The Impact of the Greening Tax System on Sustainable Development: A Political Economy Perspective

Yu-Chih Lin* and Lu Zhang 2

Krirk University, Thanon Ram Intra, Khwaeng Anusawari, Khet Bang Khen, Krung Thep Maha Nakhon10220, Thailand.
*E-mail: Lin.YuChih@staff.krirk.ac.th

Abstract. The paper examines the impact of the greening tax system on sustainable development with a political economy perspective. The influence of greening tax system, green gross domestic product (green GDP) and education on developing sustainability are reviewed. The research shows that the greening tax system has a positive influence on developing sustainability, including decreasing air pollutant, improving the quality of marine environment, decreasing the percentage of light polluted rivers, and increasing garbage recycling rate. Furthermore, the greening tax system has a positive influence on economic growth and green GDP. Nevertheless, the innovative approach of green education is suggested for future sustainable development.

Keywords: Greening Tax System; Green GDP; Sustainable Development

1 Introduction

The impact of the greening tax system on sustainable development is examined specifically with the perspective of political economy. Sustainability is ‘a systems-based concept and, environmentally at least, only begins to make any sense at the level of eco-systems’. It is ‘an ecological and societal concept’, ‘a way of being’ and interacting between ‘organisations, individuals, societies and states’. [15] With a political economy perspective, the paper studies the influence of the greening tax system on green gross domestic product (green GDP), economic growth, education, and sustainable development. The approach of documentary data analysis is adopted to study Chen’s research on the empirical data of sustainability and the greening tax system. The empirical data illustrate the positive impact of the greening tax system on developing sustainability. It is argued that the greening tax system applies to improving environment for sustainable development. Furthermore, it is argued that the reform of greening tax system has a positive impact on green GDP. The greening tax system not only influences positively on green GDP, but also promotes economic growth. Meanwhile, education is emphasized on training or advocating sustainable development.

2 Literature Review
2.1 Greening Tax System

According to the principle of the United Nations Framework Convention for Climate Change (UNFCCC), states based on the capability of gross domestic product (GDP) are responsible for greenhouse gas emissions. Chen mentions that sustainable development has been an issue concerned due to the awareness of environment protection in recent years. In order to fulfill the demand of UNFCCC, greening tax system is advocated for decreasing air pollutant and carbon emissions, and meanwhile, achieving the balance of environment protection and economic development. Chen studies the model of the influence of the greening tax system on sustainable development. It is found that after collecting air pollution fee, the index of air quality is significant improved; nonetheless, the recycling index is improved due to regulations. Chen stresses that greening tax system indeed has a positive influence on sustainable development.

Hoerner and Bosquet study European environmental tax reform and suggest that:

- A poorly-designed environmental tax reform can impose substantial costs on the economy. On the other hand, a well-designed reform can increase employment and have GDP and distributional effects that are negligible or positive.

It is argued that the developed countries place more emphasis on green growth while the developing country still struggling to achieve. Due to advocating and worrying about environmental issues, policies or tax systems may have progress ‘green growth economy’. The greening tax system is examined to study its impact on green GDP, education, and sustainable development.

2.2 Green Gross Domestic Product (Green GDP)

It is argued that in order to achieve higher GDP rates, the environmental sustainability may be sacrificed; moreover, traditional economic measurements, such as gross national product (GNP) and gross domestic product (GDP), may not account for the green growth. Therefore, green gross domestic product (green GDP) is suggested as an alternative measurement of ‘the social and environmental damage caused by a country’s economic growth’. In the 1940s, the concept of GNP was put forward in the process of macroeconomic measurement, and then derived the GDP; the accounting system became a crucial factor in measuring regional economic development. Furthermore, via analyzing the green GDP, the problem of excessive demand for resources, such as ecological environment, may be effectively solved.

The green GDP mainly refers to the local natural resources and environmental factors within country and region. Natural resources include land, forest and aquatic products. Environmental factors include ecology, humanities and environment. The influence of natural resources and environmental factors may reflect the cost of resource depletion and environmental degradation generated in economic activities and may be deducted from GDP. The green GDP, the competition of national economic growth effect, reflects the social
progress of the relationship between the sustainable economic and social welfare, and meanwhile, reflects the economic index of the GDP. In the process of the green GDP accounting, the environmental pollution loss which derives from the economic growth is taken into account and deducted from the value of resource depletion in GDP in order to understand the balance between human and nature. Compared with GDP, green GDP is a supplement to it. The formation of green GDP, also a derivative of the GDP, cannot be separated from it.[10] It is mentioned that

A comparison of the ratio of environmental tax revenues to GDP is an informative indicator for comparing...achievements related to greening budget revenues and the importance of environmental taxes for accumulating budget revenues. [5]

However, as Gao and Zhu argue, whether the greening tax may be too high and the impact on the green GDP are concerned.[6] Following the argument of diverse perspective, whether the greening tax may be too high to influence green GDP or economic growth is also examined via analyzing the research of empirical data.

2.3 Education and Green GDP

When analyzing the influence of economic growth, Minos Kiriakou adopts regression analysis with the concept of Lucas endogenous economic growth model, and takes the education level of working population as a crucial index to measure human capital. The research shows that human capital is related to national education level and economic growth. There is a positive correlation between education level and economic growth. Furthermore, Solow model is adopted to analyze the influence of education on economics. It is found that when analyzing the overall contribution of China’s education to the economic growth rate, a small amount of increase means a small share of the overall contribution. The average educational level of labor population may be seen as the main education index. [12] It is argued that education is a foundation for industrial optimization and upgrading. Industrial structure optimization plays a positive role in promoting the growth of enterprises and is the driving force of economic growth. While optimizing industrial structure, it is also necessary to smooth the operation of the economy. [11] However, it is suggested that the non-market value of natural resources, such as national culture, society and tranquility into human resources, is considered to solve the difficulty of gathering economic data, and to calculate the green GDP index.[13]

It is argued that economic growth may not develop sustainability; instead, natural resources may be consumed more while developing economy. Therefore, green GDP index may apply for sustainability development. [3] Nonetheless, research examines the green GDP accounting system to explore the impact of education on green GDP. It is suggested that education indeed makes contribution to green economic development [4]; via education, the transition of
economies to green and clean’ development may be fulfilled. [9] However, it is concerned that the failings of green education, such as research without good quality or universities without good performance, may not lead to sustainability. It is suggested that in order to achieve green development, the ‘enrollment in technical tertiary education’ may be increased and quality may be improved, especially in developing countries. [9] Whether education may develop sustainability or whether economic growth may improve sustainable development is examined via studying documentary data.

2.4 Sustainable Development

Sustainability, as Gray mentions, is ‘a systems-based concept and, environmentally at least, only begins to make any sense at the level of eco-systems’. However, due to the reason, it may not be easily conceptualized at the levels ‘below planetary and species’ ones. It is ‘an ecological and societal concept’, ‘a way of being’ and interacting between ‘organisations, individuals, societies and states’. [15] Furthermore, it is argued that the ‘realist ontology and epistemology’ of sustainability is doubted. It is suggested that ‘accounts of sustainability will both communicate and construct reality’. [15][16]. Sustainable development, as Elliott mentions, under the context of globalization, have been brought both new challenges and opportunities. However, it is stressed that there is no simple solution for sustainable development. [18] According to the United Nations, sustainable development goals include ‘clean water and sanitation’, ‘affordable and clean energy’, ‘industry, innovation and infrastructure’, and ‘responsible consumption and production.’ [17] The sustainable development goal is also examined via analyzing the empirical data. Nonetheless, the impact of the greening tax system on sustainable development is examining via documentary data analysis.

3 Documentary data analysis

Chen gathered the documents related to sustainable development, and then adopted comparison analysis to study the influence of greening tax system on sustainable development. The evaluation model of sustainable development and greenhouse gas emissions were from the official documents in order to explore the influence of regulations on supply and demand of energy, macroeconomics and pollutant emissions.[1] As Punch mentions, documentary data include ‘personal notes’ or ‘policy documents and papers.’ [14] The documentary data of Chen’s research were studied to demonstrate the relation between the change of environment and the impact of the greening tax system on sustainability.

4 A Political Economy Perspective on the Greening Tax System and Sustainable
Development

4.1 The Decreasing Air Pollution

The empirical data show that the quality of environment has been improved. Chen indicates that the air pollutant has been decreasing for 17 years (see Figure 1). It is suggested that the decreasing air pollutant is related to greening tax system.

![Figure 1: The air pollutant has been decreasing (a) Carbon Monoxide (CO) (b) Sulfur Dioxide (SO2) (c) Nitrogen Dioxide (NO2) (d) Hydrocarbon][1]

According to Chen, the air pollutant, including Carbon Monoxide (CO), Sulfur Dioxide (SO2), Nitrogen Dioxide (NO2) and Hydrocarbon, has been steadily decreasing due to the greening tax system. [1] Streimikiene et al. have stated, environmental tax, as a tool, promotes sustainable development and reduces ‘atmospheric pollution’ and ‘fossil fuel consumption’. [5] According to Gao and Zhu, the tax policies related to carbon emissions have been increasingly made in China since 2006. [6] Meanwhile, the green transition is stressed to increase ‘energy efficiency’, including ‘energy-efficient equipment’ and ‘vehicles’. [9] It is also shown that the environmental products in the global market has been increasing. For example, sustainable transport has been increasing from 247 to 494 billion USD.[9]

4.2 The Improving Quality of Marine Environment

The empirical data show that the quality of marine environment has been improved. Chen indicates that the quality of marine environment has been improving for 8 years (see Figure 2).[1]
According to Chen, the quality of marine environment has been continuously improved. The further discussion on the relation between the greening tax system and the quality of marine environment is suggested. [1] As Jagannathan stresses, the usage of ‘energy from renewable sources’, including solar, ocean, and hydropower may be seen as ‘a green transition’ leading to sustainable world. [9]

4.3 The Decreasing Percentage of Light Polluted River

The empirical data show that the light polluted river has been improved. Chen indicates that the percentage of light polluted rivers has been decreasing for 23 years (see Figure3). Nevertheless, the further discussion on the relation between the greening tax system and the percentage of light polluted rivers is suggested. [1]

According to Chen, the percentage of light polluted rivers has been steadily decreasing. [1] It is argued that in order to ‘conserve natural resources’, the usage of products conserving natural resources, such as ‘organic agriculture’, ‘land and soil management’, and ‘water management’, are suggested. Furthermore, it is stressed that the usage of products for conserving natural resources, including ‘water supply’ and ‘water efficiency’, has been increasing from 253 to 658 billion USD. Jagannathan indicates that ‘a green transition’ may develop sustainability.[9]
4.4 The Increasing Garbage Recycling Rate

The empirical data show that the garbage recycling rate has been improved. Chen indicates that the garbage recycling rate has been increasing for 13 years (see Figure 4). It is suggested that the increasing rate is related to greening tax system.[1]

![Figure 4 The garbage recycling rate has been increasing](image)

According to Chen, the garbage recycling rate has been significantly increasing.[1] It is argued that the emphasis on green transition may reduce pollution via ‘recycling and reuse’. Furthermore, Jagannathan indicates that for developing sustainability, waste recycling has been increasing from 41 to 63 billion USD.[9] Nonetheless, the concept of user-pays may also be adopted. As Streimikiene et al. has mentioned ‘the polluter-pays principle in a cost-effective and flexible way’ may change producing and consuming behavior toward sustainable development. [5]

4.5 The Greening Tax System, Green GDP, Education and Sustainable Development

Following the analysis of empirical data, it is argued that the greening tax system may apply to improving environment for sustainable development. As Chen indicates, the greening tax system has been decreasing the air pollutant and increasing the garbage recycling rate.[1] It is argued that greening tax reform achieves ‘both environmental and economic objectives’ via reforming ‘environmental pollution’ and ‘resources consumption’ tax.[3][8] As Jagannathan states, the usage of environmental products, energy from renewable sources, products conserving natural resources, and recycling and reuse has been increasing for developing sustainability.[9] For the development of sustainability, it is suggested that the elements of tax reform designs include policies to promote clean technology. [7]

Furthermore, it is argued that the reform of greening tax system has a positive impact on green GDP. Streimikiene et al. have stressed that increasing ‘proportion of environmental tax to GDP’ has a positive impact on sustainable development, and the increasing contribution of environmental tax promotes the greening tax system. Furthermore, consumer behavior changes due to environmental tax reform, and less ‘environmentally damaging products’ are purchased.[5] Nevertheless, the greening tax system not only influences positively on green
GDP, but also promotes economic growth. As Stjepanovic et al. have mentioned, the growth of economy speeds up due to reforming greening tax system. [3]

For sustainable development, it is argued that the educational approach is stressed for the green reform. As Jagannathan indicates, the innovative approach of education toward green growth is recommended in order to educate green professionals for the development of sustainability. For example, in recent years, world leading universities, such as Stanford University and Columbia University, have launched environmental curriculum for the green development. The more innovative approach of green education and training system is also suggested for sustainable development. [9]

5 Conclusion

The paper studies the impact of the greening tax system on sustainable development with a political economy perspective. It is indicated that the greening tax system has a positive influence on developing sustainability, including decreasing air pollutant, improving the quality of marine environment, decreasing the percentage of light polluted rivers, and increasing garbage recycling rate via reforming green tax system. For example, the environmental tax reduces air pollution and the usage of energy from renewable sources improves the marine environment. The products conversing natural resources enhance water management and decrease polluted water. The reform of greening tax system, such as polluter-pays principle, increases garbage recycling rate.

Furthermore, it is indicated that via greening tax system, both environmental development and economic growth are achieved. The reform of greening tax system also speeds up the growth of economy and has a positive impact on green GDP. Meanwhile, green education is emphasized on training or advocating sustainable development for future sustainable development. The paper may be a step forward for further academic research examining the relationship between greening tax system and sustainable development. Nonetheless, the concern of developing green GDP via education may be stressed by further research.

Reference

[1]Chen, W. K. Colin 2012 The Analysis of the Impact of Greening Tax System on Sustainable Development. The Cross-Strait Environment and Energy Conference and The First Global Chinese Environment and Energy Conference.

[2]Giplet, D. and Roberts, J T 2017 Climate Change and the Transition to Neoliberal Environmental Governance. Global Environmental Change. Vol.46, p.148-156.

[3]Stjepanovic, S, Tomic, D and Skare M 2019 Green GDP: An analyses for developing and developed countries. Economics. P.4-16

[4]Chen Ran, Ding Xiaohao and Min Weifang 2019 Research on the contribution of
education to green GDP. *Education research*. Vol.40 (5), p133-141.

[5] Streimikiene, D, Siksnelyte, I, Zavadskas E K and Cavallaro F 2018 The Impact of Greening Tax System on Sustainable Energy Development in the Baltic States. *Energies*.11.

[6] Gao, Y and Zhu B 2011 Examining Motor Vehicle Tax and Carbon Emissions Tax based to the perspective of environmental txx. *Tax and Economic Research*. Vol.68, p.16-22.

[7] Hoerner, J A and Bosquet B 2001 *Environmental Tax Reform: The European Experience*. Center for a Sustainable Economy. US:Washington, DC.

[8] European Commission. 2013 *Tax Reforms in EU Member States 2013 of European Commission*. European Commission: Brussels, Belgium.

[9] Jagannathan, S 2013 Education and Skills in Asia: Responding to Greening Economies. In R Maclean and S Jagannathan (Eds.) *Skills Development for Inclusive and Sustainable Growth in Developing Asia-Pacific. Technical and Vocational Education and Training: Issue, Concerns and Prospects*. Vol.19. Dordrecht: Springer.

[10] Ma, Shucai and Cui, Zhongping 2018 *GMM empirical analysis of green technological progress and economic growth*. *Journal of Shenyang normal university* (social science edition). Vol. 42 (5), p44-49.

[11] Jin, Xinghua and Yan, Jinqiang 2019 *The crux of China’s green GDP accounting dilemma and the breakthrough path — based on the negative value perspective*. *Lanzhou journal*. Vol(9), p136-148.

[12] Zhang, Xinyou 2018 *Thinking on innovation mode of Xinjiang’s cooperation with Russia in cultural industry under the background of ‘One Belt And One Road, initiative [J]*. *Xinjiang social science forum*. Vol(5), p.63-66.

[13] Zhong Shuiying and Feng Yingjie 2017 *Measurement and evaluation of inter provincial green development welfare in China*. *China population & resources & environment*. Vol. 27 (9), p.196-204.

[14] Punch, K 2014 *Introduction to Social Research*. Third Edition. UK: Sage.

[15] Gray, R 2010 Is Accounting for Sustainability Actually Accounting for Sustainability…and How would We Know? An Exploration of Narratives of Organizations and the Planet. *Accounting, Organizations and Society*. Vol.35, p.47-62.

[16] Quattrone, P. 2006 The Possibility of the Testimony: A Case for Case Study Research. *Organization*. Vol.13(1), p.143-157.

[17] The United Nations Sustainable Development Goal. [https://www.sdgfund.org/goal-1-no-poverty](https://www.sdgfund.org/goal-1-no-poverty)

[18] Elliott, J. 2013 *An Introduction to Sustainable Development*. UK: Routledge.

**Acknowledgements**

The authors would like to thank to the recommendation of Colin W.K. Chen, Chief Editor of IOP EEC ICSM 2020, and the contribution of his research ‘The Analysis of the Impact of greening tax system on sustainable development’.