

Shackles or Insurance?

-- A Comparative and Political Economic Study of Carbon Taxation

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Abstract: Although the carbon tariff and taxation are not a new initiative, the up-to-now debate is wide around the world since EU has initiated the carbon emission act. Main concerns regard to whether the taxation is imposed as a restriction and bondage or a diversion and promotion for environmentally-friendly industries. This paper will go through scholarly exploration on both sides. Specifically, historical reviews on carbon tariffs will shed light on the nature of this protocol in regulating environmental-friendly manufacturing and traditional energy consumption. The second chapter will adopt political economic point of view to analyze the value of carbon tariff, and its cultural impacts will also be taken into consideration. The concluding segment shall furnish a limited assortment of alternative avenues, thereby affording an array of choices to those tasked with making pivotal determinations. In general, this paper is a legislative analysis on carbon tariff, findings suggest that future practices and comparative policy should be strictly taken in different communities.

Keywords: carbon tariff, carbon emission, comparative policy, environmental-friendly regulation

1. Introduction

In December, 2022, EU lawmakers approved the first taxation upon carbon emission, and this legislative decision has been recognized as a pioneering step in fighting against the greenhouse gases [1]. However, its supporters seemed to decline after months, proponents focus on its negative spillover effects, particularly concerning that this tariff is a discrimination and a regional protectionism which against the free-market principle and TWO spirits. Arguments pay more attention to developing and least developed countries. Although diplomatic debate is not the orientation of this paper, it is a crucial point to summarize, scrutinize, and analyze the carbon tariff in historical points of view with the legal spirits of freedom, equality, and development.

Before diving deeper in to the topic, Ulgen has provided systematic arguments on EU's carbon border tax, saying that the mechanism of CBAM, upon which carbon tariff is imposed legally, is causing harm to the vulnerable others [2]. Russia and China, although standing as the top exporters of CBAM goods, is not the prior affected states. On the contrary, those EU's smaller trade partners are at risk for a big deal of fine, as their high dependence on this exportation toward the EU. Although the counter insights prove that this short-time, limited harm upon small countries can help urge the whole

world to legalize the pricing mechanism of carbon emission and help reduce the carbon in the end, it is not yet proved as a determined future [3].

Upon this concern, we will explore whether taxation of carbon emission is a punishment-oriented mechanism or a leading law which guide the whole society to a betterment. This evaluation, although theoretically feasible while practically unable to be prevalent, tries to shed light on future practices to the similar kind, and providing a meta-study resource for future policy and legal studies. Assumably, this paper will testify whether the political and economic criticism on EU's new mechanism is plausible, and potential suggestions on alternatives will be discussed.

2. Historical View of Carbon Tariff: A Comparative Study

The history of carbon tariff can be traced back to 1980s, when National Academy of Sciences Climate Research Board offered the carbon tax as a mechanism to minimize the effects of global warming. Theoretically, carbon tax was designed to visualize the costs, which motivated the modelling that used carbon tax as a cap and trade system [4]. Furthermore, developed scheme from a supporter at the USA proposed that carbon tax could be something more than a cap and trade system [5]. This developed scheme, in most cases, tried to use the tax to adjust the price of a good, while this good could be the carbon emission [6]. However, its history, academically and politically, concerning on a few conflicts that will be addressed in this section.

2.1. An Emission Tax or an Energy Tax?

Nordhaus is an important scholar in the presentation and prevalence of this tax, and he argued that the DICE (Dynamic Integrated model of Climate and the Economy) can solved the problem of pricing the carbon, which laid a solid foundation to impose carbon tax on production and consumption [6]. So far, punishment on production is still the mainstream concept when considering taxation as a solution, since consumption is hard to measure and elaborate. Most scholars who stand by the side to promote the carbon tax assumed that as soon as the emission is prohibited and priced, the emissions will lose its interests to manufacturers. From University of Oslo, Prof. Hoel even declaimed that there is no need to differentiate taxation upon sectors. To this end, the emission, in sum, is measured, evaluated, and punished upon the quantity. Therefore, those who consumed and produced the carbon emissions, in terms of the quantity while regardless to its significance in the process, will be imposed of this tax.

However, some scholars regard carbon tax as a kind of energy tax. Focusing on the 1997 Kyoto protocol, Speck and his fellows found that the carbon tax cast little impacts on individual families or household who spent limited fuel or similar carbon energy [7]. In Speck's model, more taxation will go to the consumers of the energy, and this idea was also supported by many Asian scholars, as they believe the final consumers, although not immediately and directly affected by the tax, would pay for this environmental tax [8]. Noticeably, this tax is added to the income-neutral environmental physical revolution, which will protect the equality of power products.

These two arguments, when the final agreement is no yet to be determined, provided a thoughtful idea that carbon tax was imposed to a certain group of people, either the producers and operators that directly cause the outgrowth of the carbon emissions, or the final consumers who grow the demand in carbon-based production. To solve this conflict, scholars and governments were seeking solutions. Tang Wenguang declared that the carbon tax can be divided into three kinds: production-only, consumer-only, and mixed type [9]. And it is suggested that mixed type scheme can maximize social welfare and enterprise profit. Other similar, comprehensive, and neutral models, which adopted the mixed-type to design their taxation model, have expanded and been promoted day by day, and it can deal with the conflict between production-first or consumer-first problem in controlling carbon emissions.

2.2. Pricing the Carbon or Carbon Quota?

To systematically evaluate the carbon emissions and regulate its growth, two theories are at the center of the academia: one is pricing the carbon and require the relevant stakeholders to pay for the pollution; and the other theory takes social cost of carbon (SCC) into consideration and assumed that it is better for developed countries if every individual (firms or organizations) have a set quota of carbon emissions.

To be specific, the carbon price theory is similar to the Pigou tax imposed by Arthur Cecil Pigou. According to Pigou, the pollution makers should be fined with environmental taxes [10, 11]. In the 1970s, it is widely accepted that pollution tax should be imposed, and studies evaluated its framework and efficiency, saying that “The pattern of pollution taxes that will achieve least-cost abatement when differing degrees of market power exist [12].” Till now, many structures and models have been developed to help price the carbon, and thanks to the advancement of the data technologies, this pricing theory is more feasible and achievable. A classic practice for this theory is the Carbon Tax Regulation enacted at 2008 from British Columbia of Canada. In this law, we can see that the payment has been firmly recognized as equal to the taxation.

On the contrary, we also see another theory, which is booming rapidly in the academia, saying that carbon taxation should be evaluated based on quantity. Therefore, John Dales believed that the carbon emission, as a quota for individual organization can be traded, controlled, and measured in whole in the end [13]. This mechanism is backed by the theory of social cost for corporations, when Ronald Coase alarmed that “the owner of the factory should be liable for the damage caused to those injured by the smoke, or alternatively, to place a tax on them varying with the amount of smoke produced. [14].” Although Coase also connect these costs to money to a certain degree, he insists that quantity, rather than the price, is more important. The perfect sample for this theory is the Acid Rain Program (ARP), which was established to require major emission reductions of other greenhouse gases which would lead to the acid rain. In this scheme, there is an implementation of emissions trading that allow participants to buy and sell emission permits.

It is hard to tell whether the carbon price mechanism, which set price for emissions in direct taxation, or the carbon quota scheme that allows emissions permits to be traded in a relatively public forum, is better for the society. Both practices are plausible in terms of its efforts in reducing emissions.

Noticeably, the latter scheme counts the emissions and retrieve the fine as a compensation for victims of the emissions, but the former one is fined the producers of emissions for governmental uses and relocation of resources and energy. To this degree, the carbon quota theory is more popular when highly-polluted factories are urged to be relocated or surveilled on their production, especially when the victims of the pollution is measurable and identifiable, and the former one is better for regions where polluted air and emitted carbon cannot be measured directly but its production and consumption activities are countable. Till now, both theories are equally adopted in different countries.

2.3. Punishment or Guidance?

The final question is not a direct problem toward the environmental regulation but a common and old-styled question for legislation. Since the environment tax was proposed by different scholars, some wish to use the taxation to mitigate the global warming, while some accuse the factories and traffic of constant, high-quantity emissions of carbon, the taxation is set with different targets. For environmentalists, especially those protectionists, this taxation is set as a punishment for over-production of carbon, but the opposite like developing countries and fast-growing enterprises and regions will regard this scheme as a protection and guidance on future development.

It might be symbolic to differentiate its targets, and people might argue this is not a black or white problem. Although the argument is right, it is also obvious that with different targets, the scheme will be set differently. Again, the ARP is a perfect example of punishment-oriented scheme, while those who wish to emit have to pay a great deal of cost on purchasing the permits. Money collected from pollution producers will be sent to governments for welfare and environment enforcement. To this degree, strict regulation on emission will gradually reduce the production, as data showed that over 10 years, the mortality risk has declined 5% thanks to the ARP [15].

While the EU's first carbon taxation law is more thorough, all-rounded, and multi-facet, which is more like a guidance than a punishment-oriented regulation. According to the CBAM (Carbon Border Adjustment Mechanism), those who wish to export high-carbon-emission products to the EU will be charged of a high taxation, but this tariff is not mandatory while many exemptions are listed. At the same time, exportation, rather than the production, is the main concern when this law is used in regulation. Therefore, to avoid negatively affect the free operation of the market while lead the market to build a more environmental-friendly market, this solution is plausible. However, it is still an alarm to the public that this law, other than being used as a tool to promote clean energy, might be misused as a tool for political discrimination and economic bias upon wealth differences. The conclusion for this section, in sum, would be that the carbon tariff is historically inherited from environmental tax and punishment-oriented law, and its main concerns is still alive but favorably adopted by different regiments.

3. Political, Economic, and Cultural Reviews of Carbon Tariff

Today, EU, British Columbia at Canada, Mainland China, Japan and many other regions have adopted a certain kind of carbon taxation to regulate the carbon emissions. As the UNFCCC initiated and dozens of countries signed and participated, the mission to reduce carbon emission quota has been distributed to different countries, and many of which are working on achieving the reduction goal. Scholars have even proposed that to introduce a uniform carbon tax to achieve UNFCCC goal. Although practices just began, criticism focus on its instinct damage toward the energy industry and its feature as a political regulatory tool. Therefore, in order to respond to the criticism while verify the practicality of the solution, we will discuss its economic, political, and cultural impacts.

3.1. Economic Impact: Twinges or Destruction?

It is argued that the carbon tax method is predicted to be effective in controlling emissions, but it also causes immediate economic downfall. Meng and fellows developed a computational system to simulate the policy and found out that a mild economic contraction will come afterwards [16]. This simulation is also supported by China's study. Liu and Lu used the CGE-CASIPM-GE model to explore the economic impact of carbon tax on Chinese economy [17]. The simulation discovered that the cost for the reduction of carbon emissions is a mild impact on economy, but noticeably, most industries will be negatively affectively, and exportation businesses will face immediate challenges. Although different simulating models have been developed, mainstream causes that drag down the economy is proven to be the drop of exportation and high expense in raw materials and processing [18].

At the same time, other studies used actual examples and data to prove the economic concerns. In Ireland, Conefrey found that transfer payment through taxation is a better solution, but it would lead to bigger burden on capital and affect the stability of manufacturing industries [19]. As the first place that imposed full-round carbon tax in the North America, British Columbia has proven a 5% to 15% decrease in carbon emissions, but its economic impacts still existed after four years [20].

In sum, although different models and samples have similar results in economic impacts, but most scholars think positively about the carbon tax as a solution to reduce carbon emissions, and so far, its impacts are predicted to be controllable and affordable for most governments of developed countries. However, tests and studies in developing countries are absent.

3.2. Political Impact: What Purpose Does the Law Serve?

Tax, especially tariff, has been prevalently used as a tool to protect local businesses, and some countries are seriously criticized of protectionism and abuse of taxes [21]. Carbon tariff, ever since the first day that countries are assigned to complete a carbon reduction quota, opinions started to criticize that developed countries are relocating manufacturing countries while imposing inequal tariff to prohibit the fast development of developing countries.

As for the EU's carbon tax law, in which the vastest regions were involved, self-interest and discrimination have been mentioned as a comment to this policy. Umit holds a positive standpoint toward the carbon tax, but he insists that self-interest is priorly considered when people being asked whether or not they wish to have the carbon tax policy [22]. Furthermore, some news reports even called the EU's carbon border tax as an "unfair taxation in the name of climate action". Its fairness and legitimacy, especially when the climate problem encounters the issue of poverty, have been criticized [23].

In Australia, a massive protest attracted the public attention, when the Gillard government decided to reverse their promise on not to imposing the carbon tax. This boycott lasted for almost one year, and politicians and scholars assume this boycott was an explosion of outrage against the media and an uncivil politics [24]. However, what stands behind the protest might be the public misunderstanding in this new taxation, as its drives, orientations, and reasoning still need time to spread.

3.3. Cultural Impact: Is Carbon Emissions Guilty?

Before the carbon tax is imposed, traditional climate change promotion and environmentalists continue to teach the public about the value of clean energy, but people have not come to a conclusion saying that using high carbon emission vehicles is a guilt. However, when the carbon tax is taken into account, this payment, although in the name of taxation, have been recognized as a protocol of fine, and will disseminate a concept, saying that emitting carbon is guilty. This guilty intonation will lead to conceptual inequality and social unfairness to a certain degree, although this aftermath have not yet been proven. To be specific, people in developing countries and least developed areas will be more vulnerable to be discriminated in this great scope of anti-carbon system, and it should be noticed ahead before the law is widely adopted.

4. Conclusion

As a response to the urgent calling for mitigating global warming and global governance, the carbon tax has been taken as a promising method. While its criticisms and concerns are vast as listed, political abuse and immediate economic shock are regarded as prior problems. Therefore, environmentalists have provided alternatives such as resource taxation (impose tax on those who used petrol and gases), and carbon trade and cap systems (develop a virtual market to sell, process, and relocate the carbon). Before these solutions develop into mature schemes, carbon tax, as it has started to commit its mission as a public policy tool, shall be further examined in terms of its impacts in the developing areas and least developed areas.

Since so many concerns and debates are still going on about its fairness and targets, future studies turn to seek other options, rather than GCG model which is a system of simulated policy based on parameters, to verify its effectiveness and value. The overall solution, requires more details, such as

the basic line of the quota, the pricing system and its variability in different industries, and exemptions for carbon tariff in the international scope.

References

- [1] Dalton, M. and Ramkumar, A. (2023) *World's First Carbon Import Tax Approved by EU Lawmakers*. *The Wall Street Journal*.
- [2] Ülgen, S. (2023) *A Political Economy Perspective on the EU's Carbon Border Tax*.
- [3] Elliott, J., Foster, I., Kortum, S., Munson, T., Cervantes, F.P. and Weisbach, D. (2010) *Trade and Carbon Taxes*. *American Economic Review*, 100, 465-469.
- [4] South Coast Air Quality Management District. (1994) *RECLAIM Program Summary: A Market Incentive Air Pollution Reduction Program for NOx and SOx*. South Coast Air Quality Management District, Diamond Bar.
- [5] Metcalf, G.E. (2009) *Designing a Carbon Tax to Reduce US Greenhouse Gas Emissions*. *Review of Environmental Economics and Policy*.
- [6] Nordhaus, W.D. (2017) *Revisiting the Social Cost of Carbon*. *Proceedings of the National Academy of Sciences*, 114, 1518-1523.
- [7] Speck, S. (1999) *Energy and Carbon Taxes and Their Distributional Implications*. *Energy Policy*, 27, 659-667.
- [8] Yang, H. and Chen, W. (2018) *Retailer-driven Carbon Emission Abatement with Consumer Environmental Awareness and Carbon Tax: Revenue-sharing Versus Cost-sharing*. *Omega*, 78, 179-191.
- [9] Tang, W., Li, H. and Chen, J. (2021) *Optimizing Carbon Taxation Target and Level: Enterprises, Consumers, or Both?*. *Journal of Cleaner Production*, 282, 124515.
- [10] Pigou, A.C. (1909) *The Policy of Land Taxation*. Longmans, Green.
- [11] Edenhofer, O., Franks, M. and Kalkuhl, M. (2021) *Pigou in the 21st Century: A Tribute on the Occasion of the 100th Anniversary of the Publication of the Economics of Welfare*. *International Tax and Public Finance*, 1-32.
- [12] Lee, D.R. (1975) *Efficiency of Pollution Taxation and Market Structure*. *Journal of Environmental Economics and Management*, 2, 69-72.
- [13] Dales, J.H. (2002) *Pollution, Property & Prices: An Essay in Policy-Making and Economics*. Edward Elgar Publishing.
- [14] Coase, R.H. (1960) *The Problem of Social Cost*. *The Journal of Law and Economics*, 3, 1-44.
- [15] Barreca, A.I., Neidell, M. and Sanders, N.J. (2021) *Long-run Pollution Exposure and Mortality: Evidence from the Acid Rain Program*. *Journal of Public Economics*, 200, 104440.
- [16] Meng, S., Siriwardana, M. and McNeill, J. (2013) *The Environmental and Economic Impact of the Carbon Tax in Australia*. *Environmental and Resource Economics*, 54, 313-332.
- [17] Liu, Y. and Lu, Y. (2015) *The Economic Impact of Different Carbon Tax Revenue Recycling Schemes in China: A Model-based Scenario Analysis*. *Applied Energy*, 141, 96-105.
- [18] Liu, L., Huang, C.Z., Huang, G., Baetz, B. and Pittendrigh, S.M. (2018) *How a Carbon Tax Will Affect an Emission-intensive Economy: A Case Study of the Province of Saskatchewan, Canada*. *Energy*, 159, 817-826.
- [19] Conefrey, T., Fitz Gerald, J.D., Valeri, L.M. and Tol, R.S. (2013) *The Impact of a Carbon Tax on Economic Growth and Carbon Dioxide Emissions in Ireland*. *Journal of Environmental Planning and Management*, 56, 934-952.
- [20] Bernard, J.T. and Kichian, M. (2021) *The Impact of a Revenue-neutral Carbon Tax on GDP Dynamics: The Case of British Columbia*. *The Energy Journal*, 42.
- [21] Davidson, K. (2011) *The Use and Abuse of Taxes*. *Dissent*, 36, 2-8.
- [22] Umit, R. and Schaffer, L.M. (2020) *Attitudes towards Carbon Taxes across Europe: The Role of Perceived Uncertainty and Self-interest*. *Energy Policy*, 140, 111385.
- [23] Vandyck, T., Della Valle, N., Temursho, U. and Weitzel, M. (2023) *EU Climate Action through an Energy Poverty Lens*. *Scientific Reports*, 13, 6040.
- [24] Ward, I. (2015) *Tea Party Imitators? The Campaign Against the Carbon Tax, the Media and a New Uncivil Politics*. *Australian Journal of Political Science*, 50, 225-240.