

Sadler, Thomas R.

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An Economic Evaluation of the European Union's 2030 Climate Policy Plan

Thomas R. Sadler[†]

Professor of Economics, College of Business and Technology, Western Illinois University, United States of America

ABSTRACT

Purpose: The purpose of the study is to evaluate the European Union's "Fit for 55" plan, announced in 2021, which intends to meet a 2030 goal of reducing carbon emissions by 55 percent from 1990 levels.

Design/methodology/approach: An analytical model is used to assess the impact of the EU environmental policies, including the carbon border tax, emissions trading system, energy efficiency, and emission standards.

Findings: The study finds that the environmental policies achieve different policy criteria, including cost minimization, equalization of marginal abatement cost, minimization of general equilibrium cost, political feasibility, and minimization of inequitable impacts across income groups. But no single policy instrument is necessarily superior to the others. The paper finds that a revenue-neutral carbon border tax and an emissions trading system with auctioned permits satisfy the most evaluation criteria.

Research limitations/implications: For the purpose of simplification, the model ignores dynamic extensions. That is, the adjustments of businesses to policy measures and the effects on emissions are beyond the scope of this analysis.

Originality/value: The study develops a model that evaluates the European Union's environmental policies in a unifying perspective, assessing the tradeoffs of policy design.

Keywords: Environmental Policy, Carbon Emissions, Climate Change

I. Introduction

Climate change exists as the world's pre-eminent environmental problem (Wolde-Rufael & Mulat-Weldemeskel, 2022). The growing concern about the detrimental effects of carbon emissions is forcing governments to implement environmental policies that lower emissions but maintain economic growth (Borozan, 2019).

In response, the European Union's "Fit for 55" plan, announced in 2021, intends to meet a 2030 goal

of reducing carbon emissions by 55 percent from 1990 levels (Kohl et al., 2021). This plan is part of the EU's overall goal of climate neutrality by 2050, which would result in the world's first climate-neutral continent (Schlacke et al., 2022). In effect, the Fit for 55 plan exists as an "unprecedented set of policies and instruments to reduce greenhouse gas emissions" (Ovaere and Proost, 2022).

The EU presents the plan as a comprehensive package, aligning climate, energy, and transportation policies. Specific objectives include a reduction in carbon emissions in the transportation sector, an increase in the price of pollution, an elimination of the ability of firms to produce in jurisdictions with lax environmental standards, an incentive for more

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[†] Thomas R. Sadler

E-mail: TR-Sadler@wiu.edu

renewable energy, and political feasibility. This is why the plan targets a mix of emission standards, carbon pricing, and market measures.

Because of the multi-dimensional nature of global climate change, the Fit for 55 plan includes carbon taxation, an extension of cap-and-trade, energy efficiency, and emission standards. These policies intend to address multiple forms of market failure and inefficiencies that relate to carbon emissions, such as traffic congestion, consumer inattention, market power, air pollution, and energy insecurity (Ovaere and Proost, 2022). Environmental policy implementation provides incentive for decarbonization of the energy sector and clean technologies.

With respect to the EU policies, the carbon border tax would tax imported products sold in the EU based on their carbon content. The carbon content is determined by the carbon emissions required to produce each product. The idea of the carbon border tax is to regulate the process of exporting carbon-intensive production outside the EU, when firms move production processes outside of EU countries that have lower or no emission regulations (Ovaere and Proost, 2022).

The EU trading system uses the cap-and-trade principle, when the environmental authority establishes a cap on the allowable number of emissions per unit of time and allocates tradable emission permits in the market. Polluters buy and sell these permits as they need them. In the system, government either allocates the permits through an auction or freely, a choice that impacts the policy's efficiency outcome. The idea is that governing authority may reduce the number of permits in the market each year, thus decreasing the level of carbon emissions (Wolde-Rufael & Mulat-Weldemeskel, 2022).

Given the importance of climate change and the ambitious nature of the Fit for 55 plan, it is important to evaluate the plan in an economics framework. Does the plan include least-cost policies? Will the policy measures reduce carbon emissions while satisfying additional policy criteria, such as equity and political feasibility? Because the plan is designed to reduce carbon emissions, it is important to answer these

questions in a unifying model framework.

The purpose of this paper is to analyze specific policies within the Fit for 55 plan, including the carbon border tax, emissions trading system, energy efficiency, and emission standards. In the field of economics, an extensive literature on environmental policy demonstrates the need to consider efficiency effects, equity, and political feasibility. The paper uses these criteria to evaluate the EU policies.

The paper is organized as follows. Section II provides a literature review on the economics of environmental policy. Section III discusses the research method. Section IV provides results in a comparative policy perspective. Section V includes a discussion of policy criteria. Section VI concludes, discusses the paper's limitation, and provides areas of future research.

II. Literature Review

Policies that focus on economic theory suggest the implementation of monetary incentives to reduce polluting behavior. Baumol & Oates (1988) serves as an example, where price corrections capture negative environmental externalities. In their framework, environmental policies link a policy objective, such as optimal pollution abatement, with a mechanism to achieve the objective. While the literature focuses on both of these components, it largely addresses the second component, the instruments of environmental policy, and the degree to which they achieve environmental objectives in cost-effective ways.

Some policy incentives fail to achieve the objective of optimal pollution abatement, often resulting from design flaws rather than theoretical promise (Anderson & Carlin, 1997). But, as Stavins (2003) elucidates, market-based instruments such as emission taxes and emissions trading systems provide incentive for pollution control efforts with market signals rather than explicit directives, equating marginal abatement cost across polluters, a requirement for cost minimization.

Baldursson & von der Fehr (2004) explain, however, that market imperfections may cause this result to fail: risk aversion and uncertainty affect the comparison between taxes and tradable permits, where the choice of taxes transfers risk to society while tradable permits transfer risk to firms. Pindyck (2007) furthers the analysis, demonstrating that, in a world of uncertainty over pollution outcomes, abatement costs, benefits and discount rates, optimal policy design must be flexible enough to address these realities.

Goulder & Parry (2008) evaluate which environmental policy instruments meet specific evaluation criteria, demonstrating that incentive policies such as environmental taxation and auctioned emissions trading systems minimize the general equilibrium costs from interactions with the broader tax system. Goers et al. (2010) find that, for climate change policy, a hybrid instrument between taxes and allowances optimizes the benefits of the latter policies. Dietz & Atkinson (2010) consider equity, arguing that policy fairness is as important as efficiency. But the influence of market-based policies on innovation creates weak effects (Kemp & Pontoglio, 2011). Zhang (2013) emphasizes that market-based policies provide incentive for technological advance, behavioral changes and the minimization of abatement cost.

While standard economic theory emphasizes efficient policy solutions and the benefits of price incentives, behavioral economics, according to Gsottbauer & van den Bergh (2010), provides a method to address intertemporal choices, decision heuristics, and heterogeneity. Further, behavioral economics addresses the modification of normative policy recommendations. Insights from behavioral economics demonstrate that policy recommendations from environmental economics often prevail (Carlsson & Johansson-Stenman, 2012). But green nudges, intended to reduce negative externalities, trigger a reaction that encourages behavioral change while highly dependent on context (Carlsson et al., 2022). The point is that, with standard economic theory or behavioral economics, environmental regulators may choose among several policy tools.

III. Method

The method entails a standard economic framework, addressing the following questions:

- What environmental policies internalize the external cost of carbon emissions?
- Under what conditions do environmental policies increase efficiency?

For perspective, economic theory argues that, in the presence of a negative externality such as carbon emissions, environmental policy should target the external cost imposed on society from polluting behavior (Tietenberg & Lewis, 2018). In this framework, external cost is defined as the difference between social cost (all costs borne by society) and the private cost of polluters.

As the model demonstrates, two policy contexts exist. First, from society's perspective, changes in resource choice depend on the difference between total social cost (TSC) and total private cost (TPC). This resource choice means how society decides to allocate resources among competing alternatives. Second, as Figure 1 demonstrates, changes in policy design address the difference between marginal social cost (MSC) and marginal private cost (MPC), which is marginal external cost (MEC).

From an economics perspective, an important way to measure the effectiveness of environmental policy is to assess the extent to which the policy links to

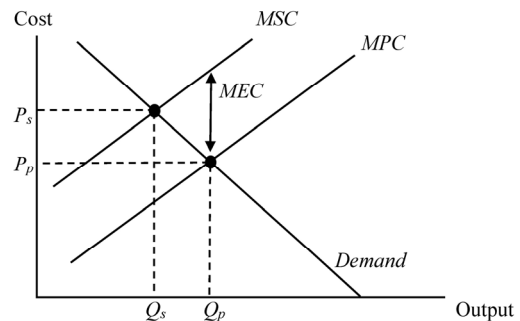


Figure 1. Marginal External Cost (MEC)

marginal external cost: if environmental policy targets *MEC*, providing incentive for emitters to internalize the negative externality of carbon emissions, efficiency gains for society occur. In Figure 1, in the absence of environmental policy, the market will set an equilibrium level of output (Q_p) that is too high and an equilibrium price (P_p) that is too low from society's perspective. But if environmental policy links directly to the marginal external cost of carbon emissions, output decreases to the optimal level (Q_s) and price increases to the optimal level (P_s).

In the model, two policy assumptions exist:

- In the absence of environmental policy, emissions (E_a)—assumed to be the only source of environmental cost—are proportional to output (Q): $E_a(Q) = \psi Q$.
- In the presence of environmental policy, emissions decrease to E_p , where $E_p < E_a$.

As a result, the firm's production costs (C_1) are a function of output: $C_1(Q)$. Abatement costs (C_2)—the costs of reducing carbon emissions—are a function of emission abatement and output:

$$C_2 = C_2(E_a - E_p, Q) = C_2(\psi Q - E_p, Q). \quad (1)$$

In the model, two assumptions relate to damage from carbon emissions and efficiency:

- Pollution damage (D) is an increasing function of emissions (E).
- Efficiency conditions require $MPC = MSC$ and both equal marginal willingness to pay.

To simplify, the model ignores dynamic extensions. That is, firms' adjustments to policy measures and the effects on emissions are beyond the scope of this analysis. But the organizing principle is that, because firms take environmental policies as given, their actions occur within a second-best framework. As a result, it is unlikely that environmental policy will reduce carbon emissions to the optimal level.

IV. Results

A. Carbon Border Tax

Many economists consider carbon pricing as an important dimension of climate policy (Criqui et al., 2019). The policy implements a tax per emission ton on carbon dioxide (CO_2). In theory, carbon taxation provides an incentive for pollution abatement by establishing a pollution price. Taxing carbon increases the cost of fossil fuels and decreases both fossil fuel consumption and carbon emissions. As a policy mechanism, carbon taxation internalizes the externality from polluting behavior (World Bank & Ecofys, 2018). Because carbon taxation equalizes marginal abatement cost across polluters, it serves as a least-cost policy option (Tietenberg & Lewis, 2018).

In the EU plan, the carbon border tax (τ_c) is a tariff on imports. The policy is imposed directly on companies that produce output such as cement, iron or steel that lead to carbon emissions. The policy therefore targets countries that are not taking steps to reduce carbon emissions. Polluters that export products into the EU pay a tax for every ton of CO_2 emissions. If the firms want to sell output that leads to carbon emissions, they have to pay the tax, thus incentivizing emission abatement. The carbon border tax increases the firm's cost of production by the sum of its abatement costs and tax payment.

The model includes society's total social cost (TSC_i) and the firm's total private cost (TPC_i):

$$TSC_i = C_1(Q) + C_2(\psi Q - E_p(\tau_c), Q) + D(E_p) \quad (2)$$

and

$$TPC_i = C_1(Q) + C_2(\psi Q - E_p(\tau_c), Q) + \tau_c E_p \quad (3)$$

Total external cost (TEC_i) equals $TSC_i - TPC_i$, so

$$TEC_i = D(E_p) - \tau_c E_p, \quad (4)$$

which will be negative, zero or positive as τ_c is greater than, equal to, or less than τ_c^* , where τ_c^* is

the optimal carbon border tax.

To adjust relative prices, the tax is set according to marginal external cost (MEC_t), the difference between marginal social cost (MSC_t) and marginal private cost (MPC_t), as in Figure 1:

$$MSC_t = C'_1 + \psi C_{21} + C_{22} + D' dE/dQ, \quad (5)$$

$$MPC_t = C'_1 + \psi C_{21} + C_{22} + \tau_c dE/dQ, \quad (6)$$

$$MEC_t = MSC_t - MPC_t = (D' - \tau_c) dE/dQ. \quad (7)$$

If the carbon tax is set at its optimal level, (7) equals zero.

B. Emissions Trading System

The European Union Emissions Trading System (EU ETS), the largest cap-and-trade system in the world, is the continent's main policy to address climate change (Perino et al., 2022). In 24 countries, the cap-and-trade mechanism, launched in 2005, allocates permits to over 12,000 power stations and industrial plants, accounting for over 40 percent of the EU's greenhouse gas emissions (Calel & Dechezlepretre, 2016). Each permit allows a firm to emit one ton of carbon emissions. The EU plan proposes to tighten the cap, thus reducing carbon emissions and eliminating the number of free permits it allocates to industries exposed to trade competition. As an incentive policy, the EU ETS equalizes abatement cost across polluters, ensuring a cost-effective outcome (Tietenberg & Lewis, 2018).

In the emissions trading system, the total level of emissions is fixed, but emissions from individual firms vary. The policy allows polluters to buy and sell permits from each other. As a result, permit price (P) per unit of emissions serves either as the polluter's opportunity cost of not reducing emissions or the cost of additional emissions. Total private cost of the firm (TPC_p) is:

$$TPC_p = C_1 + C_2 + P \cdot E(P, Q). \quad (8)$$

Assume damage cost from emissions is the same,

regardless of the source. Firms selling permits must reduce emissions by either reducing output or increasing emission controls. For economy-wide effects, let C_0 equal the cost of additional emission control and reduced output. Total social cost to society (TSC_p) is:

$$TSC_p = C_1 + C_2 + C_0 + D. \quad (9)$$

Total external cost (TEC_p) equals $TSC_p - TPC_p$, so

$$TEC_p = C_0 - P \cdot E(P, Q) + D. \quad (10)$$

A polluter will sell a permit if the resulting revenue, $P \cdot E(P, Q)$, is as at least as large as the cost it incurs (C_0).

With the EU emissions trading system, marginal private cost is:

$$MPC_p = C'_1 + \psi C_{21} + C_{22} + P \cdot dE/dQ. \quad (11)$$

Because total emissions are fixed, changes in production will leave pollution damage unchanged. Marginal social cost therefore does not include a factor for incremental pollution damage. But the transfer of permits from one firm to another creates costs: higher pollution controls and less output.

$$MSC_p = C'_1 + \psi C_{21} + C_{22} + C'_0 \cdot dE/dQ. \quad (12)$$

The difference between (12) and (11) leads to marginal external cost:

$$MEC_p = MSC_p - MPC_p = (C'_0 - P) dE/dQ. \quad (13)$$

C. Energy Efficiency

Energy efficiency refers to the amount of output produced per unit of energy consumption. An increase in energy efficiency means producing the same level of output with fewer energy inputs. Because energy consumption correlates with emissions, less energy consumption means fewer emissions. Incentivizing energy efficiency, suppose a binding limit on emissions

per unit of output, $E/Q = \delta$ where $\delta < \psi$:

$$TSC_e = C_1(Q) + C_2((\psi - \delta)Q, Q) + D(\delta Q). \quad (14)$$

and

$$TPC_e = C_1(Q) + C_2((\psi - \delta)Q, Q) \quad (15)$$

Total external cost (TEC_e) equals:

$$TEC_e = D(\delta Q), \quad (16)$$

so total social cost always exceeds total private cost by $D(\min\{\delta Q, \psi Q\})$. With a binding limit on emissions per unit of output, MSC_e , MPC_e and MEC_e equal:

$$MSC_e = C'_1 + (\psi - \delta)C_{21} + C_{22} + \delta D', \quad (17)$$

$$MPC_e = C'_1 + (\psi - \delta)C_{21} + C_{22}, \quad (18)$$

$$MEC_e = MSC_e - MPC_e = \delta D'. \quad (19)$$

D. Emission Standard

Standards limit the release of emissions into the atmosphere. In particular, emission standards establish limits on the amount of emissions that are released from specific sources over a designated timeframe. For cars and vans, the EU plan strengthens CO₂ standards. If a binding limit (E_s) reduces emissions per unit of time, $E_s < E_a = \psi Q$:

$$TSC_s = C_1(Q) + C_2(\psi Q - E_s, Q) + D(E_s). \quad (20)$$

and

$$TPC_s = C_1(Q) + C_2(\psi Q - E_s, Q) \quad (21)$$

Total external cost (TEC_e) equals:

$$TEC_s = D(E_s), \quad (22)$$

With a binding emission standard per unit of time, E_s does not vary with output:

$$MSC_s = C'_1 + \psi C_{21} + C_{22} \quad (23)$$

$$MPC_s = C'_1 + \psi C_{21} + C_{22}, \quad (24)$$

As a result, a change in output does not alter the value of emission damage. As long as the emissions limit is binding, the result is not a function of where the standard is set.

Table 1 summarizes the results of resource choice and policy design from this section. The following discussion explains how the results in Table 1 link to the concept of efficiency.

V. Discussion

Policy evaluation criteria—including efficiency, equity, and political feasibility—establish a framework to assess the merits of environmental policy (Klenert et al., 2018). The literature emphasizes the importance of pollution reduction, distributional fairness, and the ability to implement policy in the political system (Sadler, 2001; Goulder, 2013; Klenert and Mattauch, 2016). In a much-cited article, Goulder & Parry (2008) establish five evaluation criteria (Table 2), which are used in this section to assess the EU environmental policies. The paper's results are summarized in Table 2.

Table 1. Resource choice and policy design

Policy	Adjustment to TPC for resource choice	Adjustment to MPC for policy design
Carbon border tax	$D(E_p) - \tau_c E_p$	$(D' - \tau_c) dE/dQ$
Emissions trading system	$C_0 - P \cdot E(P, Q) + D$	$(C'_0 - P) dE/dQ$
Energy efficiency	$D(\delta Q) > 0$	$\delta D'$
Emission standards	$D(E_s) > 0$	0

The criteria are:

- Least-cost policy: do environmental policies reduce emissions in a cost-effective manner?

The first criterion is achieved when firms reduce pollution to the optimal level of abatement (E^*) in a least-cost manner, where marginal abatement cost equals marginal damage in Figure 2 (Tietenberg & Lewis, 2018).

- Equalization of marginal abatement cost: do environmental policies equate marginal abatement cost across polluters?

The second criterion is achieved when environmental policy establishes an optimal pollution price, so marginal abatement cost is equalized across polluters at the optimal level of pollution abatement (E^*) in Figure 2 (Tietenberg & Lewis, 2018).

- Minimization of general equilibrium cost: do specific environmental policies minimize the general equilibrium cost of new regulation in the economy?

The third criterion is achieved when environmental policy minimizes costs in the economy that occur if industry expenses increase and output decreases. One of the differentiating characteristics in the EU plan of carbon border taxes and emissions trading

systems with auctioned permits, as opposed to energy efficiency and emissions standards, is the ability of the former policies to generate revenue. The idea is that policymakers could use the revenue to lower rates on pre-existing taxes that distort economic decision-making and/or reduce the burden on low-income households. When this substitution occurs, an increase in the present value of net benefits creates a double dividend effect, a cleaner environment and efficiency gains in the economy as a whole. As long as revenue neutrality occurs, this attribute creates a preference for policy instruments that raise revenue (Wolde-Rufael & Mulat-Weldemeskel, 2022).

- Political feasibility: are environmental policies politically feasible?

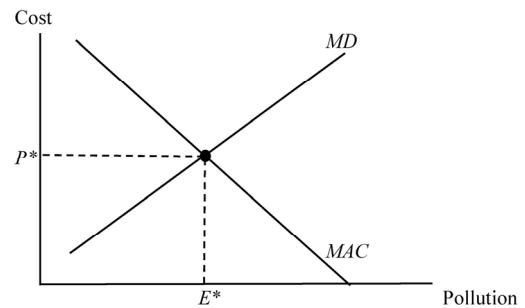


Figure 2. Equalization of Marginal Abatement Cost (MAC) and Marginal Damage (MD)

Table 2. Attributes of environmental policy instruments

Policy	Efficiency: least-cost policy	Equalization of marginal abatement cost	Minimization of general equilibrium costs	Political feasibility	Equity across income groups
Carbon border tax (no revenue redistribution)	✓	✓			
Carbon border tax (revenue-neutral)	✓	✓	✓		✓
Emissions trading system - freely allocated	✓	✓		✓	
Emissions trading system - auctioned (revenue-neutral)	✓	✓	✓	✓	✓
Energy efficiency				✓	✓
Emission standard				✓	✓

The fourth criterion is achieved when an environmental policy is accepted by the political system and general public. This criterion focuses on the difference between incentive policy (carbon taxes and emissions trading systems) and command-and-control (CAC) regulation (energy efficiency and emission standards). Incentive policies reallocate pollution rights from polluters to the public sector, because polluters have to pay a charge, either in the form of a tax or permit. In contrast, the CAC approach leaves pollution rights on the remaining emissions with polluters.

In the EU plan, if polluters are not compensated after they pay the emission charge or polluting allowance, they will favor the CAC instrument. If they are compensated in a revenue-neutral program, they will prefer the incentive policies. These results apply to polluters with a uniform distribution of emissions. But if different emission levels exist, political feasibility depends on the individual polluter's level of emissions. Polluters with low emissions prefer incentive policies, while large polluters prefer CAC regulation (Felder & Schleiniger, 2002).

- Equity: do environmental policies establish equitable outcomes?

The fifth criterion is achieved when policy costs and benefits are in balance across all affected constituents. In particular, equity means preventing a disproportionate burden on low-income households (Sadler, 2001). In the EU plan, the issues of distribution demonstrate that policymakers must address whether the potential for inequitable outcomes exceeds the value of improvements in environmental quality. In this context, the pursuit of equity may conflict with the desire to increase efficiency (Dietz & Atkinson, 2010).

A. Carbon Tax

- Least-cost policy: in Table 1, if the carbon tax (τ_c) is set equal to marginal damage (D') at the optimal level of emission abatement, this criterion

is achieved.

- Equalization of marginal abatement cost: when a per-unit charge on carbon emissions occurs at P^* (Figure 2), this criterion is achieved.
- Minimization of general equilibrium cost: when the carbon tax generates revenue, and the revenue is redistributed to finance lower rates on taxes that distort economic decision making in a revenue-neutral framework, this criterion is achieved.
- Political feasibility: carbon taxes have a lower degree of political feasibility than other forms of environmental policy.
- Equity: if the revenue from the carbon tax is used to decrease inequitable outcomes, this criterion is achieved.

B. Emissions Trading System

- Least-cost policy: in Table 1, if the price of an additional permit (P) equals the cost of additional emission control and reduced output (C'_0), this criterion is achieved.
- Equalization of marginal abatement cost: this policy may equate marginal abatement costs when the regulator establishes an optimal permit price (P^*) in Figure 2.
- Minimization of general equilibrium cost: when the emissions trading system generates revenue, the governing authority may minimize general equilibrium losses in the economy as a whole through the processes of redistribution and revenue-neutrality, thus satisfying this criterion.
- Political feasibility: emissions trading systems have a higher degree of political feasibility than carbon taxes.
- Equity: if the revenue from the emissions trading system is used to decrease inequitable outcomes, this criterion is achieved.

C. Energy Efficiency

- Least-cost policy: in Table 1, a binding limit

on emissions per unit of output (δ) means the adjustment to marginal private cost is set according to marginal damage ($\delta D'$), but this does not satisfy the least-cost criterion.

- Equalization of marginal abatement cost: energy efficiency does not establish an optimal price for carbon emissions and therefore does not equate marginal abatement cost across emitters.
- Minimization of general equilibrium cost: because energy efficiency neither generates revenue nor minimizes general equilibrium costs in the economy, it does not satisfy this criterion.
- Political feasibility: because energy efficiency does not use the price mechanism, it is politically feasible.
- Equity: to the extent to which energy efficiency does not create undue policy burden on lower-income households, it satisfies the equity criterion.

D. Emission Standard

- Least-cost policy: while the standard may be set at the optimal level of emission reduction (E^*), it does not provide the incentive for a least-cost response.
- Equalization of marginal abatement cost: because the standard does not establish an optimal carbon price (P^*), it does not equate marginal abatement cost across emitters.
- Minimization of general equilibrium cost: because the emission standard does not provide the option for revenue redistribution, it does not minimize general equilibrium costs in the economy.
- Political feasibility: because the emission standard is not a direct charge on carbon emissions, it is politically feasible.
- Equity: to the extent to which the emission standards does not impose undue policy burden on low-income households, it satisfies the equity criterion.

VI. Conclusion, Limitation, and Future Research

This paper analyzes environmental policy instruments from the European Union's 2030 Climate Policy Plan in a unifying perspective, including a carbon border tax, emissions trading system, energy efficiency, and emission standards. The paper has several conclusions. First, with respect to policy design, the carbon border tax will lead to the largest increase in price for high-carbon inputs such as aluminum, cement, and steel. Second, the emissions trading system, which may include auctioned or freely-given allowances, will expand regulation on factories, power stations, and other enterprises that emit carbon. Third, the policy of energy efficiency will encourage consumers to reduce energy consumption, leading to a decrease in carbon emissions. Fourth, emission standards establish a strict limit on the amount of carbon emissions, achieving equitable impacts and political feasibility. Fifth, the environmental policies achieve different policy criteria, including least-cost policy, equalization of marginal abatement cost, minimization of general equilibrium costs, political feasibility, and minimization of equity effects across income groups. Sixth, no single policy instrument is necessarily superior to the others, supporting Goulder & Parry (2008). Finally, a revenue-neutral carbon border tax and an emissions trading system with auctioned allowances satisfy the most evaluation criteria.

For the purpose of simplification, the model ignores dynamic extensions. This reality serves as the paper's limitation. The implication is that the adjustments by businesses to policy measures and the effects on emissions are beyond the scope of this analysis. While economists normally argue that putting a price on carbon emissions with an emissions charge or trading system serves as the most cost-effective approach, the importance of both political feasibility and equitable outcomes means that other policy approaches are important, including energy efficiency and emissions standards. Future research will consider whether the EU policies are successful in reducing carbon emissions

and satisfying the policy criteria.

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