Journal of International Trade, Logistics and Law, Vol. 9, Num. 1, 2023, 203-215

UNRAVELING THE RELATIONSHIP BETWEEN ENVIRONMENTAL TAXATION AND TRADE: THE MODERATING ROLE OF JUDICIAL SYSTEM WITHIN THE JAPANESE CONTEXT

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Received: April 22, 2023 Accepted: May 18, 2023 Published: June 01, 2023

Abstract:
The efficacy of environmental taxation in achieving global emission reduction and its impact on economic performance have been widely debated, in the context of sustainable development. However, the role of the judiciary system's effectiveness as a moderating factor has been largely overlooked in previous studies. The current study examines the impact of green taxation on trade performance from two perspectives: firstly, the individual effect of environmental taxation on trade, and secondly, the moderating effect of the judiciary system on the relationship between environmental taxation and trade, with a focus on Japan. The study utilizes several factors, such as judicial independence, impartial courts, property rights protection, and legal enforcement of contracts, to represent the judiciary system. Autoregressive distributed lag methodology is employed to analyze the data. The findings reveal that the introduction of environmental taxation reduces Japanese trade both in the short and long run. However, the negative impact of environmental taxation on trade is balanced by the moderating effect of an effective judiciary system. The study suggests that the judiciary system can play a crucial role in mitigating the adverse effects of environmental taxation by ensuring that it is implemented equitably and efficiently, and by enforcing penalties on governments and corporations that violate environmental regulations.

Keywords:
Environmental taxation, Judiciary independence, Trade, C02 emission.

Jel:
K32, Q56, F18

1. Introduction

In general, environmental taxation (ET) applies to all tax collected across multiple categories of energy, such as fuel, electricity-generation tax, and oil product consumption tax. Lin (2019) asserted that charging the energy industry is an efficient strategy to conserve energy, decrease greenhouse gas emissions, and enhance environmental standards. Unequivocally, from an idealistic point of view, carbon emissions (C02) can be scaled back using different approaches, including environmental-levied charges, which can incentivize the market to assimilate green technologies pathways and implement energy-saving measures, which is the primary source of CO_2 emissions, through enhancements to energy efficiency and further transitioning toward clean technology embracement (Calderón et al., 2016). In regard to this, changes in such taxes possess the potency to be competent to advance the adoption of renewable energy which are optimal options of carbon curtailment by supporting the market toward green growth and enhance trade performance (Danish & Ulucak, 2020; Aden, 2023). Conversely, classical economic are apprehensive about taxation in general since they exert a contractionary effect on economic growth and trade activities. Yet, evidence from current growth theories suggests that environmental laws, including tax legislation, are the principal factor of the move to low-carbon technology, which may provide a foundation for countries to build sustainable pathways (Acemoglu, 2016). Furthermore, profits from such initiatives could also provide extra funds to upgrade obsolete infrastructure, which requires more assets and generates intensified waste and pollution, as well as

to optimize workforce development, which is a critical component of long-term economic development and ecological consciousness if properly managed.
The critical aspect of environmental taxes and state legislation has been addressed in previous studies (e.g., Damania et al., 2003; Castiglione et al., 2014). However, these studies have disregarded the moderating role of judicial factors. The structure of the judicial system is essential from an environmental perspective because it conveys the predominance of law and the resilience of the institutional system itself. Normative execution, especially, the health of the juridical system and other law enforcement, should delineate the ability of the state to impose, administer, and oversee taxation system, and particularly green taxes. Consequently, the scope of variation in the legitimacy of Law implementation among nations is anticipated to have varying impacts on the effectiveness of environmental programs. For example, emerging, or previously transitioning nations may face hindrances in implementing environmental taxes due to inadequate rule of law or low compliance towards green taxation owing to a myopic legal system. In this context, this study focuses heavily on the interactive moderating role of the judicial health system in examining the impact of environmental taxation on growth, particularly on trade performance. Similarly, rather than relying on a singular indicator of the effectiveness of the judicial system, this study employs a composite index that comprises four distinct factors to represent the overall state of the judicial health system. Japan is a suitable case study since it ranks among the top three countries in Asia and the top 25 in the world for environmental protection, according to the environmental protection index published by Yale University in 2022. Japan's strong performance can be attributed to its policies in energy efficiency, renewable energy, and waste management, making it an ideal case study.

2. Literature review

2.1. C02 Emissions and Environmental Taxation

According to McEvoy research, a emissions tax is the optimal method to regulate greenhouse gas emissions. Unequivocally, a myriad of scholars calls for improvement in environmental performance by imposing energy taxation since it will be a panacea parameter for all environmental degrading activities (see; Hayashi, 2001; Hao et al., 2021; Banerjee & Carrion2017; He, 2019). Therefore, in order to advance environmental sustainability, policymakers worldwide should introduce carbon taxes on fossil fuels according to their carbon volume. Nevertheless, Barragán-Beaud et al. (2018) underlined the benefits of employing emission trading as opposed to emission tax as the most suitable carbon charging mechanism when seeking the most effective strategy to address ecological problems. For instance, the case of Mexico, carbon trading is thought to be more feasible politically and economically in terms of reducing greenhouse gas (GHG) emissions. Zhang (2018) focused on the tourism-based economy and discovered that tax on emission policy might have a significant impact that could increase the value of low emissions transport options. In this regard, environmental considerations are increasingly on the global stage, and businesses are under pressure from a variety of sources, including regulators, funders, customers, and rivals, to conduct environmental R&D in order to safeguard the environment while still pursuing high profit (Yenipazarli 2019). As result of this rising worry about climate change and the ongoing occurrence of unplanned natural disasters have pushed the government to enact tax reform that can stifle activities that harm the environment. Studies by Freire-González and PuigVentosa (2019), and Rodrguez et al. (2018) shift the spotlight to examine authorities' strategy of employing tax overhaul to tackle environmental degradation. They argued that even if levying fees or taxing some activities could cause the economy to falter, it might have a long-lasting beneficial impact on the ecology. Nonetheless, Goulder (1995) contends that an emission tax is more anti-competitive than a labor tax given that it has a narrower tax base, a potential for double taxing (i.e., on both input material and final output), and its uneven distribution among energy supplies. Moreover, Gaskins and Weyant (1993) asserted that the implementation of an environmental taxation would result in greater pricing distortions due to how much an emission tax or other climate action reform would impact costs paid by both purchasers and providers. Indeed, the entire purpose of an environmental tax is to completely or relatively repair a perversion resulting from an earlier ecological externality. The results of reducing distortions by internalizing an environmental externality are adaptations in the market to a greater degree of allocative efficiency, nevertheless, such a bold move without green economy strategy formulation will undermine the country's overall performance.

2.2. Green Taxation and Macro-economic Factors

Kohn (2000) studied the dilemma of whether environmental levies impact global commerce more favorably or more adversely. The author used a Heckscher-Ohlin-Samuelson model with three countries. The results indicate Environmental taxes raise the amount of commerce between any two nations when the tax is higher in the nation that exports (imports) the polluting good, absent pollution havens and three-country effects that reverse natural comparative advantage. The third country predicted tax effect may be reversed by the green tax, which can also have significant commerce consequences amongst nations by altering manufacturing prices. Some studies (Bento and Jacobsen 2007;Takeda 2007) endorse the presence of double returns for environmental taxation (ET). In some circumstances, switching from traditional taxes to ET not only addresses the adverse impact of certain externalities but also lessens the market-skewing impacts of taxation, hence enhancing welfare (Ekins et al. 2011). The existence of various outcomes in green taxation is also transparent from economic expansion or fiscal austerity. A theoretical model presented by Karydas and Zhang (2019) enables the identification of the necessary conditions for greater development following an ET. They discover, that, there is uncertainty regarding the effect of green tax change on growth, however, in the instance of Switzerland, they demonstrate that when revenues from carbon taxes is utilized to offset capital taxes, there is a growth profit over the long term. Yamazaki (2017) offers evidence that a carbon fee and dividend would not have a negative impact on employment. Pereira (2017) demonstrate, for the instance of Portugal, that it is feasible to design of a revenue, infused by green tax reform would deliver three benefits; achieving good environmental, employment, and fiscal outcomes.

3. Methodology

The study uses yearly time series data ranging from 2000 to 2020 with the regard to Japan as a focus country. In the case of Japan specifically, the country has implemented a range of environmental taxes, including taxes on carbon emissions, fuel, and waste disposal. These taxes have had mixed impacts on trade performance, with some sectors experiencing increased costs and reduced competitiveness, while others have benefited from the shift towards more sustainable practices. Analyzing these impacts in more detail can help policymakers to identify areas where further support may be needed to ensure a smooth transition to a more sustainable economy, while still maintaining Japan's position as a key player in global trade. Within this context, the study uses trade (% of GDP) as a proxy for trade performance. Next, environmental taxation is employed as an independent factor in order to evaluate the relationship between the independent variable with the dependent variable (Trade). The data are gathered from the OECD data. Further, several indicators for the Japanese judicial system are selected as a moderating factor, including judicial independence, impartial courts, protection of property rights, and the legal enforcement of contracts. The data are extracted from the Fraser Institute economic freedom Index. Finally, we incorporated the co2 emission as a controlling variable. To proceed with the study, the paper performed Autoregressive distributed lag (ARDL). The model will be useful in predicting the long-term and short-term correlations between variables. It is particularly useful when dealing with small sample sizes and mixed-order variables, as it allows for the estimation of both short-term and long-term effects of changes in variables. It can also be used examine the presence of a long-term equilibrium relationship between variables, which means that they have a long-term equilibrium relationship. Next, the Granger causality test is performed to capture the long-run and short-run dynamic relationship among the variables. It also helps in determining whether changes in one variable are likely to cause changes in another variable, or whether the relationship is bidirectional or spurious.

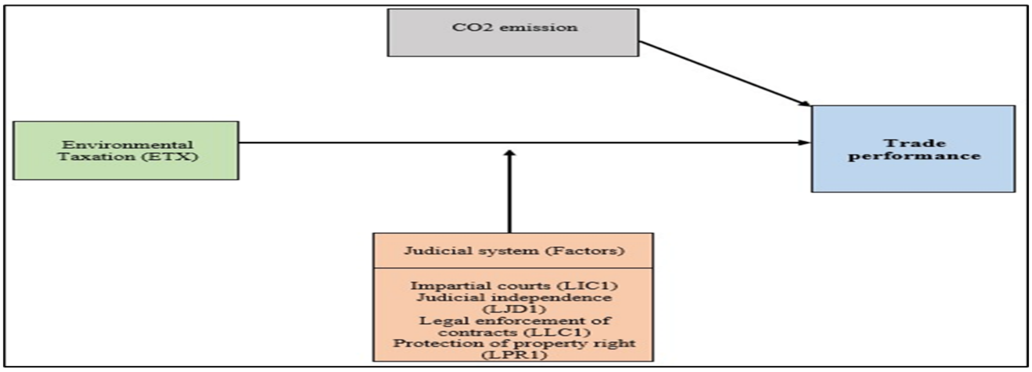

Figure 1. The conceptual model of the study

Table 1. Variables' description

Variable	Abbreviation	Description	Measurement
Dependent	TR	Trade performance	Trade (%GDP)
Moderating	ETX	Environmental taxation	Environmental Tax energy/total/transport/pollution/resources %GDP
Independent	IC	Impartial courts	Impartial courts (scores out of 10)
	JD	Judicial independence	Judicial independence (scores out of 10)
	LC	Legal enforcement of contracts	Legal enforcement of contracts (scores out of 10)
	PR	Protection of property rights	Protection of property rights (scores out of 10)
Controlling	CO2	Co2 emission	Co2 emission (metric tons per capita)

3.1. Econometric model

For an empirical analysis of cointegration, we use the ARDL technique. One benefit of the ARDL technique is that it does not require equal levels of integration for each variable. It does not really matter whether a factor has a variable order of integration, order zero integration, or order one integration. This feature makes ARDL superior to conventional cointegration techniques. Due to the test's capacity to identify long-term relationships between variables is diminished when there are different orders of integration among variables, standard cointegration procedures become unstable. Our model's general functional form is as follows:

$$\text{TR} = \int (ETX, (IC * ETX), (JD * ETX), (LC * ETX), (PR * ETX), CO2) \quad (1)$$

We observe that TR is the trade performance, while the other indicators are the environmental taxation, impartial courts, judicial independence, legal enforcement contracts, property rights and co2 emission. Once Equation (1) is log-linearized, the below equation is generated:

$$TR_t = \beta_0 + \beta_1 ETX_t + \beta_2 (IC * ETX)_t + \beta_3 (JD * ETX)_t + \beta_4 (LC * ETX)_t + \beta_5 (PR * ETX)_t + \beta_6 CO2_t + \varepsilon_t \quad (2)$$

In this equation, β_0 is the constant, and ε_t is regarded as the equation's error term. The parameters of β_1 through β_6 are the coefficients that are utilized to calculate the trade performance. Additionally, it is possible to compute both the short-run and long-run coefficients simultaneously. The preceding model was developed in order to establish ARDL bounds:

$$\Delta TR_t = \propto_0 + \sum_{i=t}^{p} \propto_1 \Delta TR_{t-} + \sum_{i=t}^{p} \propto_2 \Delta ETX_{t-1} + \sum_{i=t}^{p} \propto_3 \Delta(IC * ETX)_{t-1} + \sum_{i=t}^{p} \propto_4 \Delta(JD * ETX)_{t-1} + \sum_{i=t}^{p} \propto_5 \Delta(LC * ETX)_{t-1} + \sum_{i=t}^{p} \propto_6 \Delta(PR * ETX)_{t-1} + \sum_{i=t}^{p} \propto_7 \Delta CO2_{t-1} + \lambda_1 TR_{t-1} + \lambda_2 ETX_{t-1} + \lambda_3 (IC * ETX)_{t-1} + \lambda_4 (JD * ETX)_{t-1} + \lambda_5 (LC * ETX)_{t-1} + \lambda_6 (PR * ETX)_{t-1} + \lambda_7 CO2_{t-1} + \varepsilon \quad (3)$$

The $\propto$ parameters in the equation denotes the short-term relationship. On the other hand, the λ symbol represents long-term relationships. Consequently, this approach tests the null hypothesis of no cointegration ($\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = \lambda_6 = \lambda_7 = 0$) or the alternatve hypothesis of cointegration ($\lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq \lambda_5 \neq \lambda_6 \neq \lambda_7 \neq 0$) based on the F-test. Additionally, this F-test was developed based on the relevance of the lower and upper bound values, which were primarily expressed by (Pesaran et al., 2001). As a result, this method aids in providing pertinent information regarding whether the elements are cointegrated. Thus, if over a long period of time, the variables are cointegrated, an error correction model is used to estimate each variable's coefficient. The formula is shown below.

$$\Delta TR_t = \gamma_0 + \sum_{i=t}^{p} \delta_i \Delta TR_{t-1} + \sum_{i=t}^{p} \phi_i \Delta ETX_{t-1} + \sum_{i=t}^{p} \phi_i \Delta(IC * TX)_{t-1} + \sum_{i=t}^{p} \phi_i \Delta(JD * ETX)_{t-1} + \sum_{i=t}^{p} \phi_i \Delta(LC * ETX)_{t-1} + \sum_{i=t}^{p} \phi_i \Delta(PR * ETX)_{t-1} + \sum_{i=t}^{p} \phi_i \Delta CO2_{t-1} + \mu ECT_{t-1} + \upsilon_t \quad (4)$$

In this model, the parameters μ, reflect the speed of adjustment, and ECT stands for the error correction term.
Granger causality
The purpose was to show the factors' causal linkages. To ascertain if there is a meaningful relationship between the indicators, the Granger causality test proposed by Granger (1969) was carried out. The strategy is explained in further context below:

$$X_t = \sum_{l=1}^{p} \left(a_{11,1} X_{t-1} + a_{12,1} Y_{t-1}\right) + \mu_t \quad (5)$$

$$Y_t = \sum_{l=1}^{p} \left(a_{21,1} X_{t-1} + a_{22,1} Y_{t-1}\right) + \epsilon_t \quad (6)$$

As illustrated in equation 5 and 6 p implies the order of the model, a_(ij,1) (i,j=1,2) denotes the coefficients expressed in the model, while μ_t and ϵ_t denotes the residuals. A causation linkage between X and Y may be established using F tests, and the parameters can be computed using simple least squares.

4. Empirical Findings

The statistical information guided the regulators' trend analysis throughout the course of the time span and allowed them to conduct a thorough investigation of the factors that impacted the reliant variables. The factors' statistical characteristics are shown in Table 2. The percentage of trade performance ranges from 1.57% to 1.29%, with an average of 1.45%. With a kurtosis of 2.07% and a standard deviation of 0.09%, the distribution is negatively skewed. In Japan, environmental taxation has an average value of 1.50%, with an upper limit of 1.68%, and a lower limit of 1.25 percent. Additionally, the findings reveal a negatively skewed distribution for all the variables. The low standard deviation value for all the variables indicates that data are clustered around the mean. The correlating matrix is yet another key technique for obtaining inferences between elements before they are examined. In Table 2 the results indicate that all the variables are negatively correlated with trade performance. Except, CO2 emission, and legal enforcement of contracts which demonstrated a moderate positive association with trade performance.

Table 2. Statistics Overview

Descriptive statistics

Items	TR	ETX	IC	JD	LC	PR	C02
Mean	1.459071	1.505714	1.066738	1.059800	1.001220	1.076069	0.968271
Maximum	1.573236	1.680000	1.127312	1.121835	1.047664	1.164329	0.996005
Minimum	1.291360	1.250000	0.973497	0.965747	0.960994	0.861558	0.934410
Std. Dev.	0.093035	0.147125	0.049019	0.053411	0.026183	0.085979	0.014988
Skewness	-0.658403	-0.338194	-0.465336	-0.400667	-0.003409	-1.080551	-0.291432
Kurtosis	2.073231	1.652694	2.101906	1.706606	1.913195	3.255764	2.877512
Jarque-Bera	2.268771	1.988644	1.463634	2.025630	1.033542	4.143805	0.310393
Observations	21	21	21	21	21	21	21
Correlation Matrix							
	TR	ETX	IC	JD	LC	PR	C02
LTR	1.000000	-0.780963	-0.727727	-0.771481	0.458750	-0.655961	0.204676
ETX	-0.780963	1.000000	0.955574	0.989628	-0.018160	0.894292	0.033125
LIC1	-0.727727	0.955574	1.000000	0.970725	-0.025118	0.966325	0.157176
LJD1	-0.771481	0.989628	0.970725	1.000000	-0.024386	0.925605	0.034241
LLC1	0.458750	-0.018160	-0.025118	-0.024386	1.000000	0.068147	0.127825
LPR1	-0.655961	0.894292	0.966325	0.925605	0.068147	1.000000	0.215124
LC02	0.204676	0.033125	0.157176	0.034241	0.127825	0.215124	1.000000

The outcomes of the DF-GLS, PP, KPSS, and ADF tests are displayed in Table 3. After initial divergence, any variables that are not stationary at level turned stationary at I (1). This suggests that all of the factors under consideration are either I (0) or I (1), not I (2), and that none of them are I (2). It is noteworthy to mention unlike other tests the KPSS test revealed that almost all the variables are stationary at level.

Table 3. Unit root test

Variables	(ADF)	(PP)	(DF-GLS)	(KPSS)
Level				
TR	-1.951	-2.071	-1.495	0.531**
ETX	0.988	0.578	0.499	0.609**
IC	-0.308	-0.291	-0.261	0.586**
JD	0.001	0.150	0.081	0.600**
LC	-1.776	-1.524	-1.537	0.192
PR	-0.886	-0.887	-0.826	0.552**

C02	-2.809*	-2.043	-2.638**	0.073
First difference				
TR	-4.221***	-4.246***	-4.262***	0.306
ETX	-5.854***	-5.854***	-5.745***	0.220
IC	-4.381***	-3.426**	-3.391***	0.125
JD	-4.638***	-4.639***	-3.988***	0.221
LC	-2.900*	-2.924*	-2.992***	0.436*
PR	-3.423**	-3.283**	-3.176***	0.089
C02	-3.229**	-3.125**	-3.248***	0.785

The Autoregressive distributed lag test approach will help us evaluate the short- and long-run elastic qualities between components in order to develop successful policy measures. Given this, the elements exhibit long-term connections and are systematically related, as indicated by the ARDL boundaries projection in Table 4. The F-statistics are notable at the 1% level with a 101.578 value and fall below the I (1) upper limit after considering causation and partial equilibrium correlations between variables. We shall thus move forward with the error correction and long-run estimate.

Table 4. ARDL Bounds Testing Estimates

Test Statistic	Value	K
F-Statistic	101.5782	6
Critical Value Bounds		
Significance	I (0) Bound	I (1) Bound
10%	1.99	2.94
5%	2.27	3.28
2.5%	2.55	3.61
1%	2.88	3.99

Table 5 demonstrates that the Adjustment error correction factor is quantitatively meaningful and negative (-1.608). This claim illustrates how quickly equilibrium returns after a shock to the long-run causal connection. According to the short-run and long-run results, most of the variables appear to have a significant association with the trade performance. Starting with the long-run estimates we observe that protection of the property law and environmental taxation decreases by 1.35%, and 2.05% the Japanese trade performance. For instance, a 1% increase of environmental taxation decreases by 1.35%, the Japanese trade. However, the interaction effect of the judicial system compensates for such a negative effect. We observe that JD, LC cause a positive impact on the trade performance of Japan. This implies a 1% increase in judicial independence, legal enforcement of the contract rises the Japanese trade performance by 5.94% and 1.35% respectively. The table also shows that c02 emission have a long-run association with trade as both factors complement each other. Finally, the impartial court uncovered insignificant influence on the Japanese trade performance. Although, a positive association can be noted in the short run for impartial court (1.66).

Table 5. ARDL short-run and long-run estimation

Dependent variable: Trade

Selected Model: ARDL (2, 1, 1, 1, 1, 1, 1)				
Short-run cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
TR(-1)	0.177891	0.057973	3.068518	0.0373
TR(-2)	-0.786158	0.111786	-7.032679	0.0022
ETX	-2.160919	0.310825	-6.952197	0.0022
ETX(-1)	-1.149192	0.200542	-5.730431	0.0046
IC	1.664356	0.455244	3.655964	0.0217
IC(-1)	-1.051753	0.560872	-1.875210	0.1340
JD	1.954449	0.840540	2.325231	0.0807
JD(-1)	7.600689	0.913769	8.317959	0.0011
LC	0.881448	0.180782	4.875757	0.0082
LC(-1)	1.303086	0.213448	6.104929	0.0036
PR	-1.223463	0.166994	-7.326383	0.0018
PR(-1)	-0.955369	0.155662	-6.137474	0.0036
C02	3.220758	0.478940	6.724764	0.0025
C02(-1)	0.287770	0.277241	1.037977	0.3579
C	-6.715302	0.669681	-10.02762	0.0006
ECT(-1)	-1.608267	0.034021	-47.27282	0.0000
Long-run coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ETX	-2.058185	0.186633	-11.02795	0.0004
IC	0.380909	0.502874	0.757463	0.4909
JD	5.941262	0.558267	10.64234	0.0004
LC	1.358315	0.087436	15.53496	0.0001
PR	-1.354770	0.182622	-7.418421	0.0018
C02	2.181557	0.138222	15.78304	0.0001
C	-4.175489	0.373826	-11.16961	0.0004

To determine the causation between the variables and whether it exists, one can use the F-statistic, which assesses the Pairwise Granger causality. Table 6 summarizes the Causality association between the indicators as well as the orientation of connection, such as one-way or two-way causality. Generally, the results of the test demonstrate a unidirectional relationship between trade performance and impartial courts and legal enforcement of contracts. This can be explained by the fact that when traders enter into contracts with each other, they rely on the legal system to enforce those contracts and provide a mechanism for resolving disputes. If the legal system is perceived to be biased or corrupt, traders may be less willing to engage in trade, which can have a negative impact on trade performance. Certainly, when legal enforcement of contracts is effective, it can lead to increased trust and confidence among traders. This can encourage more trade and improve trade performance. Strong legal systems can also help to ensure that contracts are honored, reducing the risk of default and enabling traders to plan for the future. Finally, the remaining variables did not exhibit a significant causal relationship with Japanese trade performance.

Table 6. Pairwise Granger causality

Variables	F-Statistic	Prob.	Note
ETX ≠> TR	0.08030	0.7803	No causality
TR ≠> ETX	0.92589	0.3494	
IC ≠> TR	0.23522	0.6339	Unidirectional
TR≠> IC	5.72022	0.0286	
JD ≠> TR	0.01394	0.9074	No causality
TR ≠> JD	1.77448	0.2004	
LC ≠> TR	6.21156	0.0233	Unidirectional
TR ≠> LC	2.48425	0.1334	
PR ≠> TR	0.10586	0.7489	No causality
TR ≠> PR	2.29282	0.1483	
CO2 ≠> TR	0.27452	0.6071	No causality
TR ≠> CO2	0.00368	0.9523	

In order to ensure the integrity and dependability of our chosen model, the study thus makes extensive use of analytic statistical tests, the observations are provided in Table 8. The outcomes indicate that its design is reliable because it passed all diagnostic evaluations. The results of all the diagnostic tests indicate that there are no problems with the model. For instance, the Ramsey RESET test has demonstrated that the model is not misspecified. The heteroscedasticity of the model is assessed using the Breusch-Pagan-Godfrey test, Harvey, and the ARCH test. The empirical findings show that heteroscedasticity is minor and unimportant. The residuals of the model are found to be normally distributed by the Jarque-Bera test. Furthermore, the graph resides under the 5% level of significant constraints, which is another indication of the stability of the model according to the CUSUM and CUSUMSQ plots (see Figure 2).

Table 8. The diagnosis tests

Test	F. stat/Prob	Remark
Heteroskedasticity Test: Breusch–Godfrey	0.8046/ 0.6622	No problem of heteroscedasticity
Heteroskedasticity Test: Harvey	1.2057/ 0.4717	No problem of heteroscedasticity
Heteroskedasticity Test: ARCH	2.3488/ 0.1449	No problem of heteroscedasticity
Ramsey RESET Test	1.3992/ 0.3221	The model is specified correctly
Jarque–Bera (normality)	0.2542/ 0.8806	The model is normally distributed

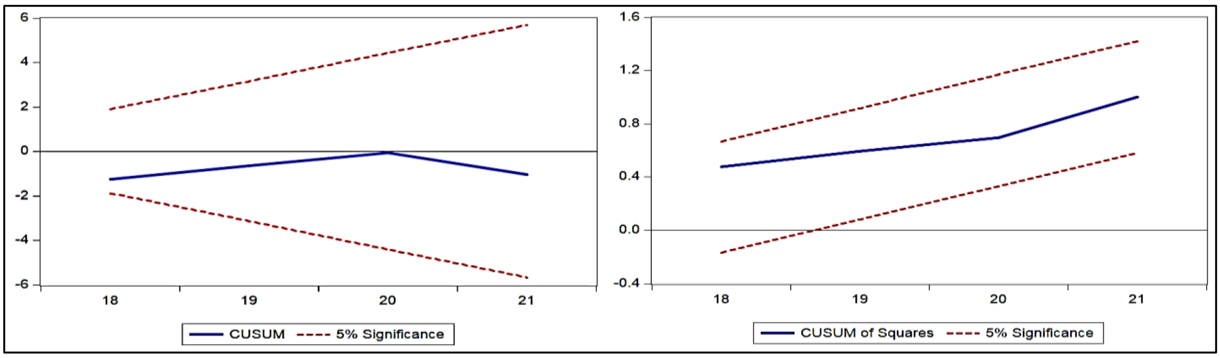

Figure 2. Cusum and CusumQ

5. Conclusion

Japan has long been recognized as a leader in environmental regulation and technology innovation, and the country has been actively working to improve its judicial system to enhance its competitiveness in international trade. Japan has been an important player in international trade for decades, with a strong focus on exporting high-tech products and automobiles. However, in recent years, Japan's trade performance has been somewhat mixed. In 2020, Japan's exports declined by 11.1% due to the COVID-19 pandemic, which led to decreased demand for Japanese products in key markets such as the United States and China. However, the country's exports have since recovered, with a 21.4% increase in exports in 2021, driven in part by the global economic recovery and increased demand for Japanese electronics and automobiles. In terms of its trade balance, Japan has had a persistent trade surplus, meaning that the value of its exports has exceeded the value of its imports. However, this surplus has been declining in recent years, and in 2020, Japan recorded a trade deficit for the first time in four years due to the pandemic.

Within this context, the effectiveness and efficiency of the judicial system can impact the ease of doing business in Japan. If the judicial system is slow, opaque, and unpredictable, it can create barriers to trade by making it difficult for companies to resolve disputes and enforce contracts. This can reduce foreign investment and discourage international trade. On the other hand, a strong and transparent judicial system can increase confidence in the rule of law, encourage investment, and promote trade by providing a predictable and stable business environment. This can lead to a more vibrant economy, increased exports, and greater competitiveness in the global market. Secondly, environmental taxation can impact trade performance by affecting the cost of production and competitiveness of industries. Environmental taxes can incentivize companies to adopt cleaner production technologies and reduce their environmental impact, but they can also increase production costs, which can reduce competitiveness in the global market. However, if environmental taxes are structured appropriately and implemented in a way that promotes innovation and competitiveness, they can spur the development of new technologies and products that have a lower environmental impact, while maintaining or even enhancing competitiveness in international trade.

Accordingly, the current study investigated the impact of environmental taxation on Japanese trade performance by using the judicial system as a moderating factor. The study consists of time series data from 2000 to 2020. Additionally, the ARDL model and Granger causality test were employed in order to capture the long-run cointegration among the variables. Based on this, the long-run results presented that the Japanese independence, legal enforcement of contracts reduces the negative effect of environmental taxation on trade performance, whereas, C02 emission contribute favorably to trade performance. This indicates, an efficient and transparent judicial system can create a stable and predictable business environment, which can attract foreign investment and encourage international trade. Japan's legal system has a reputation for being reliable and impartial, which can help to build trust between business partners and investors. This can lead to a greater willingness to enter into contracts and invest in Japan, which can boost the country's trade performance. Secondly, effective enforcement of contracts can provide greater certainty for businesses operating in Japan, which can help to reduce transaction costs and increase business activity while balancing the effect of green tac. This can improve trade performance by facilitating greater engagement with foreign partners and reducing the risk of disputes and contract breaches. Thirdly, the judiciary can provide a check on the power of the government, ensuring that environmental tax policies are not implemented in a way that violates citizens' rights or infringes on other legal principles. This can help to ensure that environmental tax policies are developed and implemented in a way that is consistent with legal and constitutional frameworks, thereby promoting both environmental protection and economic growth. Finally, an effective judiciary system can help avoid any negative impacts on economic growth that may arise from a poorly designed or implemented tax system.

Furthermore, the protection of property rights and environmental taxation revealed a detrimental influence on Japanese trade performance. This can be explained due to the fact that if the protection of property rights is overly strict or complicated, it can create unnecessary barriers to trade and discourage innovation. For example, overly strict patent laws or licensing requirements can make it difficult for foreign businesses to enter the Japanese market, which can reduce competition and harm trade performance. Secondly, environmental taxation can have a detrimental influence on Japan's trade performance if it is perceived as overly burdensome to businesses or if it is not implemented in a way that encourages innovation and competitiveness. If environmental taxes increase production costs significantly, this can reduce the competitiveness of Japanese products in the global market, particularly if other countries do not have similar taxation policies. This can reduce demand for Japanese products, harm exports, and have a negative impact on Japan's trade performance. In addition, if environmental taxes are not designed effectively, they can also discourage innovation and hinder the development of environmentally-friendly technologies. For example, if environmental taxes are set at a level that makes it difficult for businesses to invest in research and development, this can reduce innovation and harm Japan's long-term competitiveness.

Finally, several policy implications can be extracted from this research. First, regarding the judicial system, policymakers may consider the importance of maintaining a stable and predictable business environment by continuing to strengthen the efficiency, transparency, and impartiality of Japan's judicial system. This can involve increasing resources for the judiciary, promoting transparency and impartiality in legal proceedings, and reducing barriers to dispute resolution. Additionally, policymakers may consider exploring new technologies and tools, such as online dispute resolution platforms, to improve the speed and efficiency of dispute resolution processes. Second, policymakers may need to balance the need for environmental protection with the need for a competitive and innovative business environment. Environmental taxes may be necessary to promote sustainability and reduce harmful emissions, but policymakers must design them in a way that minimizes their negative impact on businesses and trade performance. This can involve setting the tax rate at a level that incentivizes companies to invest in cleaner technologies while also ensuring that it does not significantly increase production costs or reduce competitiveness. Additionally, policymakers may consider providing incentives, such as tax credits or subsidies, to businesses that invest in clean technologies or engage in sustainable practices. Lastly, policymakers may consider the importance of promoting international cooperation and collaboration on environmental issues. This can involve participating in international climate agreements and working with other countries to develop common standards for environmental taxation and other policies. By working together, countries can create a more level playing field for businesses operating in different parts of the world, reduce the risk of regulatory arbitrage, and promote greater sustainability and trade performance across the globe.

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