_2 emissions, which will take into effect in 2010. The president Sarkozy renewed such a call for a European carbon tax on imports when unveiling the details of France's controversial national carbon tax. He defended his position by citing comments from the WTO that such a tax could be compatible with its rules and referring to a similar border carbon adjustment provision under the Waxman-Markey bill in the U.S. House to be discussed in the next two sections, arguing that "I don't see why the US can do it and Europe cannot" (Hollinger, 2009). So far, while the EU has considered the possibility of imposing a border allowance adjustment should serious leakage issues arise in the future, it has put this option on hold at least until 2012. The European Commission has proposed using temporary free allocations to address competitiveness concerns in the interim. Its

aim is to facilitate a post-2012 climate negotiation while keeping that option in the background as a last resort.

Interestingly, the U.S. legislators not only have embraced such BCA measures that they used to oppose, but also have focused on their design issues in more details. In the U.S. Senate, the Boxer Substitute of the Lieberman-Warner Climate Security Act (S. 3036) mandates that starting from 2014 importers of products covered by the cap-and-trade scheme would have to purchase emissions allowances from an International Reserve Allowance Programme if no comparable climate action were taken in the exporting country. Least developed countries and countries that emit less than 0.5% of global greenhouse gas emissions (i.e., those being considered not significant emitters) would be excluded from the scheme. Given that most carbon-intensive industries in the U.S. run a substantial trade deficit (Houser et al., 2008), this proposed EAR clearly aims to level the carbon playing field for domestic producers and importers. In the U.S. House of Representatives, the American Clean Energy and Security Act of 2009 (H.R. 2998),[4] sponsored by Reps. Henry Waxman (D-CA) and Edward Markey (D-MA), was narrowly passed on June 26, 2009. The so-called Waxman-Markey bill sets up an "International Reserve Allowance Program" whereby U.S. importers of primary emission-intensive products from countries having not taken "greenhouse gas compliance obligations commensurate with those that would apply in the United States" would be required to acquire and surrender carbon emissions allowances. The EU by any definition would pass this comparability test, because it has taken under the Kyoto Protocol and is going to take in its follow-up regime much more ambitious climate targets than U.S.. Because all other remaining Annex 1 countries but the U.S. have accepted mandatory emissions targets under the Kyoto Protocol, these countries would likely pass the comparability test as well, which exempts them from EAR under U.S. cap-and-trade regime. While France targeted the American goods, the U.S. EAR clearly targets major emerging economies, such as China and India.

[4] H.R. 2998, available at: http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_cong_bills&docid=f:h2998ih.txt.pdf.

3. WTO scrutiny of U.S. Congressional climate bills

The import emissions allowance requirement was a key part of the Lieberman-Warner Climate Security Act of 2008, and will re-appear again as the U.S. Senate debates and votes its own version of a climate change bill next year after the U.S. House of Representatives narrowly passed the Waxman-Markey bill. Moreover, concerns raised in the Lieberman-Warner bill seem to have provided references to writing relevant provisions in the Waxman-Markey bill to deal with the competitiveness concerns. For these reasons, I start with the Lieberman-Warner bill.

A proposal first introduced by the International Brotherhood of Electrical Workers (IBEW) and American Electric Power (AEP) in early 2007 would require importers to acquire emission allowances to cover the carbon content of certain products from countries that do not take climate actions comparable to that of the U.S. (Morris and Hill, 2007). The original version of the Lieberman-Warner bill incorporated this mechanism, threatening to punish energy-intensive imports from developing countries by requiring importers to obtain emission allowance, but only if they had not taken comparable actions by 2020, eight years after the effective start date of a U.S. cap-and-trade regime begins. It was argued that the inclusion of trade provisions would give the U.S. additional diplomatic leverage to negotiate multilaterally and bilaterally with other countries on comparable climate actions. Should such negotiations not succeed, such trade provisions would provide a means of leveling the carbon playing field between American energy-intensive manufacturers and their competitors in countries not taking comparable climate actions. Not only would the bill have imposed an import allowance purchase requirement too quickly, it would have also dramatically expanded the scope of punishment: almost any manufactured product would potentially have qualified. If strictly implemented, such a provision would pose an insurmountable hurdle for developing countries (The Economist, 2008).

It should be emphasized that the aim of including trade provisions is to facilitate negotiations while keeping open the possibility of invoking trade measures as a last resort. The latest version of the Lieberman-Warner bill has brought the deadline forward to 2014 to gain business and union backing.[5] The inclusion of trade provisions might be considered the "price" of passage for any U.S. legislation capping its greenhouse gas emissions. Put another way, it is likely that no climate legislation can move through U.S. Congress without dealing with the issue of trade provisions. An important issue on the table is the length of the grace period to be granted to developing countries. While many factors need to be taken into consideration here (Haverkamp, 2008), further bringing forward the imposition of allowance requirements to imports is rather unrealistic, given the already very short grace period ending 2019 in its original version. It should be noticed that the Montreal Protocol on Substances that Deplete the Ozone Layer grants developing countries a grace period of 10 years (Zhang, 2000). Given that the scope of economic activities affected by a climate regime is several orders of magnitude larger than those covered by the Montreal Protocol, if legislation incorporates border adjustment measures (put the issue of their WTO consistency aside), in my view, they should not be invoked at least 10 years after mandatory U.S. emission targets take effect.

Moreover, unrealistically shortening the grace period granted before resorting to the trade provisions would increase uncertainty of whether the measure would withstand a challenge by U.S. trading partners before the WTO. As the ruling in the Shrimp-Turtle dispute indicates (see Box 2), for a trade measure to be considered WTO-consistent, a period of good-faith efforts to reach agreements among the countries concerned is needed before imposing such trade measures. Put another way, trade provisions should be preceded by major efforts to negotiate with partners within a reasonable timeframe. Furthermore, developing countries need reasonable time to develop and operate national climate policies and measures. Take the establishment of an emissions trading scheme as a case in point. Even for the U.S. SO_2 Allowance Trading Program, the entire process

[5] This is in line with the IBEW/AEP proposal, which requires U.S. importers to submit allowances to cover the emissions produced during the manufacturing of those goods two years after U.S. starts its cap-and-trade program (McBroom, 2008).

from the U.S. Environmental Protection Agency beginning to compile the data for its allocation database in 1989 to publishing its final allowance allocations in March 2003 took almost four years. For the first phase of the EU Emissions Trading Scheme, the entire process took almost two years from the EU publishing the Directive establishing a scheme for greenhouse gas emission allowance trading on 23 July 2003 to it approving the last national allocation plan for Greece on 20 June 2005. For developing countries with very weak environmental institutions and that do not have dependable data on emissions, fuel uses and outputs for installations, this allocation process is expected to take much longer than what experienced in the U.S. and the EU (Zhang, 2007b).

Box 1 Core WTO principles

GATT Article 1 ('most favored nation' treatment): WTO members not allowed to discriminate against like imported products from other WTO members

GATT Article III ('national treatment'): Domestic and like imported products treated identically, including any internal taxes and regulations

GATT Article XI ('elimination of quantitative restrictions'): Forbids any restrictions (on other WTO members) in the form of bans, quotas or licenses

GATT Article XX
"Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be constructed to prevent the adoption or enforcement by any contracting party of measures…
(b) **necessary** to protect human, animal or plant life or health; …
(g) **relating to** the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption; ..."

The **threshold for (b) is higher than for (g)**, because, in order to fall under (b), the measure must be "necessary", rather than merely "relating to" under (g).

Box 2 Implications of the findings of WTO the shrimp-turtle dispute

To address the decline of sea turtles around the world, in 1989 the U.S. Congress enacted Section 609 of Public Law 101-162 to authorize embargoes on shrimp harvested with commercial fishing technology harmful to sea turtles. The U.S. was challenged in the WTO by India, Malaysia, Pakistan and Thailand in October 1996, after embargoes were leveled against them. The four governments challenged this measure, asserting that the U.S. could not apply its laws to foreign process and production methods. A WTO Dispute Settlement Panel was established in April 1997 to hear the case. The Panel found that the U.S. failed to approach the complainant nations in serious multilateral negotiations before enforcing the U.S. law against those nations. The Panel held that the U.S. shrimp embargo was a class of measures of processes-and-production-methods type and had a serious threat to the multilateral trading system because it conditioned market access on the conservation policies of foreign countries. Thus, it cannot be justified under GATT Article XX. However, the WTO Appellate Body overruled the Panel's reasoning. The Appellate Body held that a WTO member requires from exporting countries compliance, or adoption of, certain policies prescribed by the importing country does not render the measure inconsistent with the WTO obligation. Although the Appellate Body still found that the U.S. shrimp embargo was not justified under GATT Article XX, the decision was not on ground that the U.S. sea turtle law itself was not inconsistent with GATT. Rather, the ruling was on ground that the application of the law constituted "arbitrary and unjustifiable discrimination" between WTO members (WTO, 1998). The WTO Appellate Body pointed to a 1996 regional agreement reached at the U.S. initiation, namely the Inter-American Convention on Protection and Conservation of Sea Turtles, as evidence of the feasibility of such an approach (WTO, 1998; Berger, 1999). Here, the Appellate Body again advanced the standing of multilateral environmental treaties (Zhang, 2004; Zhang and Assunção, 2004). Thus, it follows that this trade dispute under the WTO may have been interpreted as a clear preference for actions taken pursuant to multilateral agreements and/or negotiated through international cooperative arrangements, such as the Kyoto Protocol and its successor. However, this interpretation should be with great caution, because there is no doctrine of *stare decisis* (namely, "to stand by things decided") in the WTO; the GATT/WTO panels are not bound by previous panel decisions (Zhang and Assunção, 2004).

Moreover, the WTO Shrimp-Turtle dispute settlement has a bearing on the ongoing discussion on the "comparability" of climate actions in a post-2012 climate change regime. The Appellate Body found that when the U.S. shifted its standard from requiring measures essentially the same as the U.S. measures to "the adoption of a program *comparable* in effectiveness", this new standard would comply with the WTO disciplines (WTO, 2001, paragraph 144). Some may view that this case opens the door for U.S. climate legislation that bases trade measures on an evaluation of the comparability of climate actions taken by other trading countries. Comparable action can be interpreted as meaning action comparable in effect as the "*comparable* in effectiveness" in the Shrimp-Turtle dispute. It can also be interpreted as meaning "the comparability of efforts". The Bali Action Plan adopts the latter interpretation, using the terms comparable as a means of ensuring that developed countries undertake commitments comparable to each other (Zhang, 2009a).

In the case of a WTO dispute, the question will arise whether there are any alternatives to trade provisions that could be reasonably expected to fulfill the same function but are not inconsistent or less inconsistent with the relevant WTO provisions. Take the GATT Thai cigarette dispute as a case in point. Under Section 27 of the Tobacco Act of 1966, Thailand restricted imports of cigarettes and imposed a higher tax rate on imported cigarettes when they were allowed on the three occasions since 1966, namely in 1968-70, 1976 and 1980. After consultations with Thailand failed to lead to a solution, the U.S. requested in 1990 the Dispute Settlement Panel to rule on the Thai action on the grounds that it was inconsistent with Article XI:1 of the General Agreement; was not justified by the exception under Article XI:2(c), because cigarettes were not an agricultural or fisheries product in the meaning of Article XI:1; and was not justified under Article XX(b) because the restrictions were not necessary to protect human health, i.e. controlling the consumption of cigarettes did not require an import ban. The Dispute Settlement Panel ruled against Thailand. The Panel found that Thailand had acted inconsistently with Article XI:1 for having not granted import licenses over a long period of time. Recognizing that XI:2(c) allows exceptions for fisheries and agricultural products if the restrictions are necessary to enable governments to protect farmers and fishermen who, because of the perishability of their produce, often could not withhold excess supplies of the fresh product from the market, the Panel found that cigarettes were not “like” the fresh product as leaf tobacco and thus were not among the products eligible for import restrictions under Article XI:2(c). Moreover, the Panel acknowledged that Article XX(b) allowed contracting parties to give priority to human health over trade liberalization. The Panel held the view that the import restrictions imposed by Thailand could be considered to be “necessary” in terms of Article XX(b) only if there were no alternative measure consistent with the General Agreement, or less inconsistent with it, which Thailand could reasonably be expected to employ to achieve its health policy objectives. However, the Panel found the Thai import restriction measure not necessary because Thailand could reasonably be expected to take strict, non-discriminatory labelling and ingredient disclosure regulations and to ban all the direct and indirect advertising, promotion and sponsorship of cigarettes to ensure the quality and reduce the

quantity of cigarettes sold in Thailand. These alternative measures are considered WTO-consistent to achieve the same health policy objectives as Thailand now pursues through an import ban on all cigarettes whatever their ingredients (GATT, 1990). Simply put, in the GATT Thai cigarette dispute, the Dispute Settlement Panel concluded that Thailand had legitimate concerns with health but it had measures available to it other than a trade ban that would be consistent with the General Agreement on Tariffs and Trade (e.g. bans on advertising) (GATT, 1990).

Indeed, there are alternatives to resorting to trade provisions to protect the U.S. trade-sensitive, energy-intensive industries during a period when the U.S. is taking good-faith efforts to negotiate with trading partners on comparable actions. One way to address competitiveness concerns is to initially allocate free emission allowances to those sectors vulnerable to global competition, either totally or partially.[6] Bovenberg and Goulder (2002) found that giving out about 13% of the allowances to fossil fuel suppliers freely instead of auctioning in an emissions trading scheme in the U.S. would be sufficient to prevent their profits with the emissions constraints from falling in comparison with those without the emissions constraints.

There is no disagreement that the allocation of permits to emissions sources is a politically contentious issue. Grandfathering, at least partially grandfathering, helps these well-organized, politically highly-mobilized industries or sectors to save considerable expenditures and thus increases the political acceptability of an emissions trading scheme, although it leads to a higher economic cost than a policy where the allowances are fully auctioned.[7] That explains why the sponsors of the American Clean Energy and Security

[6] To be consistent with the WTO provisions, foreign producers could arguably demand the same proportion of free allowances as U.S. domestic producers in case they are subject to border carbon adjustments.

[7] In a second-best setting with pre-existing distortionary taxes, if allowances are auctioned, the revenues generated can then be used to reduce pre-existing distortionary taxes, thus generating overall efficiency gains. Parry et al. (1999), for example, show that the costs of reducing U.S. carbon emissions by 10% in a second-best setting with pre-existing labor taxes are five times more costly under a grandfathered carbon permits case than under an auctioned case. This is because the policy where the permits are auctioned

Act of 2009 had to make a compromise amending it to auction only 15% of the emission permits instead of the initial proposal for auctioning all the emission permits in a proposed cap-and-trade regime in order for it to pass the U.S. House of Representatives Energy and Commerce Committee in May 2009. However, it should be pointed out that although grandfathering is thought of as giving implicit subsidies to these sectors, grandfathering is less trade-distorted than the exemptions from carbon taxes (Zhang, 1998 and 1999), which means that partially grandfathering is even less trade-distorted than the exemptions from carbon taxes. To understand their difference, it is important to bear in mind that grandfathering itself also implies an opportunity cost for firms receiving permits: what matters here is not how firms get your permits, but what firms can sell them for - that is what determines opportunity cost. Thus, even if permits are awarded gratis, firms will value them at their market price. Accordingly, the prices of energy will adjust to reflect the increased scarcity of fossil fuels. This means that regardless of whether emissions permits are given out freely or are auctioned by the government, the effects on energy prices are expected to be the same, although the initial ownership of emissions permits differs among different allocation methods. As a result, relative prices of products will not be distorted relative to their pre-existing levels and switching of demands towards products of those firms whose permits are awarded gratis (the so-called substitution effect) will not be induced by grandfathering. This makes grandfathering different from the exemptions from carbon taxes. In the latter case, there exist substitution effects (Zhang, 1998 and 1999). For example, the Commission of the European Communities (CEC) proposal for a mixed carbon and energy tax[8] provides for

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raises revenues for the government that can be used to reduce pre-existing distortionary taxes. By contrast, in the former case, no revenue-recycling effect occurs, since no revenues are raised for the government. However, the policy produces the same tax-interaction effect as under the latter case, which tends to reduce employment and investment and thus exacerbates the distortionary effects of pre-existing taxes (Zhang, 1999).

[8] As part of its comprehensive strategy to control CO_2 emissions and increase energy efficiency, a carbon/energy tax has been proposed by the CEC. The CEC proposal is that member states introduce a carbon/energy tax of US$ 3 per barrel oil equivalent in 1993, rising in real terms by US$ 1 a year to US$ 10 per barrel in 2000. After the year 2000 the tax rate will remain at US$ 10 per barrel at 1993 prices. The tax rates are allocated across fuels, with 50% based on carbon content and 50% on energy content (Zhang, 1997).

exemptions for the six energy-intensive industries (i.e., iron and steel, non-ferrous metals, chemicals, cement, glass, and pulp and paper) from coverage of the CEC tax on grounds of competitiveness. This not only reduces the effectiveness of the CEC tax in achieving its objective of reducing CO_2 emissions, but also makes the industries, which are exempt from paying the CEC tax, improve their competitive position in relation to those industries which are not. Therefore, there will be some switching of demand towards the products of these energy-intensive industries, which is precisely the reaction that such a tax should avoid (Zhang, 1997).

The import allowance requirement approach would distinguish between two otherwise physically identical products on the basis of climate actions in place in the country of origin. This discrimination of like products among trading nations would constitute a prima facie violation of WTO rules. To pass WTO scrutiny of trade provisions, the U.S. is likely to make reference to the health and environmental exceptions provided under GATT Article XX (see Box 1). This Article itself is the exceptions that authorize governments to employ otherwise GATT-illegal measures when such measures are necessary to deal with certain enumerated public policy problems. The GATT panel in Tuna/Dolphin II concluded that Article XX does not preclude governments from pursuing environmental concerns outside their national territory, but such extra-jurisdictional application of domestic laws would be permitted only if aimed *primarily* (emphasis added) at having a conservation or protection effect (GATT, 1994; Zhang, 1998). The capacity of the planet's atmosphere to absorb greenhouse gas emissions without adverse impacts is an 'exhaustible natural resource'. Thus, if countries take measures on their own including extra-jurisdictional application *primarily* to prevent the depletion of this 'exhaustible natural resource', such measures will have a good justification under GATT Article XX. Along this reasoning, if the main objective of trade provisions is to protect the environment by requiring other countries to take actions comparable to that of the U.S., then mandating importers to purchase allowances from the designated special international reserve allowance pool to cover the carbon emissions associated with the manufacture of that product is debatable. To increase the prospects

for a successful WTO defense, I think that trade provisions can refer to the designated special international reserve allowance pool, but may not do without adding "or equivalent". This will allow importers to submit equivalent emission reduction units that are not necessarily allowances but are recognized by international treaties to cover the carbon contents of imported products.

Clearly, these concerns raised in the Lieberman-Warner bill have shaped relevant provisions in the Waxman-Markey bill to deal with the competitiveness and leakage concerns. Accordingly, the Waxman-Markey bill has avoided all the aforementioned controversies raised in the Lieberman-Warner bill. Unlike the EAR in the Lieberman-Warner bill which focuses exclusively on imports into the U.S., but does nothing to address the competitiveness of U.S. exports in foreign markets, the Waxman-Markey bill included both rebates for few energy-intensive, trade-sensitive sectors[9] and free emission allowances to help not to put U.S. manufacturers at a disadvantage relative to overseas competitors. Unlike the Lieberman-Warner bill in the U.S. Senate, the Waxman-Markey bill also gives China, India and other major developing nations time to enact their climate-friendly measures. Under the Waxman-Markey bill, the International Reserve Allowance Program may not begin before January 1, 2025. The U.S. president may only implement an International Reserve Allowance Program for sectors producing primary products. While the bill called for a "carbon tariff" on imports, it very much framed that measures as a last resort that a U.S. president could impose at his or her discretion regarding border adjustments or tariffs. However, in the middle of the night before the vote on June 26, 2009, a provision was inserted in this House bill that requires the President, starting in 2020, to impose a border adjustment - or tariffs - on certain goods from countries that do not act to limit their greenhouse gas emissions. The President can waive the tariffs only if he receives explicit permission from U.S. Congress (Broder, 2009). The last-minute changes in the bill changed a Presidential long-term back-up option to a requirement that the President put such tariffs in place under the specified conditions. Such changes significantly changed the spirit of the bill, moving it

[9] See Genasci (2008) for discussion on complicating issues related to how to rebate exports under a cap-and-trade regime.

considerably closer to risky protectionism. While praising the passage of the House bill as an "extraordinary first step," president Obama opposed to a trade provision in that bill.[10] The carbon tariff proposals have also drawn fierce criticism from China and India. Without specific reference to the U.S. or the Waxman-Markey bill, China's Ministry of Commerce said in a statement posted on its website that proposals to impose "carbon tariffs" on imported products will violate the rules of the World Trade Organization. That would enable developed countries to "resort to trade in the name of protecting the environment". The carbon tariff proposal runs against the principle of "common but differentiated responsibilities", the spirit of the Kyoto Protocol. This will neither help strengthen confidence that the international community can cooperate to handle the (economic) crisis, nor helps any country's endeavors during the climate change negotiations. Thus China is strongly opposed to it (MOC of China, 2009).

On September 30, 2009, Senators John Kerry (D-MA) and Barbara Boxer (D-CA) introduced the Clean Energy Jobs and American Power Act (S. 1733), the Senate version of the Waxman-Markey bill in the House. Unlike in the House where a simple majority is needed to pass a legislation, the Senate needs 60 votes from its 100 members to ensure passage. With two senators per state no matter how small, coal-producing, industrial and agricultural states are more heavily represented in the Senate than in the House. Thus the Kerry-Boxer bill faces an even uphill battle in the Senate. As would be expected, senators from those states would push for even tough border carbon adjustment provisions that would potentially tax foreign goods at a higher rate if they come from countries that are not taking steps comparable to that of the U.S., which can add to the cost of goods. At this stage the bill does propose to include some form of BCAs, but details still need to be worked out. While Senator Kerry indicates that the proposed provision would comply with the WTO rules, it remains to be seen how the bill, which is put off until Spring 2010 (Talley, 2009), is going to reconcile potential conflicts between demands for tough border

[10] President Obama was quoted as saying that "At a time when the economy worldwide is still deep in recession and we've seen a significant drop in global trade, I think we have to be very careful about sending any protectionist signals out there. I think there may be other ways of doing it than with a tariff approach." (Broder, 2009).

carbon adjustment provisions from coal-producing, industrial and agricultural states and the U.S. international obligations under WTO.

Besides the issue of WTO consistency, there will be methodological challenges in implementing an EAR under a cap-and-trade regime, although such practical implementation issues are secondary concerns. Identifying the appropriate carbon contents embodied in traded products will present formidable technical difficulties, given the wide range of technologies in use around the world and very different energy resource endowments and consumption patterns among countries. In the absence of any information regarding the carbon content of the products from exporting countries, importing countries, the U.S. in this case, could adopt either of the two approaches to overcoming information challenge in practical implementation. One is to prescribe the tax rates for the imported product based on U.S. domestically predominant method of production for a like product, which sets the average embedded carbon content of a particular product (Zhang, 1998; Zhang and Assunção, 2004). This practice is by no means without foundation. For example, the U.S. Secretary of the Treasury has adopted the approach in the tax on imported toxic chemicals under the Superfund Tax (GATT, 1987; Zhang, 1998). Alternative is to set the best available technology (BAT) as the reference technology level and then use the average embedded carbon content of a particular product produced with the BAT in applying border carbon adjustments (Ismer and Neuhoff, 2007). Generally speaking, developing countries will bear a lower cost based on either of the approaches than using the nation-wide average carbon content of imported products for the country of origin, given that less energy-efficient technologies in developing countries produce products of higher embedded carbon contends than those like products produced by more energy-efficient technologies in the U.S. However, to be more defensible, either of the approaches should allow foreign producers to challenge the carbon contents applied to their products to ensure that they will not pay for more than they have actually emitted.

4. How should China respond to the U.S. proposed carbon tariffs?

So far, the discussion has been focused on the country that is considering unilateral trade measures. Now that the inclusion of border carbon adjustment measures is widely considered essential to secure passage of any U.S. climate legislation, the question is then how China should respond to the U.S. proposed carbon tariffs.

4.1 A serious commitment to find a global solution to the threat of climate change

First of all, China needs to creditably indicate a serious commitment to address climate change issues to challenge the legitimacy of the U.S. imposing the carbon tariffs. Indeed, if China's energy use and the resulting carbon emissions had followed their trends between 1980 and 2000, during which China achieved a quadrupling of its GDP with only a doubling of energy consumption, rather than surged since 2001, then the position of China in the international climate debate would be very different from what it is today. On the trends of the 1980s and 1990s, the U.S. Energy Information Administration (EIA, 2004) estimated that China's CO_2 emissions are not expected to catch up with the world's largest carbon emitter by 2030. However, China's energy use had surged since the turn of this century, almost doubling between 2000 and 2007. Despite similar rates of economic growth, the rate of growth in China's energy use during this period (9.74% per year) has been more than twice that of the last two decades in the past century (4.25% per year) (National Bureau of Statistics of China, 2008). As a result, China was already the world's largest carbon emitter in 2007, instead of "until 2030" as estimated as late as 2004.

It is conceivable that China will argue that its high absolute emission levels are the combined effects of large population and coal-fueled economy and the workshop as the world, the latter of which leads to a hefty chunk of China's emissions embedded in goods that are exported to industrialized countries (Zhang, 2009c). China's arguments are legitimate. The country has every right to do that. Anyhow, China's share of the world's cumulative energy-related CO_2 emissions was only 8% from 1900 to 2005, far less than 30% for the U.S., and is still lower than those for the U.S. by 2030. On a per capita basis, China's CO_2 emissions are currently only one-fifth of that for the U.S., and are still less

than half of that of the U.S. by 2030 (IEA, 2007). However, the number one position has put China in the spotlight, just at a time when the world's community starts negotiating a post-Kyoto climate regime under the Bali Roadmap. There are the renewed interests in and debates on China's role in combating global climate change.

Given the fact that China is already the world's largest carbon emitter and its emissions continue to rise rapidly in line with its industrialization and urbanization, China is seen with greater capacity, capability and responsibility. The country is facing great pressure both inside and outside international climate negotiations to exhibit greater ambition. As long as China does not signal well ahead the time when it will take on the emissions caps, it will always be confronted with the threats of trade measures. In responses to these concerns and to put China in a positive position, I propose that at Copenhagen and beyond China should negotiate a requirement that greenhouse gas emissions in industrialized countries be cut at least by 80% by 2050 relative to their 1990 levels and that per capita emissions for all countries by 2050 should be no more than the world's average at that time. Moreover, it would be in China's own best interest if, at a right time (e.g., at a time when the U.S. Senate is going to debate and ratify any global deal that would emerge from Copenhagen or later), China signals well ahead that it will take on binding absolute emission caps around the year 2030.

4.1.1 Why around 2030 for timing China's absolute emissions caps?

Many factors need to be taken into consideration in determining the timing for China to take on absolute emissions caps. Assuming the commitment period of five years as the Kyoto Protocol has adopted, I think the fifth commitment period (2028-2032), or around 2030 is not an unreasonably expected date on which China needs to take on absolute emissions caps for the following reasons. While this date is later than the time frame that the U.S. and other industrialized countries would like to see, it would probably be still too soon from China's perspective.

First, the fourth assessment report of the Intergovernmental Panel on Climate Change recommends that global greenhouse gas emissions should peak by 2020 as the latest and then turn downward, to avoid dangerous climate change consequences. With China already the world's largest carbon emitter, the earlier China takes on emissions caps, the more likely that goal can be achieved. However, given China's relatively low development stage and its rapidly growing economy fueled by coal, its carbon emissions are still on the climbing trajectories well beyond 2030, even if some energy saving policies and measures have been factored into such projections.

Second, before legally binding commitments become applicable to Annex I (industrialized) countries, they have a grace period of 16 years starting from the Earth Summit in June 1992 when Annex I countries promised to individually or jointly stabilize greenhouse gases emissions at their 1990 levels by the end of the past century to the beginning of the first commitment period in 2008. This precedent points to a first binding commitment period for China starting around 2026.

Third, with China still dependent on coal to meet the bulk of its energy needs for the next several decades, the commercialization and widespread deployment of carbon capture and storage (CCS) is a crucial option for reducing both China's and global CO_2 emissions. Thus far, CCS has not been commercialized anywhere in the world, and it is unlikely, given current trends, that this technology will find large-scale application either in China or elsewhere before 2030. Until CCS projects are developed to the point of achieving economies of scale and bringing down the costs, China will not feel confident about committing to absolute emissions caps.

Fourth, developing countries need reasonable time to develop and operate national climate policies and measures. This is understood by knowledgeable U.S. politicians, such as Reps. Henry Waxman (D-CA) and Edward Markey (D-MA), the sponsors of the American Clean Energy and Security Act of 2009. Indeed, the Waxman-Markey bill gives China, India and other major developing nations time to enact climate-friendly measures. While the bill called for a "carbon tariff" on imports, it very much framed that

measures as a last resort that a U.S. president could impose at his or her discretion not until January 1, 2025 regarding border adjustments or tariffs, although in the middle of the night before the vote on June 26, 2009, a compromise was made to further bring forward the imposition of carbon tariffs.

Fifth, another timing indicator is a lag between the date that a treaty is signed and the starting date of the budget period. With the Kyoto Protocol signing in December 1997 and the first budget period staring 2008, the earliest date to expect China to introduce binding commitments would not be before 2020. Even without this precedent for Annex I countries, China's demand is by no means without foundation. For example, the Montreal Protocol on Substances that Deplete the Ozone Layer grants developing countries a grace period of 10 years (Zhang, 2000). Given that the scope of economic activities affected by a climate regime is several orders of magnitude larger than those covered by the Montreal Protocol, it is arguable that developing countries should have a grace period much longer than 10 years, after mandatory emission targets for Annex I countries took effect in 2008.

Sixth, while it is not unreasonable to grant China a grace period before taking on emissions caps, it would hardly acceptable to delay the timing beyond 2030. China is already the world's largest carbon emitter and, in the next year or so, will overtake Japan as the world's second largest economy, although its per capita income and emissions are still very low. After another twenty years of rapid development, China's economy will approach that of the world's second-largest emitter (the U.S.) in size, whereas China's absolute emissions are well above those of number two. Its baseline carbon emissions in 2030 are projected to reach 11.73 billion tons of carbon dioxide, relative to 6.4 billion tons for the U.S. and 2.1 billion tons for India (EIA, 2009), the world's populous country at that time (UNDESA, 2009).[11] This gap with the U.S. could be even bigger, provided that the U.S. would cut its emissions to the levels proposed by the Obama administration and under the American Clean Energy and Security Act of 2009. By then, China's per

[11] UNDESA (2009) projects that China's population would peak at 1462.5 millions around 2030, while India's population would be projected to be at 1484.6 millions in 2030 and further grow to 1613.8 millions in 2050.

capita income will reach a very reasonable level, whereas its per capita emissions are projected to be well above the world's average and about 5.7 times of India (EIA, 2009). While the country is still on the climbing trajectory of carbon emissions under the business as usual scenario, China will have lost ground by not to taking on emissions caps when the world is facing ever alarming climate change threats and developed countries will have achieved significant emissions reductions by then.

4.1.2 Three transitional periods of increasing climate obligations

It is hard to imagine how China could apply the brakes so sharply as to switch from rapid emissions growth to immediate emissions cuts, without passing through several intermediate phases. After all, China is still a developing country right now, no matter how rapidly it is expected to grow in the future. Taking the commitment period of five years as the Kyoto Protocol has adopted, I envision that China needs the following three transitional periods of increasing climate obligations, before taking on absolute emissions caps.

First, further credible energy-conservation commitments starting 2013

China has already committed itself to quantified targets on energy conservation and the use of clean energy. It needs to extend its level of ambition, further making credible quantified domestic commitments in these areas for the second commitment period. Such commitments would include but are not limited to continuing to set energy-saving and pollutant control goals in the subsequent national five-year economic blueprints as challenging as the current 11th five-year blueprint does, increasing investment in energy conservation and improving energy efficiency, significantly scaling up the use of renewable energies and other low-carbon technologies, in particular wind power and nuclear power, and doubling or even quadrupling the current unit capacity below which thousands of small, inefficient coal-fired plants need to be decommissioned (Zhang, 2009c).

Second, voluntary "no lose" emissions targets starting 2018

During this transition period, China could commit to adopting voluntary emission reduction targets. Emissions reductions achieved beyond these “no lose” targets would then be eligible for sale through carbon trading at the same world market price as those of developed countries whose emissions are capped, relative to the lower prices that China currently receives for carbon credits generated from clean development mechanism projects, meaning that China would suffer no net economic loss by adhering to the targets.

Third, binding carbon intensity targets starting 2023, leading to emissions caps around 2030

While China is expected to adopt the carbon intensity target as a domestic commitment in 2011, China adopting binding carbon intensity targets in 2023 as its international commitment would be a significant step towards committing to absolute emissions caps during the subsequent commitment period. At that juncture, having been granted three transition periods, China could then be expected to take on binding emissions caps, starting around 2030 and to aim for the global convergence of per capita emissions by 2050.

4.2 A clear need within a climate regime to define comparable efforts towards climate mitigation and adaptation

While indicating, well in advance, that it will take on absolute emissions caps around the year 2030, being targeted by such border carbon adjustment measures, China should make the best use of the forums provided under the UNFCCC and its KP to effectively deal with the proposed measures to its advantage (Zhang, 2009b). However, China and other leading developing countries appear to be comfortable with WTO rules and institutions defending their interests in any dispute that may arise over unilateral trade measures. Top Chinese official in charge of climate issue and the Brazilian climate ambassador consider the WTO as the proper forum when developing countries are required to purchase emission allowances in the U.S. proposed cap-and-trade regime (Samuelsohn, 2007). This is reinforced in the Political Declaration of the Leaders of Brazil, China, India, Mexico and South Africa (the so-called G5) in Sapporo, Japan, July

8, 2008 that “in the negotiations under the Bali Road Map, we urge the international community to focus on the core climate change issues rather than inappropriate issues like competitiveness and trade protection measures which are being dealt with in other forums”. China may fear that the discussion on these no core issues will overshadow those core issues mandated under the Bali Action Plan (BAP). However, in my view, defining comparable efforts towards climate mitigation and adaptation within a climate regime is critical to addressing carbon tariffs of far-reaching implications.

The BAP calls for “comparability of efforts” towards climate mitigation actions only among industrialized countries. However, lack of the clearly defined notion on what is comparable has led to diverse interpretations of the concept of comparability. Moreover, there is no equivalent language in the BAP to ensure that developing country actions, whatever might be agreed at Copenhagen, that must also be comparable to those of developed countries. So, some industrialized countries, if not all, have extended the scope of its application beyond industrialized countries themselves, and are considering the term “comparable” as the standard by which to assess the efforts made by all their trading partners in order to decide on whether to impose unilateral trade measures to address their own competitiveness concerns. Such lack of the common understanding will lead one country to define whether other countries have made comparative efforts to its own. This can hardly be objective, and in turn leads one country to misuse unilateral trade measures against other trading partners to address its own competitiveness concerns.

This is not hypothetical. Rather, it is very real as the Lieberman-Warner bill in the U.S. Senate and the Waxman-Markey bill in the U.S. House demonstrated. If such measures became law and were implemented, trading partners might choose to challenge U.S. before WTO. If a case like this really happens before a WTO panel, that panel would likely look to the UNFCCC for guidance on an appropriate standard for the comparability of climate efforts to assess whether that country has followed the international standard when determining comparability, as shown in the Shrimp-Turtle dispute where the WTO Appellate Body considered the Rio Declaration on Environment and Development (WTO, 1998). Otherwise, that WTO panel will have no choice but to fall back on the

aforementioned Shrimp-Turtle jurisprudence (see Box 2), and would be influenced by the fear of the political fall out from overturning U.S. unilateral trade measures in its domestic climate legislation.

If the U.S. measures were allowed to stand, not only China would suffer, but that would also undermine the UNFCCC's legitimacy in setting and distributing climate commitments between its parties (Werksman and Houser, 2008). Therefore, as strongly emphasized in my interview in *New York Times* (Reuters, 2009), rather than reliance solely on WTO, there is a clear need within a climate regime to define comparable efforts towards climate mitigation and adaptation to discipline the use of unilateral trade measures at the international level, taking into account differences in their national circumstances, such as current level of development, per capita GDP, current and historical emissions, emission intensity, and per capita emissions. If well defined, that will provide some reference to WTO panels in examining cases related to comparability issues.

Indeed, defining the comparability of climate efforts can be to China's advantage. China has repeatedly emphasized that it has taken many climate mitigation efforts. No country denies that, but at most China has received cheap appreciation of its abatement efforts. Being praised for such efforts, China is urged to do "a lot more" (Doyle, 2009). However, if the comparability of climate efforts is defined, then many abatement efforts that China have been taking can be converted into the corresponding equivalent carbon allowance prices under the European Union and U.S. proposed emissions trading schemes. If such an equivalent is higher than prevailing U.S. allowance price, there is no rationale for the U.S. to impose carbon tariffs on Chinese products. If it is lower, then the level of carbon tariffs is only a differential between such an equivalent and prevailing U.S. allowance price.

Take export tariffs that China applied on its own as a case in point. During 2006-08, the Chinese government levied, on its own, export taxes on a variety of energy and resource intensive products to discourage exports of those products that rely heavily on energy and

resources and to save scarce energy and resources (Zhang, 2008). Given the fact that China is a price setter in world aluminum, cement, iron and steel markets, its export policies have a significant effect on world prices and thus on EU competitiveness (Dröge et al., 2009). From the point of view of leveling the carbon cost playing field, such export taxes increase the price at which energy-intensive products made in China, such as steel and aluminum, are traded in world markets. For the EU and U.S. producers, such export taxes imposed by their major trading partner on these products take out at least part, if not all, of the competitive pressure that is at the heart of the carbon leakage debates. Being converted into the implicit carbon costs, the average export tariffs of 10-15% applied in China on its own during 2006-08 are estimated to be equivalent to a EU allowance price of 30-43 €/tCO_2 for steel and of 18-26 €/tCO_2 for aluminium (Wang and Voituriez, 2009). The estimated levels of CO_2 price embedded in Chinese export taxes on steel and aluminium are very much in the same range as the average price of the EU allowances over the same period. Moreover, carbon tariffs impact disproportionally on energy-intensive manufacturing. Manufacturing contributes to 33% of China's GDP relative to the corresponding 16% for India, and China's GDP is 3.5-4.0 times that of India. This suggests that, in volume terms, energy-intensive manufacturing in China values 7-8 times that of India. Clearly, carbon tariffs impact much more on China than on India. This raises the issue of whether China should hold the same stance on this issue as India as it does now, although the two largest developing countries in international climate change negotiations have taken and should continue to hold to a common position on developed country obligations on ambitious emissions reductions, adequate technology transfer and financing.

5. Concluding remarks

With countries from around the world set to meet in Copenhagen in December 2009 to try to hammer out a post-2012 climate change agreement, no one would disagree that a U.S. commitment to cut greenhouse gas emissions is essential to such a global pact. However, despite U.S. president Obama's recent announcement that he will push for a

commitment to cut U.S. greenhouse gas emissions by 17% by 2020, in reality it is questionable whether U.S. Congress will agree to specific emissions cuts, although are not ambitious at all from the perspectives of both the EU and developing countries, without imposing carbon tariffs on Chinese products to the U.S. market, even given China's own recent announcement that it will voluntarily seek to reduce its carbon intensity by 40-45% over the same period.

This dilemma is partly attributed to flaws in current international climate negotiations, which have been focused on commitments on the two targeted dates: 2020 and 2050. However, with the commitment period only up to 2020, there is a very little room left, say for the U.S. and China, although for reasons very different from each other. Meanwhile, taking on something for 2050 seems too far away for politicians. In my view, if the commitment period is extended to 2030, it would really open the possibility for the U.S. and China to make the commitments that each wants from the other side in the same form, although the scale of reductions differs from each other. By 2030, the U.S. will be able to commit to much deeper emission cuts as China and developing countries have demanded, while, as argued in this paper, China would have approached the threshold to take on the absolute emission cap that the U.S. and other industrialized countries have long asked for. Being aware of his proposed provisional target in 2020 well below what is internationally expected from the U.S., president Obama announced a provisional target of a 42% reduction below 2005 in 2030 to demonstrate the U.S. continuing commitments and leadership to find a global solution to the threat of climate change. While the U.S. proposed level of emission reductions for 2030 is still not ambitious enough, president Obama inadvertently points out the right direction of international climate negotiations. They need to look at the targeted date of 2030. If international negotiations could lead to much deeper emission cuts for developed countries as well as the absolute emission caps for major developing countries in 2030, that would significantly reduce the legitimacy of the U.S. proposed carbon tariffs and, if implemented, their prospect for withstanding a challenge before WTO.

However, if the international climate change negotiations continue their current course, the inclusion of border carbon adjustment measures then seems essential to secure passage of any U.S. legislation capping its greenhouse gas emissions. Moreover, the joint WTO-UNEP report indicates that border carbon adjustment measures might be allowed under the existing WTO rules, depending on how such measures are designed and the specific conditions for implementing them (WTO and UNEP, 2009). Thus, on the U.S. side, in designing such trade measures, WTO rules need to be carefully scrutinised, and efforts need to be made early on to ensure that the proposed measures comply with them. After all, a conflict between the trade and climate regimes, if it breaks out, helps neither trade nor the global climate. The U.S. needs to explore with its trading partners cooperative sectoral approaches to advancing low-carbon technologies and/or concerted mitigation efforts in a given sector at an international level. Moreover, to increase the prospects for a successful WTO defence of the Waxman-Markey type of border adjustment provision, 1) there should be a period of good faith efforts to reach agreements among the countries concerned before imposing such trade measures; 2) WTO consistency also requires considering alternatives to trade provisions that could be reasonably expected to fulfill the same function but are not inconsistent or less inconsistent with the relevant WTO provisions; and 3) trade provisions can refer to the designated special international reserve allowance pool, but should allow importers to submit equivalent emission reduction units that are recognized by international treaties to cover the carbon contents of imported products.

Being targeted by such border carbon adjustment measures, China needs to creditably indicate a serious commitment to address climate change issues to challenge the legitimacy of the U.S. imposing the carbon tariffs. Being seen with greater capacity, capability and responsibility, China is facing great pressure both inside and outside international climate negotiations to exhibit greater ambition. As long as China does not signal well ahead the time when it will take on the emissions caps, it will always face the threats of trade measures. In responses to these concerns and to put China in a positive position, the paper proposes that at Copenhagen and beyond China should negotiate a requirement that greenhouse gas emissions in industrialized countries be cut at least by

80% by 2050 relative to their 1990 levels and that per capita emissions for all countries by 2050 should be no more than the world's average at that time. Moreover, it would be in China's own best interest if, at a right time (e.g., at a time when the U.S. Senate is going to debate and ratify any global deal that would emerge from Copenhagen or later), China signals well ahead that it will take on binding absolute emission caps around the year 2030.

However, it is hard to imagine how China could apply the brakes so sharply as to switch from rapid emissions growth to immediate emissions cuts, without passing through several intermediate phases. Taking the commitment period of five years as the Kyoto Protocol has adopted, the paper envisions that China needs the following three transitional periods of increasing climate obligations before taking on absolute emissions caps starting 2028 that will lead to the global convergence of per capita emissions by 2050: *First, further credible energy-conservation commitments starting 2013; Second, voluntary "no lose" emission targets starting 2018*; and *third, binding carbon intensity targets as its international commitment starting 2023.* Overall, this proposal is a balanced reflection of respecting China's rights to grow and recognizing China's growing responsibility for increasing greenhouse gas emissions as the living of standards increases over time.

Meanwhile, China should make the best use of the forums provided under the UNFCCC and its KP to effectively deal with the proposed measures. The paper argues that there is a clear need within a climate regime to define comparable efforts towards climate mitigation and adaptation to discipline the use of unilateral trade measures at the international level. As exemplified by export tariffs that China applied on its own during 2006-08, the paper shows that defining the comparability of climate efforts can be to China's advantage. Furthermore, carbon tariffs impact disproportionally on energy-intensive manufacturing. Given the fact that, in volume terms, energy-intensive manufacturing in China values 7-8 times that of India, carbon tariffs clearly impact much more on China than on India. This raises the issue of whether China should hold the same stance on this issue as India as it does now.

Finally, it should be emphasized that the Waxman-Markey type of border adjustment provision holds out more sticks than carrots to developing countries. If the U.S. and other industrialized countries really want to persuade developing countries to do more to combat climate change, they should first reflect why developing countries are unwilling to and cannot afford to go beyond the aforementioned third option in the first place. That will require industrialized countries to seriously consider developing countries' legitimate demand that industrialized countries need to demonstrate that they have taken the lead in reducing their own greenhouse gas emissions, provide significant funding to support developing country's climate change mitigation and adaptation efforts and to transfer low- or zero-carbon emission technologies at an affordable price to developing countries. Industrialized countries need to provide positive incentives to encourage developing countries to do more. Carrots should serve as the main means. Sticks can be incorporated, but only if they are credible and realistic and serve as a useful supplement to push developing countries to take actions or adopt policies and measures earlier than would otherwise have been the case. At a time when the world community is negotiating a post-2012 climate regime, unrealistic border adjustment measures as exemplified in the Waxman-Markey bill are counterproductive to help to reach such an agreement on comparable climate actions in the post-2012 climate negotiations.

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Crisis, Cooperation and Development, Shanghai, May 11-12, 2009; the invited presentation on Climate Change Meets Trade in Promoting Green Growth: Potential Conflicts and Synergies at the East-West Center/Korea Development Institute Conference on Climate Change and Green Growth: Korea's National Growth Strategy, Honolulu, Hawaii, July 23-24, 2009; the invited presentation on NAMAs, Unilateral Actions, Registry, Carbon Credits, MRV and Long-term Low-carbon Strategy at International Workshop on Envisaging a New Climate Change Agreement in Copenhagen, Seoul, November 13, 2009; and the invited panel discussion on Green Growth, Climate Change and WTO at the Korea International Trade Association/Peterson Institute for International Economics International Conference on the New Global Trading System in the Post-Crisis Era, Seoul, December 7, 2009. It has benefited from useful discussions with the participants in these meetings. That said, the views expressed here are those of the author. The author bears sole responsibility for any errors and omissions that may remain.

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