

Special Issue: Revisiting WTO's Role in Global Governance

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THE ROLE OF WTO IN SUSTAINABLE DEVELOPMENT GOVERNANCE, REVISITED

SOO-HYUN LEE*

International legal mechanisms in trade dispute resolution, such as the instruments of the WTO, must now, more than ever, take into consideration a wider range of interests that may very well complicate procedural aspects of the rule of law in trade disputes. Institutions such as these must continue to adapt as new conditions and variables present themselves, responding to cross-disciplinary iterations of justice such as environmental or socioeconomic justice between state and non-state actors. To that end, revisiting the role of the WTO requires a re-examination of its governance role in sustainable development as it relates to international trade. More jurisprudential encounters between international trade policy and climate change policy would bring these two estranged fields into a more predictable and meaningful union. This paper provides a legal basis and economic rationale for the calculation of a dumping margin that accounts for high-emissions production methods, which provide a summative discount to cost with government support, herein labelled the “tCO₂e/t-s Adjusted Dumping Margin”. This paper identifies anti-dumping measures with the carbon-adjusted dumping margin as an ideal tool for addressing the sustainable development challenges presented by the Chinese iron and steel industry, not only because of the proven macroeconomic and firm-level influences of anti-dumping measures on export-oriented firms that benefit from industrial policy (or a lack domestic regulation), but also because of its firm-level impacts. In terms of the anticipated benefits for the Chinese iron and steel industry, one finds that should the proposed carbon-adjusted dumping margin be applied, the resultant anti-dumping duty imposed on steelmakers using high tCO₂e/t-s blast furnace (BF) to basic oxygen furnace (BOF) steel casting processes will increase the ex-factory price up to the extent that it deviates unfairly from the average price of BF-BOF. This lays the road for more ambitious goals, such as minimum environmental standards of steel production

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set by the importing country imposed by ADMs.

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List of Abbreviations

AD-CVD	Anti-Dumping and Countervailing Duties
ADM	Anti-Dumping Measure
ADA	Anti-Dumping Agreement (i.e., Agreement on Implementation of Article VI of the General Agreement on Tariffs and Trade 1994)
BAU	Business-As-Usual
BF-BOF	Blast Furnace-Basic Oxygen Furnace
Carbon-adjusted DM	tCO ₂ e/t-s Adjusted Dumping Margin (i.e., tonnes of CO ₂ equivalent emissions per tonne of steel output adjusted Dumping Margin)
CNY	China Renminbi
COP21	21 st Conference of the Parties (2015)
CSIS	Chinese Iron and Steel Industry
CVD	Countervailing Duties
DCR	Domestic Content Requirement
DM	Dumping Margin
DSB	(World Trade Organization) Dispute Settlement Body
EAF	Electric-Arc Furnace
FYP	Five-Year Plan (China)
GATT	General Agreement on Tariffs and Trade
GHG	Greenhouse Gas
GSP	Generalized System of Preferences
INDC	Intentional Nationally Determined Contribution
KgCe/t-coke	Kilograms of Coal equivalent per tonne of coke produced

KgCO ₂ /t-s	Kilograms of CO ₂ emissions per tonne of crude steel cast
LTFV	Less Than Fair Value
MEA	Multilateral Environmental Agreement
MES	Market Economy Status
MFN	Most Favoured Nation
MMT	Million Metric Tonnes
MtCe	Metric Tonnes Coal equivalent
NME	Non-Market Economy
OECD	Organisation for Economic Co-operation and Development
SD	Sustainable Development
SDT	Special and Differential Treatment
SETC	State Economic and Trade Commission (China)
SOE	State-Owned Enterprise
TBT	Technical Barrier to Trade
TFP	Total Factor Productivity
TRIMs	Trade-Related Investment Measures
UNFCCC	United Nations Framework Convention on Climate Change
USD	US Dollar
WTO	World Trade Organization

I. INTRODUCTION: WHEN REGULATORY SYSTEMS FALL BEHIND

This paper examines the Chinese iron and steel industry (CISI) as representative of China's intricate public policy approaches to global challenges, such as climate change mitigation and global sustainable development. As a matter of methodology, this paper provides an analysis to propose an alternative approach to climate change policy that is unique in that its suggested impacts start from the international, namely with anti-dumping measures (ADMs), and concaves into the domestic sphere. This alternative approach is significant in its expediency as national climate change policy attempts to mitigate climate change by the CISI have, as is shown later in this paper, been frustrated by a combination of lacking commitment, contradicting plans by provincial governments aiming at regional development, and institutional limitations in the current practice of ADMs. Further, this approach also bears significance to international economic law as an institution, since more jurisprudential encounters between international trade policy and climate change policy would bring these two largely estranged fields into a more predictable and meaningful union. This paper provides a legal basis and economic rationale for the calculation of a dumping margin that accounts for high-emission production methods which provide a summative discount to cost with government support, herein labelled the "tCO₂e/t-s Adjusted Dumping

Margin”(Carbon-adjusted DM).¹

This paper identifies ADM with the carbon-adjusted dumping margin as an ideal tool for addressing the sustainable development challenges presented by the CISI, not only because of the proven macroeconomic and firm-level influences of ADMs on export-oriented firms that benefited from industrial policy, but also because ADMs apply external pressure to CISI firms. China became a World Trade Organization (WTO) Member State in 2001 after years of expansion of the CISI. Threatened economies turned to the WTO to begin Anti-Dumping (AD) investigations, claiming that Chinese steel products were being sold at prices less than the fair value (LTFV) or, in other words, were being dumped. Investigations in anti-dumping and countervailing duties (CVDs)² began and soon turned into trade disputes administered by the WTO Dispute Settlement Body (DSB).

The ADM with the Carbon-adjusted DM is an ideal tool for addressing the sustainable development challenges of the CISI. This model has a proven macroeconomic and firm-level influence on export-oriented firms that benefited from industrial policy, and apply external pressure to CISI firms, thereby bypassing structural obstacles. Furthermore, China’s disputed market economy status makes it difficult to calculate the “normal value”, which is not only an essential step in calculating the dumping margin, but also allows for modifications such as the one proposed by this paper. China, in its WTO Accession Document, claimed that its Non-market Economy (NME) status would last until December 2016, when the country would receive “Market Economy Status (MES).”³ If China’s MES is recognized, it will become more difficult to justify the use of alternative means to

¹To be read as the “tonnes of CO₂ equivalent emissions per tonne of steel output adjusted dumping margin.”

²Investigations in countervailing duties are conducted when a subsidy being provided domestically in one industry between two trading countries is deemed a trade distortion, thereby allowing the country that initiated the investigation to apply a subsidy in their domestic market to level competition. For the purposes of this report, ADMs and CVDs are addressed as a single regime of international economic law and thus identified as one.

³The NME status of China, when it became a signatory to the WTO, made it a frequent target of anti-dumping investigations. The lack of market economy status was largely due to many countries viewing Chinese industrial policy as being contrary to Article 9(1) of its Accession Document to the WTO. This stated that “*China shall [...] allow prices for traded goods and services in every sector to be determined by market forces, and multi-tier pricing practices for such goods and services shall be eliminated.*” According to WTO law, nonmarket economy status means that rather than using the domestic value as the normal value, anti-dumping investigations employ the value of similar products in a proxy (surrogate) country to determine whether the product in question is being sold at LTFV and thus being dumped, or construct a normal value using alternative means.

measure price comparability of CISI steel, thereby restricting the flexibility needed to account for externalities such as high-emissions production. Between 2016 and 2017, the EU, the United States, Canada, several countries in Africa and the CIS, Mongolia, Turkey, India and Japan chose not to recognize the MES of China on the basis of paragraph 15(a)(i) and (iii) of China's Accession Protocol, which states that it must be clear that "market economy conditions prevail" in "manufacture, production and sale". As such, those Member-States that reject China's MES have chosen to continue to employ a "methodology that is not based on a strict comparison with domestic prices or costs in China".⁴ This allows for flexible approaches for the calculation of the DM. Beijing responded by lambasting what it perceived to be a double standard⁵ and that recalcitrant States were in violation of international obligations as Member-States of the WTO.⁶

II. ANTI-DUMPING MEASURES: USAGES AND IMPACTS

ADMs originate from voluntary export restraint agreements (VERs), which were a form of trade protectionism in the General Agreement on Tariffs and Trade (GATT) that addressed both issues related and unrelated to trade. Eventually, ADMs replaced VERs with a focus on maintaining a level playing field in international trade: protecting domestic industries in Member States from "material injury" caused by foreign firms pricing their exports at LTFV. However, the idea of anti-dumping can be traced back to the earliest expansions of international trade in the early 1900s. At the time, they were in the form of national laws to protect domestic producers from foreign producers by rebalancing comparative advantages.⁷

The WTO became more involved in this process from the Tokyo Round (1973-1979), which began efforts to standardize the rules surrounding subsidies, CVD and AD (Articles VI, XVI and XXIII, General Agreement on Tariffs and Trade, 1947 (GATT 1947). Article VI ("Anti-dumping and Countervailing Duties"), for instance, stated that dumping occurred when an import "*threatens material injury to an*

⁴Appellate Body Report, *European Communities - Definitive Anti-Dumping Measures on Certain Iron or Steel Fasteners from China*, ¶286, WTO Doc. WT/DS397/AB/R (adopted Jul. 28, 2011).

⁵*China Sees Scant Progress in Battle for Market Economy Status*, SOUTH CHINA MORNING POST (Dec. 11, 2016), <http://www.scmp.com/news/china/policies-politics/article/2053670/china-sees-scant-progress-battle-market-economy-status> (last visited: Apr. 27, 2018).

⁶Zhong Nan & Fu Jing, *EU 'has Obligation' to Recognize MES*, CHINA DAILY ASIA (May 14, 2016), http://www.chinadailyasia.com/nation/2016-05/14/content_15432790.html. (last visited Apr. 27, 2018).

⁷Bruce A. Blonigen & Thomas J. Prusa, *Dumping and Antidumping Duties*, in 1B HANDBOOK OF COMMERCIAL POLICY 107 (Kyle W. Bagwell et al. eds., 2016).

established industry in the territory of a contracting party or materially retards the establishment of a domestic industry.” From Article VI(1), the GATT, 1947 explains that a countervailing duty may be levied to “*offset any bounty or subsidy bestowed, directly, or indirectly, upon the manufacture, production or export of any merchandise*” in Article VI(3). From the Uruguay Round (1986-1994) arose the Anti-Dumping Agreement (ADA), which more clearly specified the “*determination of injury*”. Article III(1) of this Agreement states that the “*determination of injury for purposes of Article VI of GATT 1994 shall be based on positive evidence and involve an objective examination*” of volume of the dumped import as well as the “*consequent impact of these imports on domestic producers of such products.*”

To determine the extent of the material injury caused by the dumped product, the AD investigation would either focus on the price or the cost. The constructed-value method, for instance, would render an export price that was lower than local domestic production cost as dumping.⁸ Should a product be suspected of being dumped, then an investigation is carried out to establish the dumping margin and determination of injury. These factors are then used to calculate an AD duty, which would seek to increase the price of the export to or above the fair value.

While ADMs involve the pricing decisions of a firm, governments are often involved through the use of industrial policy and subsidies that give their domestic products an unfair advantage in foreign markets. If the importing country identifies dumping taking place, they may choose to apply a countervailing duty to neutralize exogenous comparative advantages granted to the subsidy-receiving export.

In terms of non-economic impacts, the incidence of AD investigations has had the influence of pushing countries into legislating AD laws. This was the case for South Korea, where five years before it passed its AD law in 1985, the country was under 40 investigations. Prusa and Skeath (2002) have shown that once new users of AD begin to implement these laws in order to protect themselves from AD investigations, they have “*long-run costs in the form of ongoing retaliation*” that occurs between the two contesting parties.⁹ Indeed, the traditional users of AD were some of the first to implement such laws. Regarding the retaliatory nature of AD, Prusa and Skeath, in their review of AD filings between 1980 and 1998, further concluded that motivations to implement ADMs were based on more than solely

⁸Nicola Theron, *Anti-Dumping Procedures: Lessons for Developing Countries with Special Emphasis on the South African Experience*, in ANTI-DUMPING: GLOBAL ABUSE OF A TRADE POLICY INSTRUMENT 67, 72-74 (Bibek Debroy et al. eds., 2007).

⁹Thomas J. Prusa & Susan Skeath, *The Economic and Strategic Motives for Antidumping Filings*, 138 WELTWIRTSCHAFTLICHES ARCHIV 389, 405 (2002).

economic concerns.¹⁰Traditional users, namely the EU and US, were “*influenced by political pressure, national security interests, and historical economic relationship*,” which would then raise “strategic considerations” for new users of ADMs.¹¹ As the users of ADMs diversified and China ascended to the top, in terms of the number of initiations, the landscape of ADs itself has begun to change.

Overall, the macroeconomic impacts of ADMs are similar to erecting barriers to trade, which include reducing both the number of domestic exporting firms and amount of imports of the contested good(s). Prusa and Knetter (2003) showed that historical trends show that for the most common users of ADMs, there is a positive relationship between the use of ADMs and the appreciation of currency, and an inverse relationship between fall in real GDP and increase in ADM usage.¹² They identified these trends based on standard deviations of AD filings from Australia, Canada, the EU and the United States.¹³While it is beyond the scope of this paper to try and review all the economic impacts of ADMs,¹⁴they can be summarized as either trade depression (also known as trade dampening) or trade diversion (also known as trade deflection).

¹⁰*Id.* at 408-409.

¹¹*Id.* at 410.

¹²Thomas J. Prusa & Michael M. Knetter, *Macroeconomic Factors and Antidumping Filings: Evidence from Four Countries*, 61J. INT’L ECON. 1, 2-3 (2003).

¹³*Id.*

¹⁴This topic has received extensive attention from a variety of perspectives, such as Bown and Crowley (2006) on Japanese exports to the EU after US AD initiations, Durling and Prusa (2006) on the hot-rolled steel market, Konings and Vandenbussche (2005) on pricing by domestic firms after trade diversion resulting from AD initiations, Pierce (2011) on US firm-level response to AD filings, Vandenbussche and Zanardi (2010) on the so-called “chilling effect” of AD, and Moraga-Gonzalez and Viaene (2015) on quality reversals resulting from strategic competition or game theory.

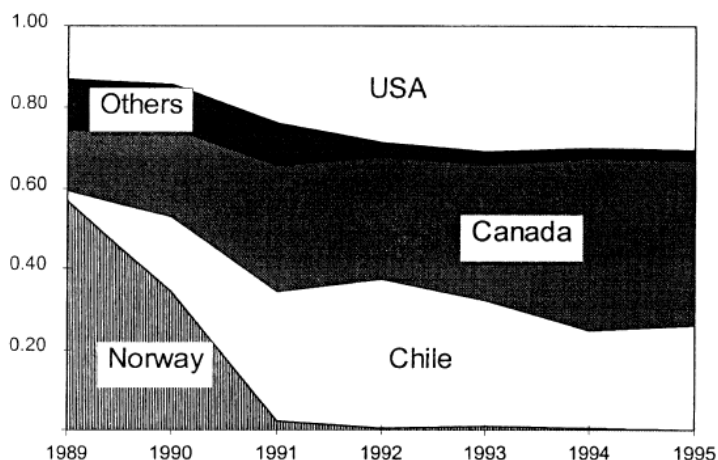


Figure 1. "Quantity shares for fresh farmed salmon at the US market", *Source: Asche (2001), p. 353*

Asche (2001) examined the trade diversionary impacts of ADMs econometrically by taking into consideration salmon prices in three different markets: the EU, Japan, and North America. Salmon was selected as the variable since they were seen to share the same long-run relationship and stochastic trend in relation to external shocks.¹⁵ Within this setting, a US duty levied on salmon imported from Norway as part of an ADM resulted in substitution through Chile and Canada. The above mentioned graphic (Figure 1) is reproduced from Asche, representing market shares for salmon in the United States. With the Y-axis representing per cent of market control and the X-axis the observation years, the effects of an ADM on a good with cross elastic demand resulted in a logarithmic decrease in the amount supplied by the recipient country, Norway, within two years after the ADM was implemented. Considering this pronounced impact of ADMs, one can presume that, *ceteris paribus*, trade depression also takes place: an inverse relationship between the increase of AD initiations and the decrease in trade of the contested product. Examples of both trade diversion and depression are quite abundant: South Korea's Donghwa Enterprise enjoyed increased shares in the particle board market in Southeast Asia after AD tariffs were lifted in 2012.¹⁶ Conversely, Taiwanese solar panels that have been enjoying a profitable comparative advantage encountered deep declines in their market shares after US employed ADMs. In response,

¹⁵Frank Asche, *Testing the Effect of an Anti-dumping Duty: the US Salmon Market*, 26 *EMPIRICAL ECONOMICS* 343, 353 (2001).

¹⁶Park Jin-Hai, *Donghwa Enterprise Hits Record Quarterly Performance*, *THE KOREA TIMES* (Nov. 19, 2015), https://www.koreatimes.co.kr/www/news/biz/2015/11/123_191410.html. (last visited Apr. 27, 2018).

Taiwanese PV panels found other markets to compensate for this loss.¹⁷

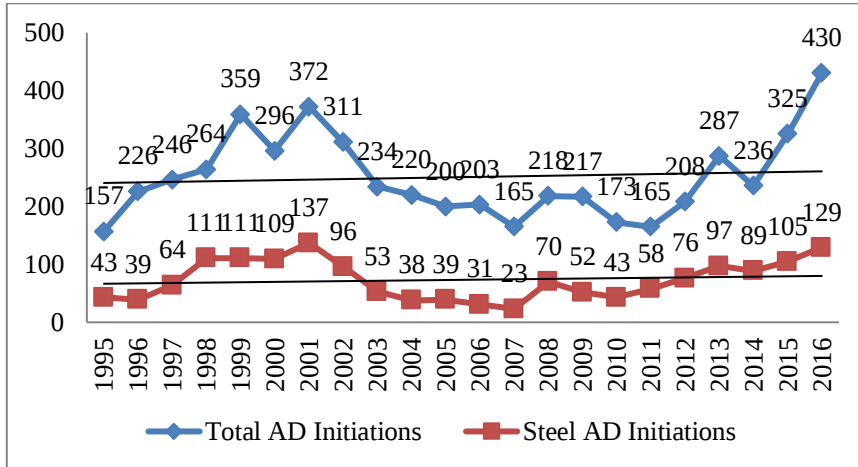


Figure 2. Total AD Initiations and Steel AD Initiations, 1995-2016, *Source: WTO Statistics on anti-dumping*

As shown in Figure 2, WTO statistics show that the number of AD investigation initiations decreased on average from 1995 to 2014 and the fluctuations remain largely stochastic between total and steel AD initiations with a similar recovery in use from 2011 to 2013. These fluctuations are also apparent in AD initiations in steel, though this may be due to the fact that the AD filing of “steel” is a widely defined macro-aggregate. Such issues are regularly taken up at the WTO Negotiating Group, addressing issues such as lacking transparency and review processes for national trade policies.¹⁸ Yet when viewing the data alone, it is undeniable that steel has always been a sector highly populated with AD investigations compared to other categories, as shown in Figure 2 above.

III. ECONOMIC CHALLENGES POSED BY CISI PRODUCTION OVERCAPACITY

Government intervention in designing and planning the steel industry is a long-established practice. This originated in the developmentalist belief that state

¹⁷Laully Li, *Production Decline in Manufacturing Sector Continues*, TAIPEI TIMES (Nov. 20, 2015), <http://www.taipeitimes.com/News/front/archives/2015/11/20/2003632893>. (last visited Apr. 27, 2018)

¹⁸Alex Lawson, *Japan wants Curtain Pulled Back from Anti-Dumping Probes*, LAW360 (Oct. 22, 2015), <http://www.law360.com/articles/717521/japan-wants-curtain-pulled-back-from-anti-dumping-probes> (last visited Apr. 27, 2018).

intervention to achieve economies of scale can lead to macroeconomic take-off.¹⁹ As developing economies expand and attempt to graduate from the supply side of commodity markets, they target major industries such as steel, telecommunications, and petrochemicals because the products can be bought and sold by the government for domestic infrastructure development. Private enterprises, especially if incentivized by the government through financial or institutional assistance, will thus, enjoy greater business confidence when investing in new facilities. In this fashion, these industries continue to expand through government backing. This has been a common trend in the industrialization periods of now high-income Asian economies such as Japan, Singapore, and South Korea and spread to developing economies such as Vietnam through the Doi Moi reforms, which is further explored by Reiffenstein and Nguyen (2011).²⁰

The OECD, in 2015, released a detailed report in their *Science, Technology, and Industry Policy Papers* series (#18), which examined the consequences of this trend of expanding already excess capacity. Greenfield investments in steel capacity continue to rise despite slowing marginal demand growth, largely based on the decisions of not only private companies but also government industrial policy. 71.5% of world capacity will be in non-OECD economies by 2017, a considerable portion of which employ interventionist industrial planning to stimulate growth in these industries.²¹ These predictions remained true to the end of 2016, though with an additional 54.5 mmt in planned capacity additions given announced investments between 2017 and 2019, of which the Middle East region accounts for 30 mmt.²² The OECD anticipated that most of the planned expansions in capacity will be between state-owned enterprises, with large-scale projects already confirmed in the Middle East through the Gulf Cooperation Council, whose members seek to reduce their dependencies on imported steel. India is also looking to do the same. According to calculations by the Ministry of Steel in 2013, in order to satisfy Indian steel demand by 2025-26, 12 trillion rupees of investment in new capacities would be necessary, increasing the country's capacity to 300 million tonnes²³.

¹⁹ See, for instance, THE DEVELOPMENTAL STATE (Meredith Woo-Cumings ed., 1999).

²⁰ Tim Reiffenstein & Ha Thanh Nguyen, *The International Developmental State: the Japanese Intellectual Property System in Vietnam*, 42(4) GEOFORUM 462 (July 2011).

²¹ Anthony de Carvalho et al., *Excess Capacity in the Global Steel Industry and the Implications of New Investment Projects*, 18 OECD SCIENCE, TECHNOLOGY AND INDUSTRY POLICY PAPERS 7-8 (2015).

²² Hokuto Otsuka, *Capacity Developments in the World Steel Industry*, OECD DIRECTORATE FOR SCIENCE TECHNOLOGY AND INNOVATION STEEL COMMITTEE, DTSI/SC(2017)2/FINAL, 8, 13 (August 2017).

²³ MECON, *Draft Infrastructure Study Report for 300MT Steel by 2025*, MINISTRY OF STEEL, GOVERNMENT OF INDIA (July, 2014),

In terms of process, therefore, the CISI is not so extraordinary at all. Yet in terms of scale, the CISI poses considerable economic challenges, both inside and outside China. Considering that China alone controls 49.4% of the global steel market shares,²⁴ amounting to 822.7 million tonnes.²⁵ In terms of world steel exports, CISI maintains a comfortable lead at 35% of exports in 2015 and 34.2% in 2016.²⁶ This dominance has resulted in ubiquitous macroeconomic impacts. Indian steel firm Tata Steel ended operations in the UK in 2016 due to the high costs of operation which were unable to compete with lower priced imports from China. These closures are projected to put 15,000 workers in Ireland out of a job.²⁷ The Arcelor Mittal steel plants at Point Lisas, Trinidad and Tobago, are cutting jobs by the hundreds for the same reason.²⁸ 1,100 workers were laid off by US Steel's Fairfield Works Mill.²⁹ Empty factories put up for sale have become a more common sight in the steel capital of South Korea, Pohang, as small- and medium-sized steel firms end operations and steel giants like POSCO and Hyundai Steel undergo structural adjustments.³⁰

http://steel.gov.in/sites/default/files/MECON_Complete%20Infra%20Report%20for%20300MT%20Steel%20by%202015_7Jul15.pdf (last visited Apr. 27, 2018).

²⁴World Steel in Figures 2015, WORLD STEEL ASSOCIATION 7-8 (2015).

²⁵Lax reporting requirements in China allow steelmakers, particularly smaller scale ones, to submit inaccurate records. Bo (2015), for instance, calculated a 4.7 percent adjustment (36.32 megatonnes) in the official figures of steel production from 2013 to 2014. That margin itself is greater than the annual steel production of Turkey, which is the seventh largest producer in the world. Bo Zhiyue, *Should the World be Worried About China's Economy?*, THE DIPLOMAT (Sep. 7, 2015), <https://thediplomat.com/2015/09/should-the-world-be-worried-about-chinas-economy/> (last visited Apr. 27, 2018).

²⁶Fabien Mercier et al., *Steel Market Developments Q4 2017*, OECD 17 (2017), <https://www.oecd.org/sti/ind/steel-market-developments-Q42017.pdf> (last visited Apr. 27, 2018).

²⁷Steve Hawkes, *Indian Steel Giant Tata set to Sell its UK Operations and could leave 15,000 Brits Jobless*, THE SUN (Mar. 29, 2016), <https://www.thesun.co.uk/archives/politics/1105761/indian-steel-giant-tata-set-to-sell-its-uk-operations-and-could-leave-15000-brits-jobless/> (last visited Apr. 27, 2018).

²⁸Kevon Felmie, *China Steel Takes Toll on Arcelor Mittal*, TRINIDAD & TOBAGO GUARDIAN ONLINE (Dec. 9, 2015), <http://www.guardian.co.tt/business/2015-12-09/china-steel-takes-toll-arcelormittal> (last visited Apr. 27, 2018).

²⁹John W. Mille & Chelsey Dulaney, *US Steel to Close Alabama Blast Furnace, Cut 1,100 Jobs*, THE WALL STREET JOURNAL (Aug. 17, 2015), <http://www.wsj.com/articles/u-s-steel-to-close-some-alabama-steel-ops-cut-1-100-jobs-1439825105> (last visited Apr. 27, 2018).

³⁰Ha Tae Min & Kim Jung Hye, *Bulhwang-e Nog Seun Cheolgang-Gyeong-Gi... 'Gujjojeong Hampa Tto Deopchina' Susim Gadeng* [The Rusting Steel Market during Recession, "The Onset of Structural Adjustment" in Full Depth], THE KOREA TIMES (Jan. 13, 2016, 2:09 PM), <http://www.hankookilbo.com/v/abd0fb89641a4b288c07db27473bbbfd> (last visited Apr. 27, 2018) [Hereinafter Min].

These examples illustrate that the widening gap between the demand for steel and its production in the CISI presents challenges to other countries as entire industries undergo drastic measures to remain price competitive against the price of CISI products. This means that unless all domestic steel exporters selling at market price received a subsidy to countervail the dumped Chinese steel, which has also been a source of dispute, they will be forced to cut costs by reducing labour force and minimizing welfare benefits, R&D investment, and corporate social responsibility. As these are rather unwholesome outcomes, economies around the world have instead been embracing trade defence.

When China joined the WTO, it was natural that its state-led industrialization would attract much attention in the way of ADM initiations. For example, the European Commission decided to levy a 25.2% anti-dumping duty on certain steel products from China in 2014 for “*subsidizing the expansion of its stainless-steel industry which is now flooding the global market and displacing trade flows.*” On this topic, the Director General of the European Steel Association, Axel Eggert, lamented that, “*it is not admissible that our efforts be taken away by a surge of unfair imports,*” referring to the “*painful efforts to restructure*” the EU stainless steel industry. These efforts include reducing “*over-capacities to improve its performance and to maintain world benchmark competitiveness*” while reducing the environmental impact of European steel.³¹ The European Steel Association’s concerns are representative of the discouraging trend of firms viewing sustainable development as coupled with sacrificing market competitiveness.

At the policy level, the Chinese government has been seeking out ways to address its overcapacity issue, including the “Guidelines to Resolve Serious Overcapacity” released in 2013, which set reduction targets for overcapacities in several sectors, including steel.³² During the 2015 China International Metal Recycling Conference, President Xi Jinping indicated that the new role of the government would be in making the steel industry more environmentally sustainable by setting up financial penalties for violating industries.³³ The 13th Five-Year Plan (FYP), which started in 2016 is expected to carry on the emphasis placed on environmental protection,

³¹ Press Release, EUROFER, EUROFER Welcomes EU Anti-Dumping Measures Against Imports of Stainless Steel Cold Rolled Flat Products (SSCR) from China and Taiwan, (Mar. 25, 2015), <http://www.eurofer.org/News%26Events/Press%20releases/EUROFER%20welcomes%20EU%20AD%20measure.ftml> (last visited Apr. 27, 2018).

³² Naoki Sekiguchi et al., *Capacity Developments in the World Steel Industry*, DIRECTORATE FOR SCIENCE, TECHNOLOGY AND INNOVATION STEEL COMMITTEE, DSTI/SU/SC(2015)8/FINAL, 21 (April, 2016).

³³ Adam Minter, *China Decides Big Steel is too Big*, BLOOMBERG VIEW (May 15, 2015), <https://www.bloomberg.com/view/articles/2015-05-14/china-decides-big-steel-is-too-big>. (last visited Apr. 27, 2018).

which continues off the 12th FYP.³⁴ Premier Li Keqiang reported in 2017 that annual targets for cutting capacity were surpassed, with 65mmt in reductions for 2016 alone and an additional 50mmt planned for 2017.³⁵ At the start of 2018, the Ministry of Industry and Information Technology (MIIT) announced that plants would be forbidden from increasing capacity³⁶ with continued cuts by 30mmt in ineffective capacity through 2018.³⁷ Yet, as government-dispatched inspection teams identified,³⁸ in addition to continued growth in CISI production,³⁹ one definitive obstacle to these policies have been internal fragmentation as well as more recent developments as Chinese manufacturers building plants abroad,⁴⁰ where they may enjoy lower labour wages as well as immunity from Chinese domestic policy.

This behaviour demonstrates that in addition to its external economic impacts, the CISI has also been raising challenges within China as well. These internal economic challenges are important to note for two reasons. The first is that they provide crucial information for understanding not only the necessity of external

³⁴James McGregor, *The 13th Five-Year Plan: Xi Jinping Reiterates his Vision for China*, APCO WORLDWIDE (Nov. 13, 2015), <http://www.apcoworldwide.com/blog/detail/apcoforum/2015/11/13/the-13th-five-year-plan-xi-jinping-reiterates-his-vision-for-china> (last visited Apr. 27, 2018). (The previous FYP emphasized inclusive growth, improving the quality of life for Chinese citizens, narrowing wide income gaps, and putting checks on deteriorating environmental conditions. The 13th FYP includes such items as oversight mechanisms for environmental conditions, emission permits, banning commercial deforestation, modernization of agriculture, decoupling carbon emissions with economic growth, and concluding China's "growth-at-all-costs" mentality).

³⁵Li Keqiang, *Full Text: Report on the Work of the Government*, XINHUANET (Mar. 16, 2017), http://www.xinhuanet.com/english/china/2017-03/16/c_136134017_3.htm (last visited Apr. 27, 2018).

³⁶Zhou Xin, *China Releases New Steel Capacity Replacement Policy*, (Jan. 8, 2018), XINHUANET, http://www.xinhuanet.com/english/2018-01/08/c_136880462.htm (last visited Apr. 27, 2018).

³⁷Zhou Xin, *China to Cut 30 MlnTonnes of Steel Capacity, 150 MlnTonnes of Coal Capacity in 2018*, XINHUANET (March 5, 2018), http://www.xinhuanet.com/english/2018-03/05/c_137016380.htm (last visited Apr. 27, 2018).

³⁸Huaxia, *Chinese Gov't Sends Steel Capacity Reduction Investigators*, XINHUANET (Nov. 26, 2016), http://www.xinhuanet.com/english/2016-11/26/c_135860648.htm (last visited Apr. 27, 2018).

³⁹World Steel Association, *World Crude Steel Output Increases by 5.3% in 2017*, (January 24, 2018), <https://www.worldsteel.org/media-centre/press-releases/2018/World-crude-steel-output-increases-by-5.3-in-2017.html> (last visited April 9, 2018).

⁴⁰Alvin Ybanez, *More Chinese Manufacturers Buildings Plants Abroad*, YIBADA (Aug. 11, 2015), <http://en.yibada.com/articles/53022/20150811/more-chinese-manufacturers-building-plants-abroad.htm> (last visited Apr. 27, 2018).

mechanisms like ADMs. Yet ADMs, as they are, remain limited as shown by the year-on-year increase in crude steel production since 2001 despite an equally increasing number of AD initiations.⁴¹ The second reason is that the fragmentation of CISI between different provinces within China continues to obstruct progress by the central government in managing the industry.

Understanding these internal challenges becomes clearer when tracing the origins of CISI fragmentation. A brief summary of the CISI's development may begin at the earlier stages of Chinese economic take-off in the latter half of the 20th century. During this period, steel and petrochemicals were, according to Abrami and Zheng (2011), the two "pillar industries," identified as the "*key sources of economic growth – industries that are strategic to competitiveness and therefore equally worth of protection.*"⁴² At least until the mid-1990s, steel and petrochemical firms had access to government support and considerable debt financing options were used to expand. By 1996, China became the largest steel producer in the world, in part propelled by added domestic demand for the steel needed to construct infrastructure during the country's rapid growth phase.

Throughout the 1990s and early 2000s, control over many of these steelmakers moved from the "super ministries" like the State Economic and Trade Commission (SETC) to the local governments.⁴³ Yet as these firms came under local administration, later attempts by the central government to implement interprovincial consolidation of the CISI were obstructed. Employment opportunities led to communities created around and dependent on regional steel production. Between 1997 and 2006, "steel production quadrupled and outstripped demand."⁴⁴

Baosteel, which continues to be a state-owned enterprise (SOE) and the largest steel producer in the country, attempted to acquire or merge with other steel firms in order to consolidate production in an attempt to control output. Such mergers and acquisitions, however, did not always end well for everyone involved. For instance, the merger between Baosteel and Wuhan Iron and Steel Group, the sixth largest producer of steel, was projected to result in the termination of 50,000 employees at Wuhan Steel to partially ease the financial burden of a dwindling

⁴¹*Tekkō-GyōNoGenjōToKadai*("Current Situation and Problems of the Steel Industry"), MINISTRY OF ECONOMY, TRADE AND INDUSTRY OF JAPAN (Apr. 21, 2015), http://www.meti.go.jp/committee/kenkyukai/sansei/kaseguchikara/pdf/010_s03_02_03_01.pdf(last visited Apr. 27, 2018).

⁴²Yu Zheng& Regina Abrami,*The New Face of Chinese Industrial Policy: Making Sense of Anti-Dumping Cases in the Petrochemical and Steel Industries*,11 J. E. ASIAN STUD.373, 374 (Sep. 2011) [Hereinafter Zheng].

⁴³*Id.* at 378-380.

⁴⁴*Id.* at 392.

market.⁴⁵ Thus, recalcitrance to such consolidation efforts is expected: there would be little in way of compensation for the loss in employment and potential tax revenues.

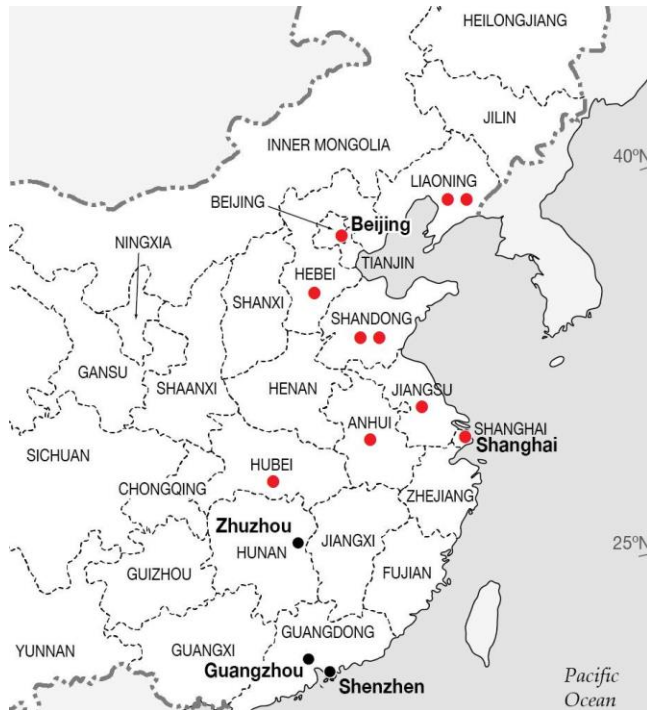


Figure 3. Top 10 Steel Producers, *Source: Author's Illustration on Map from ANU CartoGIS*

As attempts to consolidate the market failed, the central government attempted to restrict trade and investment from 2004 to 2007. Consequently, provincial governments assisted their regional steelmakers to engage in foreign trade directly.⁴⁶ Steelmakers continued expanding through debt financing in response to reduced government backing. Credit and business climate analyses by *Atradius* in 2014 showed that because these provincial governments were unable to provide the financial support needed to keep their regional steel producers afloat, firms turned to commercial banks for lending. This resulted in the accumulation of extensive corporate debt, representing by the end of 2016, 8% of the GDP with a

⁴⁵ Song Yingge, *Steel Shares Halted Pending Merger*, SHANGHAI DAILY (June 28, 2016), <http://www.shanghaidaily.com/business/manufacturing/Steel-shares-halted-pending-merger/shdaily.shtml> (last visited Apr. 27, 2018).

⁴⁶ Zheng, *supra* note 42, at 394.

total liabilities to equity ratio of 162% according to the OECD.⁴⁷ Updated figures in 2017 by Atradius put profit margins of CISI firms at about 2.7% with continued high levels of dependence on bank financing, more recently from shadow banking using overlapping collateral for loans.⁴⁸ In spite of banks increasing underwriting requirements, reducing lending to steelmakers, and global demand for imported steel decreasing year-on-year, production capacities continue to increase disproportionately.⁴⁹ As more firms find themselves with no access to finance, widespread insolvency threatens domestic employment, and a fragmented financial market which can result in shadow banking further threatens the economic stability of the country.

As a result, the expansionary trend in the CISI continued and competition within the industry became more intense with increasing fragmentation, resulting in 35 steelmakers accounting for total production, of which 10 major producers constituted 50% of total output. The ten top producers are shown in

Figure 3, which illustrates the distribution of steel producers throughout economic centres in China.

IV. ASSESSING THE NEED FOR SUSTAINABLE DEVELOPMENT GOVERNANCE THROUGH THE CISI

Another challenge associated with the CISI has been the reduction of costs by environmentally expensive methods of production, both in the use of ecosystem services and high levels of emissions. The rapid expansion in steel production in China from 100 million tonnes in 1996 to 831.7 million tonnes in 2017 was largely in the blast furnace-basic oxygen furnace (BF-BOF) rather than recycled scrap steel, which constitutes only about 11% of China's total production. This is in contrast to steel scrap usage in the EU-28 (53.9% of total production), USA (70.3%), Japan (33.3%), Republic of Korea (45.6%), and Turkey (82.9%).⁵⁰ This trend has been

⁴⁷W. Raphael Lam et al., *Resolving China's Zombies: Tackling Debt and Raising Productivity*, 5 (IMF WORKING PAPER, ASIA AND PACIFIC DEPARTMENT, WP/17/266), (November 2017), <https://www.imf.org/~media/Files/Publications/WP/2017/wp17266.ashx>.

⁴⁸*Market Monitor – Focus on Steel and Metals Performance and Outlook*, ATRADIUS, 5, (Nov. 14, 2017), https://atradius.nl/documents/mm_steel_nov_2017_eng.pdf. (last visited Apr. 27, 2018).

⁴⁹*Market Monitor - Focus on the steel Industry – China*, ATRADIUS (Sep. 1, 2014), https://group.atradius.com/documents/market_monitor_sep_2014_mm091401en.pdf. (last visited Apr. 27, 2018).

⁵⁰*World Steel Recycling in Figures 2010-2014*, BUREAU OF INTERNATIONAL RECYCLING - FERROUS DIVISION 16-24 (May 2015), <http://www.bir.org/assets/Documents/publications/brochures/Ferrous-report-2015-FIN-WEB2.pdf>.

exacerbating over time, with 100% of all increases in CISI production over the past 10 years being in the BF-BOF route.⁵¹

Further, one tonne of CO₂ emissions per tonne of crude steel cast (tCO₂/t-s) through BF-BOF process in China has been higher⁵² than the 1.7 to 1.8 tCO₂/t-s intensity world average,⁵³ with approximately 3.5 tCO₂/t-s in 2000 falling to around 2 tCO₂/t-s by 2012.⁵⁴ However, other estimations accounting for electricity use have put this figure at 2.38 tCO₂/t-s, adding emissions of particulate matter 2.5 (PM2.5) at 19.09 kg/t-s for sole use of BF-BOF.⁵⁵ For the sake of comparison, the CO₂ emissions intensity of the OECD Member States dropped to about 1 tCO₂/t-s by 2012.⁵⁶

The high tCO₂/t-s of China can be attributed to many nested factors as identified in the previous section. The largest factor is the lack of endogenous technological advancement in two primary processes: transitioning to the use of electric-arc furnaces (EAF) and implementing more energy efficient technologies in coking coal production. Since EAF involves melting down scrap steel for the creation of crude steel, it skips the raw material extraction and ironmaking processes, thus saving more than 1,400 kg of iron ore, 740 kg of coal, and 120 kg of limestone for each tonne of scrap steel used.⁵⁷

⁵¹ Frank Zhong, *The Chinese Steel Industry at a Crossroads*, WORLD STEEL ASSOCIATION - CHINA IRON ORE 2018, 15, https://www.worldsteel.org/en/dam/jcr:295ce643-fff1-4a23-8db8-d24bf3b154f2/PPT+for+MB+iron+ore+conference+2018_EN_final.pdf.

[Hereinafter Zhong]

⁵² Chengkang Gao et al., *Analyzing and Forecasting CO₂ Emission Reduction in China's Steel Industry*, 9 FRONTIER EARTH SCIENCE 105, 106 (March 2015). [Hereinafter Gao]

⁵³ Anne Carpenter, *CO₂ Abatement in the Iron and Steel Industry*, INTERNATIONAL ENERGY AGENCY CLEAN COAL CENTRE 1 (Jan. 1, 2012), <https://www.iea-coal.org/co2-abatement-in-the-iron-and-steel-industry-ccc-193/>.

⁵⁴ Y. Han et al., *Research on Carbon Dioxide Emission of Chinese Iron & Steel Industry*, 3(1) J. NANJING UNIV. OF INFO. SCIENCE AND TECH.: NAT. SCIENCE EDITION 53-57 (2011).

⁵⁵ Haozhe Yan et al., *Multi-Objective Analysis of the Co-Mitigation of CO₂ and PM2.5 Pollution by China's Iron and Steel Industry*, 185 JOURNAL OF CLEANER PRODUCTION 336 (June 2018).

⁵⁶ Kira West, *Energy Technology Perspective 2015: Iron & Steel Findings*, OECD (May 12, 2015), http://www.oecd.org/sti/ind/Item%208b%20-%20IEA_ETP2015_OECD%20Steel%20Committee_final.pdf. (last visited Apr. 27, 2018).

⁵⁷ WORLD STEEL ASSOCIATION, *Efficient Use of Materials*, (Jan. 28, 2016), <https://www.worldsteel.org/steel-by-topic/sustainability/environmental-sustainability/efficient-use-of-materials.html> (last visited Apr. 27, 2018).

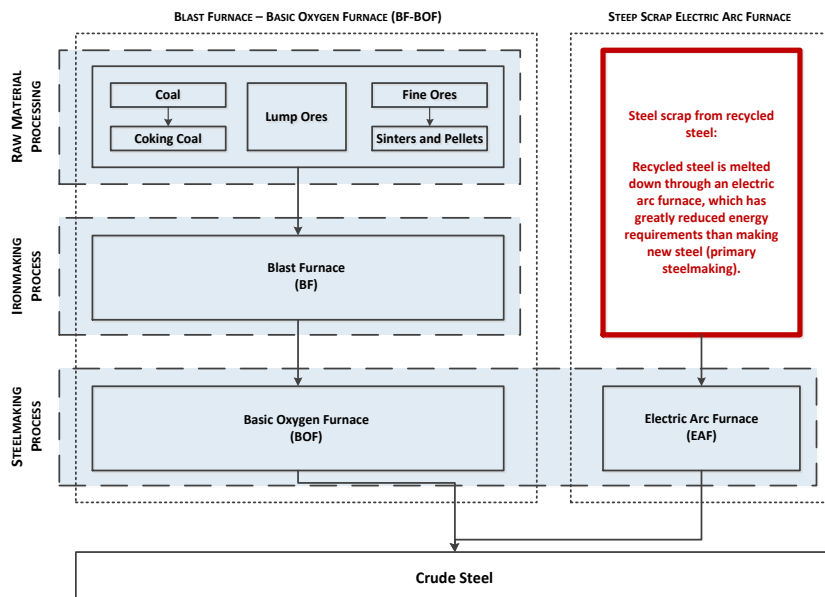


Figure 4. Steel Production Routes, *Source: author's illustration based on data from the World Steel Association*⁵⁸

Chinese data from 2009 shows that 56% of the CO₂ emissions from steel casting originates from the raw material preparation (10%) and ironmaking (46%) involved in the BF-BOF process.⁵⁹ Skipping the ironmaking process is particularly helpful in cutting down the CO₂ emission content of steel production as it bypasses the need to create coking coal, or metallurgical coal, which is necessary for iron production. Figure 4 helps visualize the steel production process and compare BF-BOF with EAF in their different stages.

⁵⁸*Id.*

⁵⁹C.X. Zhang, *Effecting on Carbon Dioxide Emission from Steel Enterprise and from Process Structure*, REPORT ON STEEL ENTERPRISE CONFERENCE (Sep. 2009).

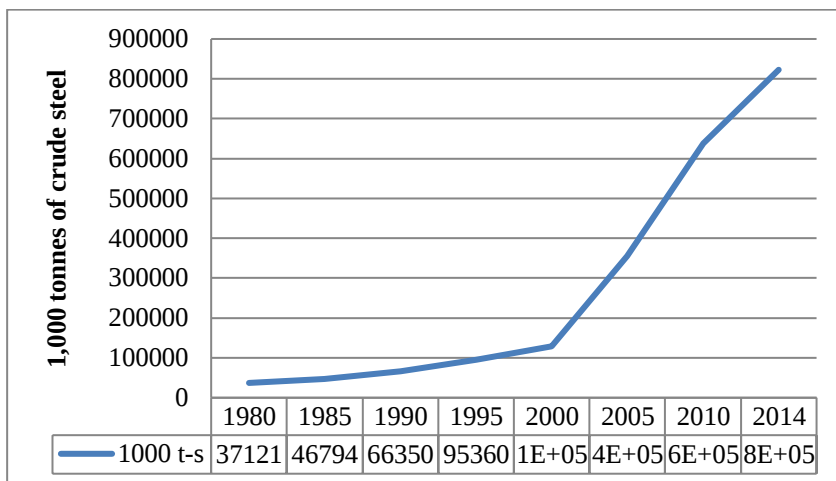


Figure 5. Crude steel production, China, 1980 to 2014. *Source: World Steel Association.*

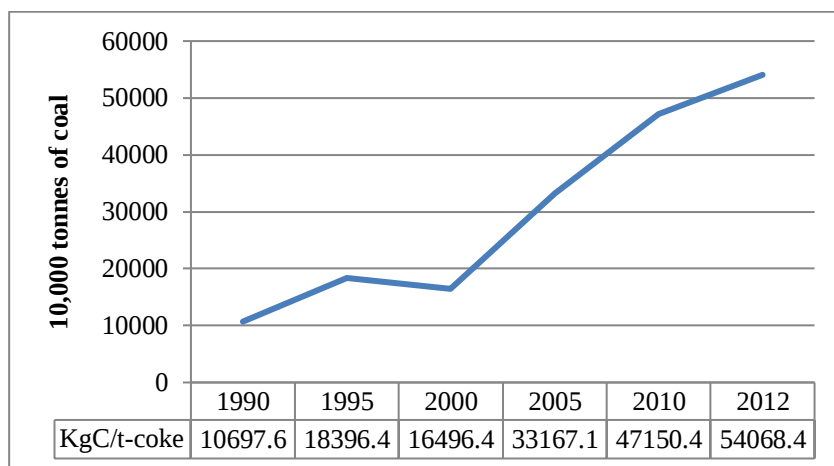


Figure 6. Coking coal, China, 1990 to 2012. *Source: China Statistical Yearbook 2014.*⁶⁰

While there are technologies in coke production that can greatly reduce its environmental impact, only 40% of the CISI uses such clean coking processes.⁶¹ This fact becomes more impactful when considering that China is the largest steel producer at approximately 86 to 89% BF-BOF with increasing marginal steel

⁶⁰Coal Balance Sheet, 2014 CHINA STATISTICAL YEARBOOK(National Bureau of Statistics of China), at §9-5.

⁶¹ChengkangGao, et al.,*Analysing and Forecasting CO₂Emission Reduction in China's Steel Industry*, 9(1) FRONTIER EARTH SCIENCE 105,107 (2015).

production capacity.⁶² Adding to this is the fact that China is also the largest coking coal producer in the world, having recorded 60% of global production in 2010. The coking coal industry in China has similar origins as that of steel, with government-backed massive expansions in scale within a short period of time. In 2000, China was producing 122 million metric tonnes (MMT) of coking coal, which nearly quadrupled by 2011 to 428 MMT in response to both global demand and domestic iron and steel production. While China achieved a 47% reduction of energy consumption in coke production processes, from 217 kilograms of coal equivalent per tonne of coke produced (KgCe/t-coke) to 114 KgCe/t-coke in 2010, coal consumption for coking increased at a logarithmic rate from approximately 10 MMT of coal in 1980 to 45 MMT in 2010.⁶³

Notable here is that coal consumption for coking was relatively stagnant at around 10 MMT per year from 1980 to 1990, but from 2000 onwards, marginal coal consumption increased exponentially at a rate of about 2 MMT per year, as shown in Figure 6. This corresponds with the dramatic increase in steel production, which is graphically represented in Figure 5. This clearly demonstrates that, while technologies that reduce environmental impact are important, a significant part of the problem is the sheer scale of China's production.

In addition to coking coal, the amount of energy consumed by the CISI increased by 3.52 times its value in 2000, at 167.82 MtCe, to 588.97 MtCe in 2011.⁶⁴ Should China successfully transition technologically, Gao (2015) estimates that by 2020, China can reduce its kilograms of CO₂ emissions per tonne of crude steel cast (KgCO₂/t-s) by 280 KgCO₂/t-s. The above mitigation strategies for the CISI represent only a small sampling of the extensive treatment that this topic receives in the literature.⁶⁵

The Chinese government recognized the environmental challenge posed by its industrial sector and has been mounting a policy response starting with the 13th Five-Year Plan (FYP) from 2016, which continues the emphasis placed on

⁶²Zhong, *supra*, note 51.

⁶³Hong Huo et al., *China's Coke Industry: Recent Policies, Technology Shift, and Implication for Energy and the Environment*, 51 ENERGY POL'Y 397, 402 (2012).

⁶⁴Boqiang Lin & Xiaolei Wang, *Carbon Emissions from Energy Intensive Industry in China: Evidence from the Iron & Steel Industry*, 47 RENEWABLE & SUSTAINABLE ENERGY REV. 746, 747 (2015).

⁶⁵Hengyu Pan et al., *Sustainability Evaluation of a Steel Production System in China Based on Energy*, 112 J. CLEANER PROD. 1498, 1498-1509 (2015) (Pan, for instance, suggest an approach through energy, which attempts to give a "more complete evaluation than other methods because it considers all systems to be networks of energy flows and [...] assigns the correct value to ecological and economic products and services based upon a theory of energy flow in system ecology." The energy approach, for instance, takes into account disaggregated inputs (renewable and non-renewable) as well as material flows.).

environmental protection from the 12th FYP. The 13th FYP includes such tools as oversight mechanisms for environmental conditions, GHG emission permits, commercial deforestation bans, agriculture modernization, and other measures for decoupling carbon emissions with economic growth.⁶⁶ President Xi Jinping spoke to these goals with specific reference to the CISI during the 2015 China International Metal Recycling Conference by indicating that the new role of the government would be to make the industry more environmentally sustainable by setting up financial penalties for violating industries.⁶⁷

However, increasing the amount of regulation and extent of enforcement is a second-order solution to the structural fragmentation discussed earlier. A demonstrative example includes attempts by the Chinese government to increase energy efficiency and reduce GHG emissions in steel production⁶⁸ through the creation of threshold standards for technological upgrading in production methods. The government met with limited success in these attempts due to a lack of uniformity in approach and effectiveness in influencing firm-level behaviour towards the implementation of low CO₂ emission production.⁶⁹ The Chinese government has taken a coercive approach through regulatory pressure surrounding energy efficiency and conservation, but in testing a range of independent variables in statistical regressions, Zhang, Wang, *et al.* (2012) showed that regulatory pressures had little influence on firms implementing CO₂ reduction strategies. Legal pressures have instead forced smaller steelmakers to shutdown and led others to improve their competitiveness by increasing scale rather than investing in R&D and technological transition that can improve efficiency.⁷⁰

Ma, Chen, *et al.* (2015) identified further barriers to wider implementation in addition to limited access to capital investment, such as an aversion to risk due to uncertainty regarding technological shifting and “inertia” caused by opponents to change.⁷¹ Small- and medium-sized steel producers are the more central opponents to change, as they are either unable or unwilling to undergo necessary capital upgrades given the large opportunity costs of transitioning away from low-cost production based on iron-ore. Furthermore, the gap in the energy efficiency between large state-owned enterprises and the smaller regional mills was

⁶⁶*Supra*, note 34.

⁶⁷*Supra*, note 33.

⁶⁸ Weekly Credit Brief, *Chinese Steel Producers Face Heightened Credit Risk*, NUS RISK MANAGEMENT INSTITUTE 1-2 (Oct. 16, 2012), <https://www.rmcri.org/media/static/images/thumbnail-pdf/WCBOCT16OCT22.pdf>.

⁶⁹ Bin Zhang et al., *CO₂ Emission Reduction within Chinese Iron & Steel Industry: Practices, Determinants and Performance*, 33 J. CLEANER PROD. 167, 168-169 (2012).

⁷⁰*Id.* at 176.

⁷¹Ding Ma et al., *Quantify the Energy and Environmental Benefits of Implementing Energy-Efficiency Measures in China's Iron and Steel Production*, 1(7) FUTURE CITIES & ENV'T 10 (2015).

considerable, at 1.5 times the energy requirement.⁷² In order to avoid incurring monetary penalties resulting from being unable to satisfy government-mandated renovation requirements, smaller firms intentionally underreported their energy consumption and production outputs. Yet this lack of endogenous technological upgrading was symptomatic of not only the small- and medium-sized steelmakers, but also the key producers.⁷³ This is despite the fact that larger firms were more capable of shouldering the increased costs from upgrading partly due to the fact that they received significantly higher production subsidies from the government.

Yet despite the two challenges posed by the CISI introduced above, subsidization, debt financing, and expanding production capacity continues in China. In terms of subsidization, a CVD investigation by the International Trade Administration of the United States Department of Commerce in 2015 determined that the CISI firms received a 26.26% production subsidy for corrosion-resistant steel products, though this excluded some of the largest producers like Baosteel. The investigation projected that these large producers received up to 235.66% subsidization, “*based on adverse facts available, following the Commerce’s preliminary determination that the companies had not cooperated in the investigation.*”⁷⁴ Reuters projected that such subsidies were equal to 22% percent of total profits in 2013 and “four-fifths of the profits reported [in] the first half of [2014],” amounting to approximately USD 5.24 billion.⁷⁵ The same investigation made subsidy determinations for India at 5.28%, Italy at 13.06%, and South Korea at 1.37%.⁷⁶ Through continued debt financing used to expand production, the CISI reached a debt-to-asset ratio of 70% with USD 486.4 billion of debt by mid-2013.⁷⁷ Of China’s debt load of 237% of GDP (USD 25 trillion), an estimate provided by The Financial Times,⁷⁸ corporate debt as a whole reached 145% of GDP with 55% of that debt belonging to state-owned

⁷²Z.C. Guo & Z.X. Fu, *Current Situation of Energy Consumption and Measures Taken for Energy Saving in the Iron and Steel Industry in China*, 35(11) ENERGY 4356, 4359-4360 (2010).

⁷³Wenying Chen et al., *A Bottom-Up Analysis of China’s Iron and Steel Industrial Energy Consumption and CO₂ Emissions*, 136 APPLIED ENERGY 1174, 1182 (2014).

⁷⁴International Trade Administration, *Fact Sheet: Commerce Preliminary Finds Countervailable Subsidization of Imports of Corrosion-Resistant Steel Products from China, India, Italy, and Korea and No Countervailable Subsidization of Imports from Taiwan*, U.S. DEPARTMENT OF COMMERCE, <http://enforcement.trade.gov/download/factsheets/factsheet-multiple-corrosion-resistant-steel-cvd-prelim-110315.pdf> (last visited Apr. 27, 2018).

⁷⁵Fayen Wong, *Steel Industry on Subsidy Life-Support as China Economy Slows*, REUTERS (Sep. 19, 2014), <http://www.reuters.com/article/2014/09/19/us-china-economy-steel-idUSKBN0HD2LC20140919>. (last visited Apr. 27, 2018).

⁷⁶Gao, *supra*, Note 52.

⁷⁷Min, *supra*, Note 30.

⁷⁸Gabriel Wildau & Don Weinland, *China Debt Load Reaches Record High as Risk to Economy Mounts*, FINANCIAL TIMES (Apr. 24, 2016), <https://www.ft.com/content/acd3f2fc-084a-11e6-876d-b823056b209b>. (last visited Apr. 27, 2018).

enterprises according to the International Monetary Fund.⁷⁹

Lacking profitability persists according to Bloomberg Business, which reported that “*medium- and large-sized mills incurred losses of CNY 28.1 billion (USD 4.4 billion) in the first nine months of [2015].*” In terms of expanded production, minerals and metals giants, BHP Billiton and Rio Tinto projected the CISI to reach peak steel at 985 million to 1 billion tonnes by 2030,⁸⁰ which corresponds with the government’s plans to reach its GHG emissions ceiling by 2030 according to its INDC submitted to the United Nations Framework Convention on Climate Change (UNFCCC).⁸¹ To put 1 billion tonnes of steel in perspective, one may consider the fact that steel production in Asia at the end of 2015 was at 1.1 billion tonnes and world production at 1.6 billion tonnes according to the World Steel Association statistics.

The shared characteristic between the *Problems 1* and *2* presented in previous sections is that while internal resolution using policy levers is important, it is necessary but not a sufficient condition. External pressure can provide a more direct and effective solution. In the following sections, this paper lays out how ADMs can provide such external pressure, not only for its proven impact on firm-level behaviour, but also their potential to address environmental issues with slight methodological adjustments.

V. THE ROLE OF THE WTO REVISITED: FIRM-LEVEL TRADE DIVERSION AS A FORM OF ADVOCATING LEGITIMATE INTERESTS

On the issue of “green protectionism”, the WTO identifies the need to design a balance between environmental measures and market access.⁸² This idea finds more specific wording in Principle 12 of the 1992 Rio Declaration on Environment and Development as “arbitrary or unjustifiable discrimination or a disguised restriction on international trade” stipulated on two further conditions.

⁷⁹David Lipton, *Rebalancing China: International Lessons in Corporate Debt*, INTERNATIONAL MONETARY FUND (June 10, 2016), at <https://www.imf.org/en/News/Articles/2015/09/28/04/53/sp061016> (last visited Apr. 27, 2018).

⁸⁰Andy Home, *What’s 40 Million Tonnes of Chinese Steel Between Friends?*, REUTERS (Sep. 14, 2015), at <http://www.reuters.com/article/us-china-steel-ahome-idUSKCN0RB20I20150911> (last visited Apr. 27, 2018).

⁸¹Fu Sha et al., *An Analysis of China’s INDC*, NATIONAL CENTRE FOR CLIMATE CHANGE STRATEGY AND INTERNATIONAL COOPERATION (July 02, 2015), at <http://www.ncsc.org.cn/article/yxgc/ir/201507/20150700001490.shtml> (last visited Apr. 27, 2018).

⁸²*Environmental Requirements and Market Access: Preventing Green Protectionism*, WORLD TRADE ORGANIZATION, at https://www.wto.org/english/tratop_e/envir_e/envir_req_e.htm (last visited Jun 3, 2018).

The first is the avoidance of unilateral action in addressing environmental challenges from outside the jurisdiction of the importing country. This is further based on Principle 11, which identifies the disparate impacts of environmental standards, objectives and priorities between countries at different levels of development. The second condition to Principle 12 is that addressing transboundary or global environmental problems requires international consensus.⁸³ The first condition on justifiability exists in all of the mechanisms related to environmental protection within the crux of WTO rules⁸⁴ and has been central in rendering most WTO disputes related to the environment as issues of MFN⁸⁵ with the partial exception of perhaps *European Communities — Measures Affecting Asbestos and Products Containing Asbestos* in the Appellate Body's ruling on GATT Art. XX chapeau.⁸⁶ The second condition, however, makes the application of TBTs as presented in this paper viable. As this work identified earlier, the transboundary nature of the pollution arising from the CISI renders the issue within the scope of the 1992 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.⁸⁷ As such, should the WTO identify that MEAs such as the 1992 Basel Convention represent an international consensus, it shall require the organization to revisit the justifiability condition within that integrative purview, especially insofar as the pursuit of such legitimate objectives are interpreted within the scope of non-tariff measures.

The “nonmarket economy” status of China when it became a signatory to the WTO made it a frequent target of AD investigations. The lack of MES was largely because many countries viewed Chinese industrial policy as being contrary to Article 9(1) of its Accession Document to the WTO, which stated that “*China shall [...] allow prices for traded goods and services in every sector to be determined by market forces, and multi-tier pricing practices for such goods and services shall be eliminated.*” According to WTO law, nonmarket economy status means that rather than using domestic value, AD investigations will employ the value of similar products in a proxy country to

⁸³ *The Rio Declaration on Environment and Development*, UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT, http://www.unesco.org/education/pdf/RIO_E.PDF. (last visited Jun3, 2018).

⁸⁴ *WTO Rules and Environmental Policies: Other Relevant WTO Texts*, WORLD TRADE ORGANIZATION, https://www.wto.org/english/tratop_e/envir_e/issu3_e.htm. (last visited June 3, 2018).

⁸⁵ *Environmental Disputes in GATT/WTO*, WORLD TRADE ORGANIZATION, https://www.wto.org/english/tratop_e/envir_e/edis00_e.htm (last visited June 3, 2018).

⁸⁶ Appellate Body Report and Panel Report, *European Communities — Measures Affecting Asbestos and Products Containing Asbestos*, WTO Doc. WT/DS135/12 (Adopted Apr. 11, 2001).

⁸⁷ *Controlling Transboundary Movements*, SECRETARIAT OF THE BASEL CONVENTION, <http://www.basel.int/Implementation/Controllingtransboundarymovements/Overview/tabid/4325/Default.aspx> (last visited Jun3, 2018)

determine whether the product in question is being sold at LTFV and thus, being dumped.

As illustrated in Figure 7, between 1995 and 2016, there have been 866 antidumping measures targeting Chinese products, which is at least more than triple the number of cases brought to any other country. Approximately 243 of those ADMs involving China were related to steel products (section XV heading),⁸⁸ corresponding with the country's rapidly increasing global market share in steel.⁸⁹

China's share just in the European steel market went up by 180% from 2010, which represents a 200% increase in the total volume entering the market. The European Commission decided to levy a 25.2% antidumping duty on certain steel products from China in 2014, for "*subsidizing the expansion of its stainless-steel industry which is now flooding the global market and displacing trade flows.*"

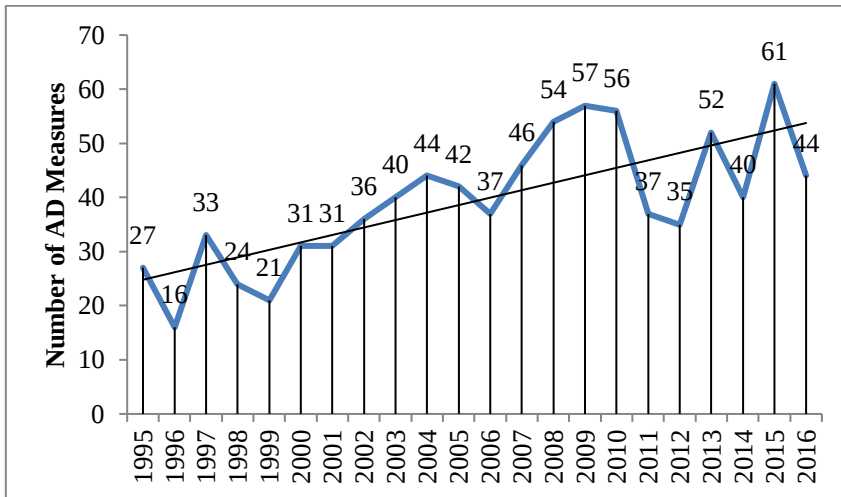


Figure 7. Number of AD measures against China, Source: WTO Anti-dumping Statistics.

Considering the extensive involvement of China in ADMs, understanding firm-level influence on Chinese steelmakers is essential. In terms of whether AD

⁸⁸ *Anti-dumping Sectoral Distribution of Measures: By Exporter 01/01/1995-31/12/2016*, WORLD TRADE ORGANIZATION, https://www.wto.org/english/tratop_e/adp_e/AD_Sectoral_MeasuresByExpCty.pdf (last visited Apr 15, 2018).

⁸⁹ *Anchidannpingu Soshiwo Meguro Saikinnnoyoukyouni Tsuite* ["Recent Trends in Antidumping Mechanisms"], MINISTRY OF ECONOMY, TRADE AND INDUSTRY OF JAPAN, http://www.meti.go.jp/committee/summary/0002465/pdf/022_03_01.pdf (last visited Apr. 27, 2018).

measures result in trade depression, firms have been shown to experience losses due to restrictions placed on the export market caused by an increase in transaction cost placed by administrative barriers, i.e., AD duties. This effect can be compounded by the so-called “chilling effect” of AD initiations, which anticipates that when possible, firms may move away from investigated products even before any decisions are made because of AD investigations. Chandra and Long (2013), for instance, found that AD duties caused a reduction in total factor productivity (TFP) of Chinese firms by 12% or more,⁹⁰ thereby causing diminished marginal returns derived from economies of scale during periods of rapid capital accumulation. These impacts were more pronounced for firms with high export intensity since the loss of producer surplus caused by reduced export volume was compensated through another exporting firm.⁹¹

Yet when taking the large production overcapacity in the Chinese iron and steel industry into consideration, the deadweight loss resultant from trade depression will increasingly become a producer surplus loss that is not compensated for by another domestic firm. The considerable disparity between steel supply and demand means that the tariff burden of AD, or the deadweight loss, goes largely to the producer as it is unable to pass that burden to the consumer by increasing price. This is shown by Lu *et al* (2013) by examining the behaviour of Chinese firms of different characteristics found similar results. First, they found that AD measures do not seem to share a direct correlation with trade deflection by Chinese firms,⁹² which was attributed to overcapacity. Secondly, it became statistically clear that firms which focus on a single product in multiple markets as direct exporters, such as makers of crude steel, were more responsive to AD measures than intermediary exporters, which typically have product mobility through multiple products.⁹³ This second finding suggests that the firm-level influences of AD on Chinese steelmakers are indeed considerable.

The aforementioned macroeconomic and firm-level influences on Chinese producers demonstrate the potential that ADMs have in responding to production overcapacity. However, many of the supply-side influences of ADMs are diluted not by the unique characteristics of Chinese steelmakers *per se*, but rather by foreign demand. First, the effects of trade diversion to different foreign markets are quite pronounced. Chandra (2016)⁹⁴ by examining changes in trade flows

⁹⁰Piyush Chandra & Cherly Long, *Anti-dumping Duties and their Impact on Exporters: Firm Level Evidence from China*, 51 WORLD DEV. 169, 169-171 (2013).

⁹¹*Id.* at 179.

⁹²Yi Lu *et al.*, *How Do Exporters Respond to Antidumping Investigations?*, 91 J. INT'L ECON. 290, 297 (Nov. 2013).

⁹³*Id.* at 300.

⁹⁴Piyush Chandra, *Impact of Temporary Trade Barriers: Evidence from China*, 38 CHINA ECON. REV. 24, 24-48 (2016).

because of the incidence of temporary trade barriers, which includes AD investigations, from 2002 to 2008, found considerable evidence of trade diversion. One notable example that was cited was the US *Frozen Shrimp and Prawns* AD duty levied on Chinese exports in 2005. In that same year, the export of frozen shrimp and prawns to the EU increased by approximately 604% from 21mn USD in exports to 150.6mn USD, remaining at an average of 165mn USD each year to 2008. From the perspective of the US market, frozen shrimp and prawns' imports from China dropped approximately 80% or 230mn USD to 48mn USD over the year of the subsidy. These findings are further supported by Park (2009), who identified that the trade depressing influences of ADMs from named countries results in increased import demand from countries that are not involved in the AD investigation. This was represented as a natural log of market share of named countries as a result of AD initiations by China over three years.⁹⁵ While Park does not look specifically at the CISI, the econometric approach employed in that study is largely compatible with the trend in trade data provided earlier in this paper.

In addition to trade diversion to other importing markets, foreign investment also has had a role in diluting the firm-level influences of ADMs. Li, Yan, and Sun (2014) examined the way in which offshoring production and government intervention added to the market value of Chinese firms, which contributed their partial resistance to the effects of ADMs.⁹⁶ By examining market data of the Shanghai and Shenzhen Stock Exchange from 2006 to 2012, during which time 97 AD investigations were announced, they found that while exporting firms face a drop in market value as a result of being targeted for an AD investigation, firms with offshore production lines and government support actually enjoy an increase in market value. This is explained largely by the fact that there were gains in investor confidence when ADMs do not have their full anticipated economic impact.⁹⁷ Foreign investors view the provincial fragmentation of the CISI and the protection and support that these firms receive from their respective local or

⁹⁵SoonchanPark, *The Trade Depressing and Trade Diversion Effects of Antidumping Actions: The Case of China*, 20CHINA ECON. REV.542,546-547 (Sep. 2009). (Park employs the following General Method of Moments (GMM) estimator in identifying changes in market share of firms of the target countries: $\ln(\text{share}_{it}) = \alpha + \gamma_2 \ln(\text{share}_{it-1}) + B_2(AD_{it}) + \delta_i + u_{it}$. Here, one finds the natural log of ($\ln$) of market share (share_{it}). This is based on an earlier model that predicted the natural log of imports ($\ln(\text{imports}_{it})$) used by Konings, Vandenbussche, and Springael (2001). This is taken for a specific country (i) at the given time (t) with $t = 0$ being the time of the initiation. At constant (α), the influence of AD ($B_2(AD_{it})$) measures on log of market share ($\gamma_2 \ln(\text{share}_{it-1})$) is measured with taking into account case-specific variables (δ_i) and other statistical errors (u_{it}).

⁹⁶W. Li et al., *The Effect of Antidumping and Countervailing Investigations on the Market Value of Firms*, 36 INTL. REV. FIN. ANALYSIS 97 (2014).

⁹⁷*Id.*

regional governments as buffering their rates of return, making their investments relatively secure. Many of these characteristics correspond to what Konings and Vandenbussche (2008) identified as the heterogeneous response of firms under trade protection,⁹⁸ where less productive steelmakers can make supernormal profits through the combination of government protection and support.⁹⁹

VI. LEGAL AND ECONOMIC FRAMEWORK AND SIGNIFICANCE OF THE TCO₂E/T-S ADJUSTED DUMPING MARGIN

This final section completes this proposal by constructing the legal and economic logic behind employing ADMs with the carbon-adjusted DM. Since this proposed usage of ADMs deviates from their common usages, a sufficient legal basis is crucial in the qualification of such use. The latter portion of this chapter then provides an overview of the payoffs of employing the carbon-adjusted DM.

A. Legal Framework and Considerations

The first immediate concern behind this proposal is whether AD, which is a measure designed to rebalance unequal terms of trade, can be used for concerns not directly related to international trade. The WTO and the GATT in fact have a fairly open-ended set of rules in relation to environmental preservation. For instance, some important concepts and materials include, *inter alia*:

1. Trade-related environmental measures (TREMs)
2. WTO Agreement on the Application of Sanitary and Phytosanitary Measures
3. Agreement on Technical Barriers to Trade (TBT Agreement)
4. National treatment principle (GATT Article III) and Most-favoured-nation principle (GATT Article I) in application of an environmental tax to not only domestic, but also foreign producers in equal measure regardless of origin country.
5. Elimination of quantitative restrictions (GATT Article XI)
6. 'Chapeau' of GATT Article XX

The above list of items does not claim to be comprehensive in representing the overall framework of WTO regulation that addresses environmental preservation. Indeed, there is a whole host of multilateral environmental agreements that deal with trade, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Montreal Protocol on Substances that Deplete the Ozone Layer, the Convention on Biological Diversity, the International

⁹⁸Jozef Konings & Hylke Vandenbussche, *Heterogeneous Responses of Firms to Trade Protection*, 76 J. INT'L ECON. 371, 372 (Dec. 2008).

⁹⁹*Id.* at 381.

Tropical Timber Agreement, and the Rotterdam Convention on Prior Informed Consent. A comprehensive survey of the body of environmental regulation in relation to trade involving the above and other measures is beyond the scope of this paper though certainly deserving of further examination. Rather, this section focuses primarily on establishing the legal viability for the proposal at the core of this paper.

While there exists a range of measures in relation to environmental protection and the WTO, there is little harmonization in the interpretation and thus implementation of these measures. The customary nature of environmental law and the very different requirements necessary for the protection of a diverse range of ecosystems have hampered such regulation from uniform legal enforceability. Further, generally accepted principles such as differentiated responsibility taking into account States' capacity have been consistent obstructions to progress in such efforts as harmonizing environmental law. Altmann (1994) demonstrates this by providing a broader overview of environmental protection, legal mechanisms in international trade, and the difficulties of harmonization. While Altmann disagreed with using trade-restrictive measures with regards to environmental standards due to retaliatory behaviour,¹⁰⁰ this paper identifies AD as an appropriate mechanism for environmental protection. On a broad, theoretical level, the overarching logic of this proposal revolves around the "polluter pays" principle. This principle states that originator of environmental harm should be the one who internalizes the external costs. In other words, the originator of the environmental damage also takes liability for that damage done unto common pool resources, i.e. the environment. Measures to uphold this principle have not in their entirety been uncommon. Environmental taxes that aim to equal the size of the negative externality, or the marginal social cost minus the marginal private cost, have been a way to enforce the polluter pays principle. However, the difficulty in evaluating the negative externality to set a level of tax that has proportional scale requires being able to evaluate the exact amount of cost that is being passed onto society.

On the other hand, the use of subsidies as forms of environmental protection, while beyond the scope of the present paper has attracted much attention. Kim (2000), for instance, explores a taxonomy of such subsidies¹⁰¹ and the WTO has regulations on the use of subsidies in relation to the environment, such as the Agreement on Subsidies and Countervailing Measures (the SCM Agreement) as well as the "green box subsidies" as specified in Annex 2 of the WTO Agriculture Agreement under Paragraph 12. Returning to the primary discussion on the use of

¹⁰⁰ Jorn Altmann, *International Environmental Standards: Considerations on Principles and Procedures*, 29(4) *INTERECONOMICS* 176, 181 (1994).

¹⁰¹ Hyung Jim Kim, *Subsidy, Polluter Pays Principle and Financial Assistance among Countries*, 34 *J. WORLD TRADE* 115, 115-141 (Dec. 2000).

ADMs as a form of trade-restrictive environmental protection, the legal basis that this paper proposes is made through two qualifying provisions:

Provision 1: ADMs initiated on grounds of dumping caused by government subsidization and private cost discounted through the presence of an unaccounted external cost (negative externality) finds legal basis as a technical barrier to trade (TBT) in the TBT Agreement and GATT Article XX.

Provision 2: The external cost (negative externality) can be domestically assessed as a “tax” and then applied into the dumping margin. More specifically, high emissions of CO₂ and equivalent greenhouse gas emissions (tCO₂e) per tonne of steel produced (t-s) for BF-BOF crude steel production can be accounted into the dumping margin as a tCO₂e/t-s Adjusted Dumping Margin (carbon-adjusted DM)¹⁰² as an additional administrative cost (as part of an administrative, selling, and general cost) based on the national treatment principle (GATT Article III) and the most-favoured nation principle (GATT Article I). In applying such a tax, the valuation of the weight added to the dumping margin finds legal premise in Article 2.4. of the Anti-Dumping Agreement (ADA).¹⁰³

In terms of Provision 1, ADM as a trade-restrictive measure can be applied on grounds of both pricing at LTFV due to government subsidization as well as a distorted weighted average value resulting from a discounted cost through the use of low-technology steelmaking procedures that has a high impact on the environment. The application of a technical barrier to trade made possible by Article 2.2 of the TBT Agreement, which identifies “*protection of human health or safety, animal or plant life or health, or the environment*” as a legitimate objective for trade-restrictive action. Risk to this legitimate objective is satisfactorily established as a “relevant element of consideration” insofar as it is a “related processing technology.” Tests of arbitrariness or unjustifiable discrimination are satisfied by the chapeau of GATT Article XX (General Exceptions) subparagraphs (b) and (g).

¹⁰²This report introduces the concept of the tCO₂e/t-s Adjusted Dumping Margin. Specific calculations of the margin, relevant case precedence, and other technical information is reserved for future research on this topic. The dumping margin goes into the determination of the material injury caused by the less than fair value price. This, according to Article 2.4.2 of the *Anti-Dumping Agreement*, requires the comparison of the weighted average normal value to the weighted average of all comparable export prices using the transaction-to-transaction method. However, should there be no comparable normal value in the ordinary course of trade then the normal value must be constructed.

¹⁰³*Agreement on Implementation of Article VI of the General Agreement on Tariffs and Trade 1994*, WORLD TRADE ORGANIZATION, https://www.wto.org/english/docs_e/legal_e/19-adp.pdf. (last visited Apr. 27, 2018).

These are reproduced below:

- “[...] nothing in this Agreement shall be construed 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 and consumption”*

The TBT Agreement is particularly effective in responding to the provincial fragmentation of the CISI described earlier. Article 3 of the TBT Agreement (“Preparation, Adoption and Application of Technical Regulations by Local Government Bodies and Non-Governmental Bodies”) expresses in 3.1 that central governments are expected to take reasonable measures to ensure compliance by provincial governments and non-government bodies. Articles 7 and 8 provide further explanations on procedures for the assessment of conformity of such bodies. Thus, as a Member State of the WTO, China and its provincial governments are party to the TBT Agreement. Thus, given that all conditions are satisfied, the hypothetical carbon-adjusted DM would be applicable to Chinese firms to which an anti-dumping duty has been applied.

Based on Provision 2, the external cost added to the weighted average normal value or the weighted average constructed value as suggested by the carbon-adjusted DM has proven to be legally viable. First, in determining whether dumping has occurred, the normal value in the ordinary course of trade must be derived in application to the Chinese context. Article 2.1 of the ADA states that this should be done by considering the domestic price of the product- in other words, the price of Chinese steel in China in the ordinary course of trade. However, ADA Article 2.1 is inapplicable in the case of the CISI for at least two reasons, which would then necessitate the application of ADA Article 2.2.¹⁰⁴

The first involves the “particular market situation” of the exporting country, as written in ADA Article 2.2. This means that if a country receives NME treatment, then normal values are equated to constructed normal values based on a third, or surrogate, country. China agreed to receive NME treatment until December 2016, according to its WTO Accession document.¹⁰⁵ Based on this reading alone, ADA

¹⁰⁴ Mark Wu, *Anti-Dumping in Asia's Emerging Giants*, 53 HARV. INT'L L. J. 101 (Winter 2012); HOLMAN FENWICK WILLAN LLP, *China's Future Market Economy Status: Recent Developments*, (Nov. 2013), <http://www.hfw.com/downloads/HFW-China-future-market-briefing-November-2013.pdf> (last visited Apr. 27, 2018).

¹⁰⁵ *Trade Remedies: A Tool Kit*, ASIAN DEVELOPMENT BANK AND INTERNATIONAL INSTITUTE FOR TRADE AND DEVELOPMENT 23 (2009), <https://www.adb.org/sites/default/files/publication/27526/trade-remedies-toolkit.pdf> (last visited Apr. 27, 2018).

Article 2.2 applies insofar that China's "particular market conditions" do not allow for a "proper comparison." Once China's NME treatment expires, application of ADA Article 2.2 would require the satisfaction of the second supplementary provision of Annex 1 to paragraph 1 of GATT 1947 Article VI [**"Annex I"**].¹⁰⁶ Whether and to what extent other WTO member states will recognize China's MES, however, remains speculative.

Secondly, CISI exports are being sold at below-cost sales demonstrated by the lack of profitability and high debt-to-profit of firms shown earlier in this paper. This finds definition in ADA Article 2.2.1 as those sales that are made "*within an extended period of time in substantial quantities and are at prices which do not provide for the recovery of all cost within a reasonable period of time.*" Whether or not prices are below per unit cost is based on whether the weighted average selling price of the transaction is below the weighted average per unit cost through this channel. If the carbon-adjusted DM can add to the weighted average per unit cost, ADA Article 2.2.1 would be applicable here, should it be found that Chinese steelmakers have been able to sell at prices lower than costs through (A) poor environmental standards of production, and (B) government assistance in violation of either NME status and/or Annex I. The 1930 Tariff Act of the United States, for instance, has in place similar below-cost provisions that rely on a "cost of production investigation" that can be initiated on reasonable grounds.¹⁰⁷ The same grounds can be established through the difference between Chinese steel and an open market value or price in, as the Marrakesh Agreement identified in its first recital, "a normal situation."¹⁰⁸ The complicated role of the state, at least financially, in its relationship with the corporate sector will have to find clearer definition in the existing

¹⁰⁶Vera Thorstensen et al., *WTO – Market and Non-Market Economies: The Hybrid Case of China*, 1(2) LATIN AM. J. INT'L TRADE L. 765, 765-798, (2013) (Annex I, GATT 1948 Second Supplementary Provision to paragraph 1 of Article VI reads:

It is recognized that, in the case of imports from a country which has a complete or substantially complete monopoly of its trade and where all domestic prices are fixed by the state, special difficulties may exist in determining price comparability for the purposes of paragraph 1, and in such cases importing contracting parties may find it necessary to take into account the possibility that a strict comparison with domestic prices in such a country may not always be appropriate.

NME status and its effect on the calculation of normal value receive extensive treatment in this article.)

¹⁰⁷COMMITTEE ON FINANCE ET AL., URUGUAY ROUND AGREEMENT ACT: JOINT REPORT TO ACCOMPANY S. 2467, REP. NO. 103-412 (2d. Sess. 1994).

¹⁰⁸Bernard O'Connor, *Constructing Normal Value in WTO Anti-Dumping Law; Giving Meaning to the Phrase Open, Market-Oriented Policies in the Preamble to the Marrakesh Declaration*, NCTM STUDIO LEGALE ASSOCIATO 4-5 (2015).

language of what defines a normal situation.¹⁰⁹

In the framework established by the two provisions identified above, this paper suggests the carbon-adjusted DM “*reasonabl[y] reflect[s] the costs associated with the production and sale of the product under consideration*” in accordance with ADA Article 2.2.1.1 by accounting for the discount rate afforded by low cost and environmental standard production.

After establishing the applicability of ADA Article 2.2 to the CISI, it then becomes important to establish the legal basis behind calculating the added weight of the carbon-adjusted DM. Firstly, the added weight in the carbon-adjusted DM can be calculated, as are all costs, in accordance to the records of the exporter so long as generally accepted rules of accounting are employed. However, given the many challenges obstructing the formulation and implementation of a universally accepted carbon pricing mechanism, applying any sort of local environmental tax or additional carbon price to the carbon-adjusted DM would be a viable option in the interim. Within the regulations of the WTO and GATT, this is quite possible based on the national treatment principle on internal taxation and regulation (GATT Article III)¹¹⁰, which provides that while the foreign firms are protected from regulatory discrimination, it is liable to the same internal regulations and tax as domestic firms. From this, applying the Most Favoured Nation (MFN) clause (GATT Article I) would render the same domestic tax to other firms from other countries with similarly low efficiency, high emissions production afforded by passing the burden of any reduced private costs to deductions in marginal social benefit.

Once established that the application of one such weight to the dumping margin is legally feasible, justifying the extent of the tCO₂e/t-s adjustment to the dumping margin of an anti-dumping investigation is possible through ADA Article 2.4, which lays out the conditions of price comparability. Specific to the case of the CISI, however, one finds that the fair comparison in price is difficult to assess for

¹⁰⁹*Id.* at 9-11; see Appellate Body Report, *US – Investigation of the International Trade Commission in Softwood Lumber from Canada*, WTO Doc. WT/DS277/AB/RW (adopted May 9, 2006); Appellate Body Report, *US – Definitive Anti-Dumping and Countervailing Duties on Certain Products from China*, WTO Doc. WT/DS379/AB/R (adopted Mar. 11, 2011).

¹¹⁰ Article III (4) reads:

The products of the territory of any contracting party imported into the territory of any other contracting party shall be accorded treatment no less favorable than that accorded to like products of national origin in respect of all laws, regulations and requirements affecting their internal sale, offering for sale, purchase, transportation, distribution or use. The provisions of this paragraph shall not prevent the application of differential internal transportation charges which are based exclusively on the economic operation of the means of transport and not on the nationality of the product.

two reasons as was mentioned throughout this report: nonmarket distortions and high emission production methods. Furthermore, the combination of credit risk; government subsidization; low-cost, low-efficiency production; and difficulties regarding accurate data-collection based on official records all obfuscate finding a comparable price. As such, rather than a normal value, one would establish a constructed normal value “*at a level of trade equivalent to the level of trade of the constructed export price*,” which would then leave space for the tCO₂e/t-s adjustment.

Once the constructed normal value is produced, one can then find the determination of injury in the same manner that it is found in any investigation. The legal basis of this is in ADA Article 3.4, on the premise that the examined impact on the domestic industry can include, *inter alia*, negative effects on growth and the ability to raise capital and investment. Based on this, as well as the totality urged in ADA Article 3.7, the impact of Chinese steel dumping has and can be expected to continue to decrease the returns on investment as non-Chinese steelmakers make efforts to improve their efficiency by reducing the environmental impact of steel production. In other words, steelmakers attempting to improve the environmental sustainability of their production are enjoying reduced rates of return on their investment(s) because of dumped Chinese steel. However, the question then is whether the reduction in efforts to improve environmental sustainability can be classified as a negative effect on growth and a firm’s capacity to raise capital and investment. While literature in development studies and, to a great many, common sense would dictate that this is the case, to make a substantive legal argument one must turn to the counsel of past arbitral decisions, which lies beyond the present discourse.

B. Legal Implications and Significance

Unfortunately, and yet without surprise, there exists little precedence of AD or CVDs attempting to achieve sustainable development. Within the framework hitherto constructed, the material injury as per Article 3.7 of the ADA must be determined in part by the extent to which less efficient and more environmentally harmful production methods have a negative effect on growth and a firm’s capacity to raise capital. There is great merit at this juncture to developing an exact mechanism for quantitative assessment as well as a closer examination of existing decisions by the WTO DSB to better understand the role of environmental standards in assessing material injury.

The carbon-adjusted DM helps to reverse a rather discouraging trend of a state being penalized for attempting to subsidize its transition to a more sustainable production, by becoming a target for AD investigations. Two representative cases include *China – Countervailing and Anti-dumping Duties on Grain Oriented Flat-Rolled*

*Electrical Steel from the United States (China – GOES, WT/DS414/R)*¹¹¹ and *India – Certain Measures Relating to Solar Cells and Solar Modules (India – Solar Cells, WT/DS456/R)*.¹¹² In both cases, attempts by the government to mitigate the climate impact of their respective economies have been interpreted as warranting ADM or CVD action.

In *China – GOES*, China, the initiating country, argued that a three-year extension (1982 to 1985) of a deadline set for US steelmakers to meet the environmental standards advanced by the Clean Air Act, 1990, amounted to the “*provision of income or price support to the industry through delaying an obligation to invest in clean air technology.*” Estimations by China put savings by the US steel industry over this three-year grace period at USD 3.7 billion, which they argued that essentially resulted in a benefit that acted as a countervailable subsidy. While the Panel ultimately dismissed this argument on the basis that it was approximately 30 years before the initiation, the implications of this kind of argument should be taken into consideration within the topics raised in this exposition. The implication of this ruling is that should public funds used to help firms lower their environmental impact be recognized by the Panel as a countervailable subsidy or warrant AD investigations, then the very practice of ADM would depart from its potential role *de legeferenda* of helping to promote the carbon-adjusted DM as further described in Section 1 above. On this basis, the great long-term importance of such mechanisms as the carbon-adjusted DM and its expedited application to WTO dispute settlement *mutatis mutandis* to the interpretation and implementation of ADM is clear.

India – Solar Cells involves the increasing production and use of solar energy in national efforts for sustainable energy security and climate mitigation in India. By adopting its Jawaharlal Nehru National Solar Mission (Solar Mission), the Indian government attempted to reduce the costs of solar energy through the “*rapid scale-up of capacity and technological innovation,*”¹¹³ and the use of incentive packages for “*indigenous manufacturing of low temperature solar collectors.*”¹¹⁴ These incentives are aimed to “*set up integrated manufacturing plants*”¹¹⁵ as well as establish solar power purchase obligations, representing domestic content requirements (DCR) for foreign manufacturers.¹¹⁶ In this particular case, the United States initiated

¹¹¹Panel Report, *China – Countervailing and Anti-Dumping Duties on Grain Oriented Flat-Rolled Electrical Steel from the United States*, ¶7.37, WTO Doc. WT/DS414/R (adopted June 15, 2012).

¹¹²Panel Report, *India – Certain Measures Relating to Solar Cells and Solar Modules*, WTO Doc. WT/DS456/R (adopted Feb. 24, 2016) (*India – Solar Cells*).

¹¹³Ministry of New and Renewable Energy, *Jawaharlal Nehru National Solar Mission: Towards Building SOLAR INDIA*, GOVERNMENT OF INDIA, at 1, <http://www.mnre.gov.in/solar-mission/jnnsmission/mission-document-3/> (last visited Apr. 27, 2018).

¹¹⁴*Id.* at 5.

¹¹⁵*Id.* at 10.

¹¹⁶*Id.* at 8.

investigations on whether the DCR component of Solar Mission violated WTO regulations,¹¹⁷ such as Article 2.1 of the Agreement on Trade-Related Investment Measures (TRIMs). The central point of this argument was that the mandatory nature of DCR is not necessary to achieve the goals of Solar Mission.¹¹⁸

Over the three phases of Solar Mission, it was found that the use of foreign photovoltaic (PV) cells and modules in the domestic market went from 50% to 0% over four years. India defended Solar Mission and its DCR component by arguing that these measures had to be viewed within the context of the country's objectives of attaining "*energy security, ensuring ecologically sustainable growth, and ensuring sustainable development*"¹¹⁹ and that the application of TRIMs Article 2.1 cannot be read as a "stand-alone claim".¹²⁰ They continued by stating that Solar Mission as well as its performance requirements were part of India's endeavour to comply with international laws, namely the preamble of the WTO Agreement, the United Nations Framework Convention on Climate Change (UNFCCC), the Rio Declaration on Environment and Development, and the UN General Assembly Resolutions adopting Rio+20: *The Future We Want*.¹²¹ The WTO DSB Panel ultimately decided that DCR was not essential to accomplish Solar Mission and that the international and national instruments that India cited did not have direct relevance to the application of such a requirement.

This case leads to a similar conclusion as *China – GOES*, in that national measures to ensure sustainable development have become targets of penalty rather than encouragement. These efforts are being limited by the imposition of trade standards, which may not coincide with the spirit of environmental protection. A country's attempt to transform its energy profile into one that is sustainable and less environmentally damaging should be rewarded and receive international support. However, the tragedy is that trade defence often works against such attempts at achieving sustainable development in industry.

The two cases reviewed above both demonstrate the singular importance of further developing mechanisms such as the carbon-adjusted DM. This importance can be summarized in relation to the CISI through three points:

1. The low production cost of the CISI has already put its profits above those realized by other steel and iron exporters and producers, so even if an administrative cost is levied onto Chinese steel imports, only one of a considerably large value would render the adjusted dumping

¹¹⁷India – Solar Cells, *supra*, note 112, at ¶7.19.

¹¹⁸*Id.* at ¶7.55, 7.58.

¹¹⁹*Id.* at ¶7.17.

¹²⁰*Id.* at ¶7.44.

¹²¹*Id.* at ¶7.269, 7.272.

margin significant.

2. While the specific procedures for implementation are important to consider, at least on a legal basis the “reasonable method” test is further satisfied in consideration of both the TBT Agreement and the GATT. As mentioned earlier, the TBT Agreement identified the environment as being a legitimate objective for raising a technical barrier to trade. In terms of the GATT, the Chapeau listed both ecosystem health and the conservation of exhaustible natural resources as being relevant elements of consideration in implementing trade-restrictive measures.
3. Should international trade laws and legal mechanisms like ADMs and CVDs continue this pattern in relation to considerations of the environment, the very international legal regime can very well become conducive to inefficient and environmentally destructive production methods.

C. Economic Framework and Considerations

In terms of the anticipated benefits for the CISI, one finds that should the proposed carbon-adjusted DM be applied, the resultant AD duty imposed on the CISI's steelmakers using high tCO₂e/t-s BF-BOF steel casting processes will increase the ex-factory price¹²² up to the extent that it deviates unfairly from the average price of BF-BOF. This lays the road for more ambitious goals, such as minimum environmental standards of steel production set by the importing country imposed by ADMs. Matching the average normal value of BF-BOF steel is important because when calculating the dumping margin, prices are “netted back” to ex-factory price to assess the difference between normal value and the CISI export price.

With a higher ex-factory price, exporting firms in the CISI will have narrower profit margins to the extent of the carbon-adjusted DM. Should the AD duty be levied appropriately to the material injury inflicted by both government intervention and production processes of a low environmental standard, those CISI firms most affected will have to reconsider whether there is continued value in maintaining the status quo. This becomes more effective if the Chinese government continues to enforce national policy measures to battle both production overcapacity and low environmental standards in industry. Furthermore, as steel industries around the world begin to transition away from BF-BOF into alternative forms of steel production such as EAF that have less environmental impact, the carbon-adjusted DM can continuously adapt to transitioning world standards, thereby assisting in the prevention of relapse.

¹²² The ex-factory price is the price out of the factory, thus not including taxes, transportation costs, or other charges that are applied after the production process.

The impacts of carbon-adjusted DM, however, depend on two factors: (1) whether the anti-dumping regulatory system adopts the practice, and (2) the proposed adjustment has an appropriate and sufficient impact on the CISI. In order to exposit on these outcomes more thoroughly, this section provides an overview of the projected merits of adopting the carbon-adjusted DM as well as the expected consequences of maintaining the status quo, or the business-as-usual (BAU) scenario. In short, the BAU scenario minimizes the maximum benefit for both CISI as well as the anti-dumping and countervailing duties (AD-CVD) regime. Conversely, adopting the carbon-adjusted DM within the AD-CVD regime and correcting *Problem 1* and *2* associated with CISI represents the scenario that minimizes the maximum regret, offering the greatest potential benefit. While the following scenarios are in no way comprehensive, they help to elucidate the decision matrix of first generation stakeholders involving the implementation of the carbon-adjusted dumping margin.

The Minimax Strategy as the Zero-Sum for Both CISI and AD-CVD

At the first instance, BAU is taken as the minimized maximum benefit, or the worst available option, for both CISI and AD-CVD within the framework constructed in this paper. In this scenario, both CISI and AD-CVD maintain the status quo: CISI continues its current production practices and AD-CVD does not adopt the carbon-adjusted DM.

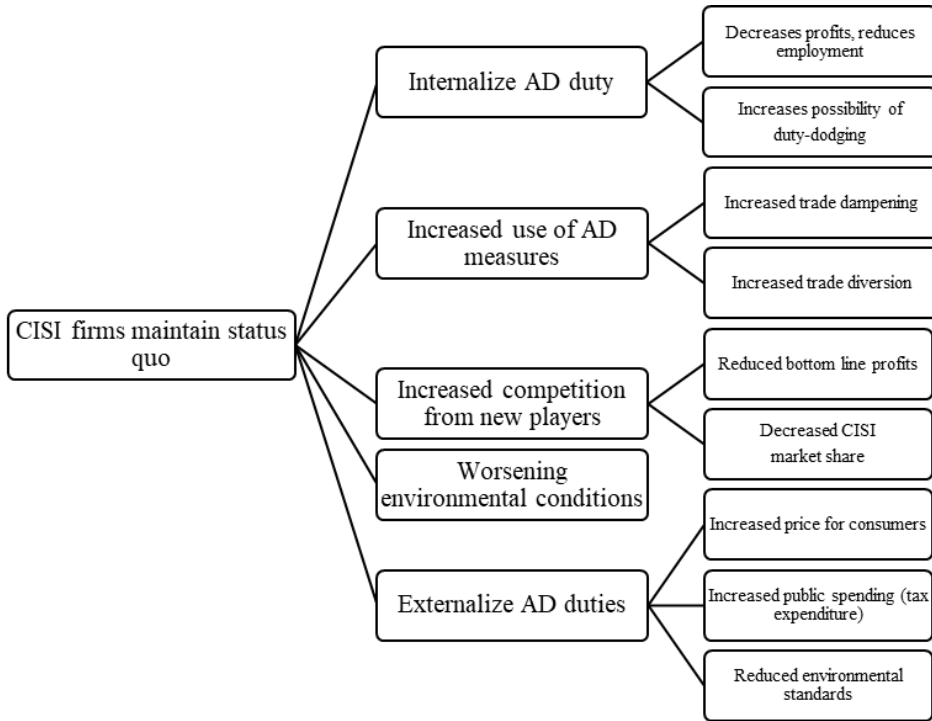


Figure 8. *Minimax* decision tree for CISI

The *minimax* payoff for CISI, as represented in

Figure 8, would equate to, *ceteris paribus*, continued or increasing production capacity with decreasing profitability as firms internalize the additional costs imposed by AD-CVD measures. These are both trends that were established earlier in this paper. Secondly, continued or maintained global steel market share of CISI means that more countries around the world may implement AD-CVD measures to protect their respective domestic steel industries. Third, CISI will face competition as steel industries in other countries with similar structural conditions as China enter the market and incubate firms that can compete at this level of low-cost production competition (therein, “new players”), further exacerbating both economic and sustainable development challenges posed by the CISI. Fourth, if all conditions are held constant, the contribution by CISI to domestic environmental conditions will continue to increase at the current or an even higher constant since CISI firms lack the incentive to adopt mitigation measures in industrial processes. Finally, in the situation where CISI firms do not internalize the additional cost of AD-CVD, then they may instead find ways to externalize those costs by passing

them to the consumer by increasing price, the government by receiving increased assistance to negate the additional costs and increase production, or even to the whole community as CISI firms find ways to further decrease the environmental standards of production to reduce costs or increase their dumping margin.

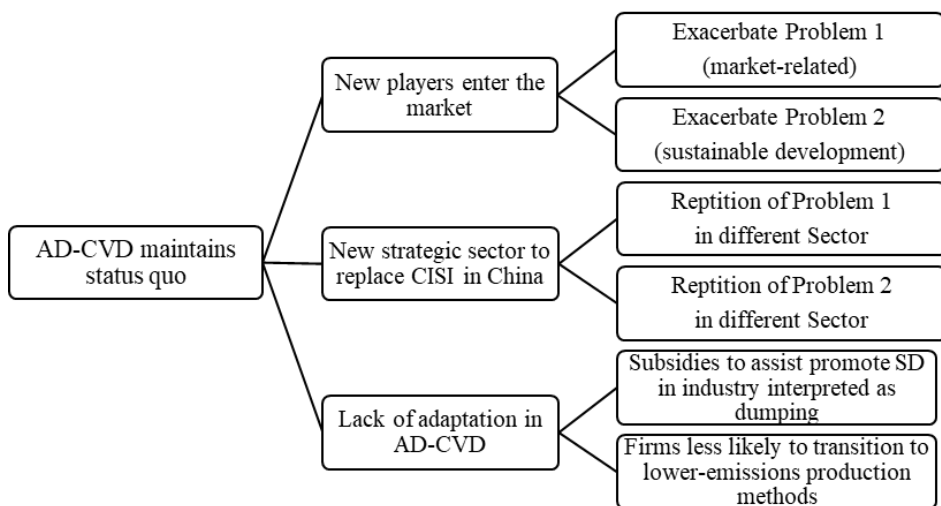


Figure 9. *Minimax* decision tree for AD-CVD

As per the *minimax* payoff for AD-CVD not adopting the carbon-adjusted DM or similar environmental adjustments, represented in Figure 9, the first consequence is that new players can enter the market following the CISI example. Economies that are just undergoing industrialization may choose to emulate the CISI, thereby exacerbating the problems introduced earlier: worldwide production overcapacity, reliance on coal-based steel production (BF-BOF), underuse of environmentally safe technologies, and increased dumping with their associated economic impacts. Secondly, Beijing may target other industries for industrial planning, expanding scale and repeating similar trends in other markets. Third, the lack of adaptation in ADMs would further establish the existing trend targeting efforts by the government to improve the environmental standards of their industries as dumping in the DSB, effectively punishing attempts to better align industry with sustainable development.

The second-tier consequences of these results can easily be speculated. The first is that the CISI will continue to internalize AD duties. This is especially the case for CISI firms that no longer receive support from the government or are at a risk of facing national administrative penalties for deviating from central planning. These firms will most likely respond by further underreporting the characteristics of their production in order to dodge duties. Should individual CISI firms choose not to

observe ADMs, this can have sectoral consequences for the CISI as importing markets choose to hedge risk causing reduced demand. Continued exacerbation of this behaviour can impact multilateral trade negotiations involving CISI. Secondly, steel industries in other countries seek to replicate the rapid growth of the CISI through the same arrangement of NME status, government intervention, and production methods of a low environmental standard. This would reduce the bottom-line profits of the CISI as it faces new competitors that have yet to face the effects of ADMs, threatening its share of the global steel market.

Thirdly, the consequence is the continuation of deteriorating environmental conditions as the CISI does not transition into cleaner forms of steel production or finds more destructive methods in order to further reduce costs. Worsening environmental conditions burdens both the government and society as a whole as they find ways to adapt and/or mitigate. For example, the state in response to threats to public health may need to increase public expenditures or enact other measures with similar opportunity costs to fund adaptation measures. Alternatively, society may find itself having to adapt to new environmental conditions through lifestyle modifications, such as staying in-doors when air quality conditions are especially deleterious.

Finally, the fourth consequence would be the lack of adaptation in the AD-CVD regime. As seen with *India – Solar Cells*, attempts by the government to enhance mitigation in its industrial sectors were shown to have been interpreted as subsidization warranting action by ADMs. Furthermore, if firms face no consequences for choosing production methods with low environmental standards, then they will be less likely to transition to cleaner alternatives.

The CISI Maximax Strategy

In the CISI *maximax* scenario, AD-CVD does not adopt the carbon-adjusted DM but CISI changes internally to have similar projected outcomes as if AD-CVD did undergo change. In other words, the CISI would effectively reduce and eliminate its excessive production overcapacity and undergo technological upgrades to improve environmental standards of production.

The payoff of the CISI pursuing this *maximax* strategy is graphically represented in

Figure 10. The wider logic behind these benefits find clearer explanation in Romer (1990).¹²³ Exponential growth in producer durable markets through capital accumulation eventually results in a levelling off into a constant and then decreasing returns to scale. In the case of the CISI, government intervention in the

¹²³Paul M. Romer, *Endogenous Technological Change*, 98(5-2) J. POL. ECON. 71, 71-102 (1990).

steel sector helped to expand the scale of the industry, which meant that CISI firms were able to increase profit in proportion to decreases in total costs (fixed and variable costs). Once increasing the scale of production through the accumulation of capital resulted in boosts in profitability and eventually into its current state of production overcapacity, a negative return to increases in scale of the CISI, which is the decreasing returns to scale, or diseconomy of scale, can be observed. As a response, Romer suggested the necessity of endogenous growth based on technological upgrades to maintain productive efficiency. In application to the CISI, the objective of technological upgrading would not be to increase productive efficiency, but rather to reduce the burden imposed by AD duties levied on to CISI imports, namely the firm-level losses in total factor productivity resulting from AD measures as explained in an earlier section. This would represent the *maximax* scenario, or dominant strategy, of China as it maintains the world competitiveness of CISI while reducing the negative impacts caused by AD-CVD. In order to assist the CISI deal with the capital requirements of shifting into EAF, the role of the State will be important, providing the capital investment necessary for the CISI to move forward together.

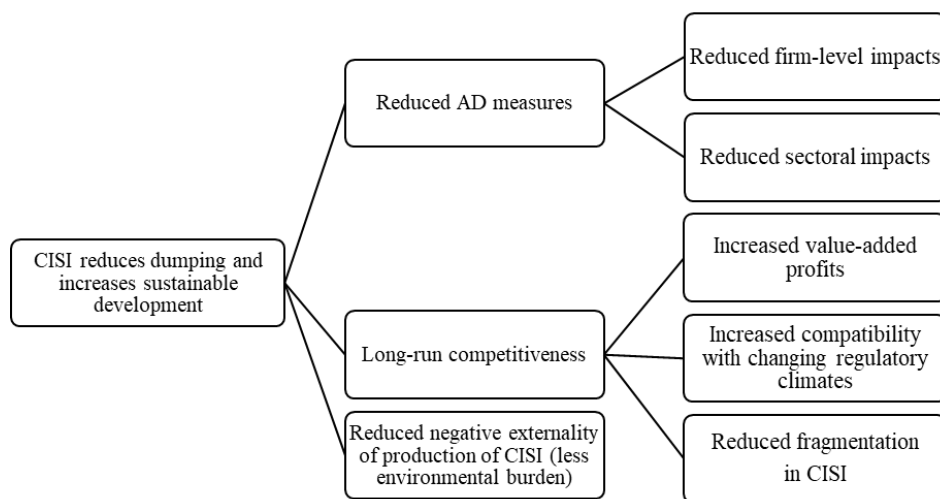


Figure 10. *Maximax* decision tree for CISI

The AD Maximax Strategy

In this strategy, the carbon-adjusted DM is adopted, which increases the impossible dumping margin. However, despite the carbon-adjusted DM, CISI does not change its price or quantity, thereby choosing to accept its *minimax* scenario with greater

welfare loss as this scenario follows the dominant strategy of AD-CVD. This means that the application of the carbon-adjusted DM increases the costs of maintaining overcapacity and low environmental production standards beyond the *minimax* scenario. This would then help AD-CVD exert pressure on CISI to resolve Problems 1 and 2 on the condition that those costs are not externalized to the consumer, government, and/or the environment.

The payoffs of this scenario, as illustrated in Figure 11, are largely identical with the legal implications of the carbon-adjusted DM identified in Subsection 6.2. Most importantly, the dominant strategy for AD in responding to the challenges posed by the CIS and similar practices is to provide the framework that enables constructive precedence in assessing dumping margins when interpreting below-cost sales or LTFV after accounting for high emissions production. Should AD-CVD follow this *maximax* strategy of adopting the carbon-adjusted DM, it would be a step towards a more concrete union between environmental and trade regulation with quantitative mechanisms in place that increase the accuracy of AD investigations.

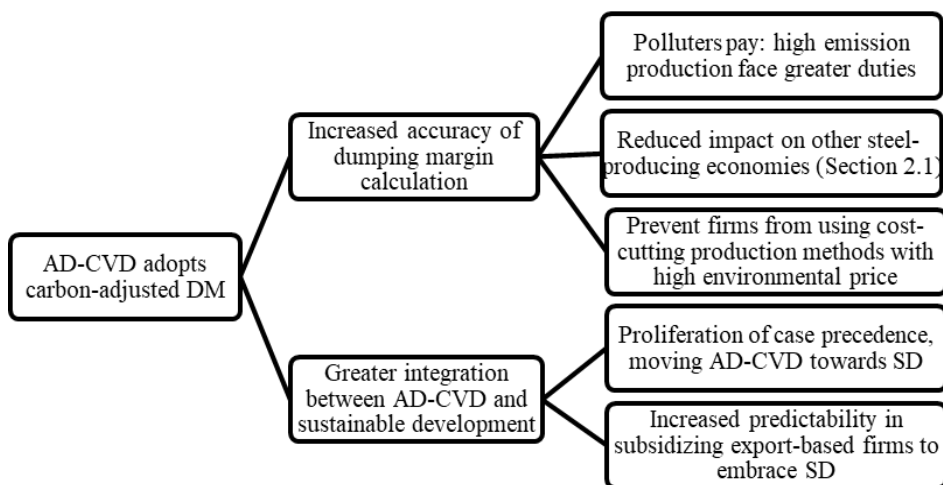


Figure 11. *Maximax* decision tree for AD

VII. CONCLUSION

Steel production overcapacity and its associated environmental problems are nested and multivariate. However, as the inherent logic behind this paper attempted to show, the solution can be institutional mechanisms with real economic impact and using it to serve long-term, shared interests like preserving the environment. To that end, the revisited role of the WTO requires a re-examination of its governance role in sustainable development as it relates to international trade.

While this research introduced several concepts in proposing the tCO₂e/t-s Adjusted Dumping Margin, the path ahead is still long and winding. The proposal put together in this must find further substantiation empirically, which would represent a valuable contribution to ongoing efforts in creating a global carbon price. Until then, the viability of these proposals shall remain normative at best. While the broad idea of a tCO₂e/t-s Adjusted Dumping Margin was introduced, its econometric engine is yet to have been designed. Integrating environmental external costs as macro-aggregates in economic models have always been riddled with assumptions and limitations. This paper sought to contribute to that endeavour by enquiring how tonnes of CO₂ emissions can be factored into steel production costs in calculating the weighted normal value as part of a dumping margin. The use of such a mechanism will require further statistical conceptualization and empirical application to anti-dumping investigations.

Regardless of how difficult the task, however, international legal mechanisms in trade dispute resolution, such as those instruments of the WTO, must now, more than ever, take into consideration a wider range of interests that may very well complicate procedural aspects of the rule of law in trade disputes. Institutions such as these must continue to adapt as new conditions and variables present themselves, responding to cross-disciplinary iterations of justice such as environmental or socioeconomic justice between state and non-state actors. This paper demonstrated that, through hypothetical modifications like the carbon-adjusted DM, anti-dumping and countervailing duty mechanisms can adapt and remain impactful in a larger range of circumstances. Yet the stark truth of the matter is that while providing these essential updates to trade dispute resolution mechanisms provides the flexibility needed to balance conflicting sovereign and non-sovereign interests, the true end-state goal is not needing these mechanisms at all. In specific relation to the CISI, long-term change will require China to find a solution that can inclusively meet its national interests while remaining thoughtful to the changes occurring outside of its borders.