ERIA-DP-2025-03

ERIA Discussion Paper Series

No. 549

Putting a Price on Carbon in ASEAN and East Asia: Are Consumers Willing to Pay?

Venkatachalam Anbumozhi

Senior Research Fellow for Innovation, ERIA

Kaliappa Kalirajan

Emeritus Professor, Australian National University

Ayu Pratiwi Muyasyaroh

Research Associate, ERIA

Veerapandian Karthick

Assistant Professor, Institute for Social and Economic Change, Bengaluru, India

June 2025

Abstract: Carbon pricing is a policy tool designed to account for the external costs of carbon emissions, such as damage to crops, healthcare costs, and property loss due to climate change. It attaches a price to these costs and allocates responsibility to the sources of emissions. This approach helps incentivise the reduction of carbon emissions and encourages the adoption of technologies aimed at achieving a net zero economy. Revenue generated from carbon pricing can be reinvested by companies to support sustainable practices, including employee benefits and health insurance. While a few countries in the Association of Southeast Asian Nations (ASEAN) and East Asia have implemented carbon pricing mechanisms, there is limited understanding of individual preferences regarding these mechanisms at the national and regional levels. The Carbon Border Adjustment Mechanism of the European Union aims to standardise carbon prices for internationally traded products. However, there is a lack of knowledge about preferences for such policy instruments across key stakeholders and countries.

A survey has been conducted to elicit stakeholders' preferences and willingness to pay (WTP) for a carbon price in ASEAN and East Asia. The overall proportion of 'yes' answers to the WTP question was around 70%. Mean WTP corresponds to an additional price of US$10–US$15. The analysis of more than 500 consumer responses revealed that several modifiers impact the choice of higher and lower WTP additional costs for climate actions. Amongst the consumer groups, academia and household residents are more concerned about climate change and its harmful consequences but have less knowledge and lower appreciation of external pressures such as the European Union's Carbon Border Adjustment Mechanism. This, coupled with the already high electricity price, could have resulted in the lower WTP by the private sector respondents. Three null hypotheses on the effects of WTP on carbon emission reductions, revenue recycling, and regional cooperation are tested. The low WTP underscores the urgency of measures to overcome market size and technical and financing constraints, and to address regulatory hurdles that raise transaction costs, to achieve industrial competitiveness.

Keywords: carbon price, climate change, net zero economy, revenue recycling, willingness to pay, ASEAN and East Asia

JEL classifications: Q49, Q58, C46

1. Introduction

Conceptual and policy interest in carbon pricing is emerging across the Association of Southeast Asian Nations (ASEAN) and East Asia in recognition of serious climate challenges, notably those highlighted in the Sixth Assessment Report of the Intergovernmental Panel on Climate Change on the risk associated with greenhouse gas (GHG) emissions. Drawing on the review mechanism agreed by the United Nations Framework Convention on Climate Change (UNFCCC) in 2023, ASEAN governments have pledged their commitment to achieving net zero targets by the middle of the century. A uniform carbon price is widely accepted as the most cost-effective way of curbing emissions. However, several studies have emphasised that effective macroeconomic policies influencing climate actions at the micro level are vital to achieve the goal of net zero emissions. A global carbon price – so far excluded from consideration in international negotiations – could be included through a direct tax on emissions or through an emissions trading system (ETS). An ETS is a market-based system that sets a limit on carbon emissions and then allows trading of the allocated allowances amongst firms within the sectors to meet the targets. Of these options, carbon pricing, which provides a price incentive to reduce emissions without being technologically prescriptive and does not draw on government budgets, has potential benefits. It can help to reduce carbon dioxide (CO_2) emissions, stimulate innovation in low-carbon technologies, and create a level playing field for industries (Kaenzig, 2021). If the emitters of CO_2 do not bear the full environmental costs of their activities, they will be forced to reduce carbon emissions effectively. Thus, carbon pricing is a policy instrument tailored to account for the external costs of carbon emissions, such as healthcare costs. Further, carbon pricing alters relative prices, influencing an automatic adjustment in behaviour by consumers and thereby industries (Stiglitz, Fitoussi, and Durand, 2018). Hence, the carbon pricing approach, which is fair, helps incentivise the reduction of CO_2 emissions and encourages the adoption of low-carbon technologies. The results from many studies indicate that certain methods of recycling the revenues collected from carbon pricing could increase the probability of stakeholder acceptance of the carbon price (Klenert et al., 2018; Beiser-McGrath and Bernauer, 2019).

Although a few countries in East Asia and ASEAN have implemented an ETS and carbon tax with respect to carbon pricing to reduce GHG emissions, there appears to be limited understanding of individual preferences regarding these instruments at the national and regional levels. Furthermore, in 2023, the European Commission introduced the Carbon Border Adjustment Mechanism (CBAM), a mechanism aimed to standardise carbon prices for internationally traded products. However, there is a lack of knowledge about preferences for such policy instruments across key stakeholders and countries. The first step in planning a carbon pricing scheme is identifying an appropriate carbon price. It is in this context that this survey explores the perception of consumers from different stakeholder groups on the effects of the carbon price at the local level and how much they are willing to pay. It identifies the main factors that enhance or limit these stakeholders' assessment of pricing preferences using a multinomial logistic regression model (MLRM), which is a popular model in strategy literature because it allows researchers to examine strategic choices with multiple outcomes.

The following three core null hypotheses concerning the willingness to pay (WTP) a carbon price are tested in this study: (i) the majority of the respondents in ASEAN and East Asia would not be willing to pay a price directly for carbon emissions reduction; (ii) any form of revenue recycling is not perceived by respondents in ASEAN and East Asia as an important policy tool to implement carbon pricing; and (iii) regional harmonisation of carbon pricing is not perceived as a crucial supporting instrument to mitigate negative impacts of the CBAM in ASEAN and East Asia.

The empirical analysis is based on primary survey data from 520 respondents, consisting of different consumer groups across ASEAN and East Asia. Applying the MLRM on the primary survey data, the results reveal that the first null hypothesis is rejected – indicating that most of the respondents in ASEAN and East Asia are concerned about climate change and are willing to pay a price for carbon emissions. The second null hypothesis is also rejected, implying that the respondents would prefer to spend the revenues collected from the carbon price primarily on clean energy development. The third null hypothesis is rejected for the data set, implying the acceptance of the general perception discussed in the literature that the CBAM is a critical variable in boosting regional harmonisation of carbon pricing in ASEAN and East Asia. Further, the results identify 'the incentivising net zero emission economy' variable as a major enhancing factor and 'the changing industry or individual consumption behaviour' as a major limiting factor for carbon pricing.

The following section provides a brief review of studies on WTP for carbon pricing, which provides the basis of the selection of variables for empirical analysis and testing of the hypotheses for this study. The methodology of the analysis of the MLRM used in this study is described in section 3. Section 4 describes the empirical model and discusses the empirical results. The final section summarises with concluding remarks and suggests the policy implications of an effective carbon pricing mechanism for ASEAN and East Asia.

2. Review of Studies on WTP for Carbon Pricing

Many studies have discussed the impact of carbon pricing on emissions reduction and the economy. However, not many studies have examined WTP for carbon pricing by consumers, including households and industries, using primary data sources. Nevertheless, Maestre-Andrés, Drews, and van den Bergh (2019) provided a comprehensive overview of households' perceptions of the fairness of carbon pricing and policy acceptability. Their review was based on empirical studies of individuals' perceptions of the distributional effects and method of implementation of carbon taxes and emissions trading schemes on their well-being. It also discussed individuals' preferences for certain types of redistribution and other uses of revenue generated by carbon pricing, particularly avoiding financial stress on low-income households, which would influence their acceptability of the carbon pricing policy. The review declared that most studies do not clearly state the public preference for using revenues to ensure fairer policy outcomes. Nevertheless, many individuals showed a preference for using revenues for undertaking projects that have positive environmental impacts, such as clean and low-carbon energy development. The authors concluded by saying that 'to increase the acceptability of additional price on carbon emissions, policymakers should think of combining the redistribution of revenue to vulnerable groups with the funding for environmental projects, such as on renewable energy' (Maestre-Andrés, Drews, and van den Bergh, 2019: 1186).

Kaenzig (2021) argued that GHG emissions in many countries have been reduced at the cost of a temporary decline in economic activities, exacerbating uneven income distribution across society. Disadvantaged and low-income households were forced to reduce their consumption drastically, while high-income households were minimally affected. The study concluded by highlighting the crucial role that a targeted fiscal policy could play in correcting the uneven distributional effects of carbon pricing without compromising emission reductions.

The limited number of empirical studies on WTP for carbon pricing in the literature has mostly used either binary or multiple logistic regression models, informing the selection of appropriate variables for empirical analysis in this study. Muth, Weiner, and Lakócai (2024) carried out a national primary survey of 7,000 adults in the summer of 2022 to understand the public attitude towards climate change, with some questions focusing on the acceptance of and WTP for a carbon tax in Hungary. The data for binary logistic regression analysis to determine WTP was based on a subsample of 3,013 respondents drawn from the baseline sample of 7,000 respondents. The purpose of this sample size for quantitative analysis was to design the sample to fairly represent sex, age, place of residence, and level of education. This analysis was restricted to consumers and did not involve industry or government officials.

The empirical results of Muth, Weiner, and Lakócai (2024) are interesting, as they differ slightly from the earlier conclusions of Carattini, Carvalho, and Fankhauser (2018) and Maestre-Andrés, Drews, and van den Bergh (2019) in the sense that the survey respondents showed low acceptance due to revenue recycling accompanied by low WTP values. Surprisingly, the empirical results of Muth, Weiner, and Lakócai (2024) revealed a preference for revenue recycling for improving public healthcare and education, though supporting the poor was not considered important.

Hammerle, Best, and Crosby (2021) examined public support in terms of WTP for carbon tax in Australia through a primary survey of Australian adult residents in 2020, highlighting electricity bills. As a corollary, they also tested whether the name of the carbon pricing scheme influenced the respondents' WTP by sending two surveys – one naming it WTP for a 'carbon tax scheme' and the other called the 'carbon pricing scheme'. For the empirical analysis, data from 210 respondents concerning carbon tax and from 211 respondents concerning carbon pricing were used to estimate the mixed multinomial logit model. Contrary to the findings of Muth, Weiner, and Lakócai (2024), the results of their study revealed that revenue recycling by providing financial support to low-income households was the dominant variable influencing WTP. Subsidies to low-carbon technologies constituted the next most important variable influencing WTP. Neither of these results showed a significant difference because of the name – carbon tax or carbon price. The results also indicated that respondents did not like the carbon pricing policy influencing their behavioural changes, which was reflected in their low WTP preferences.

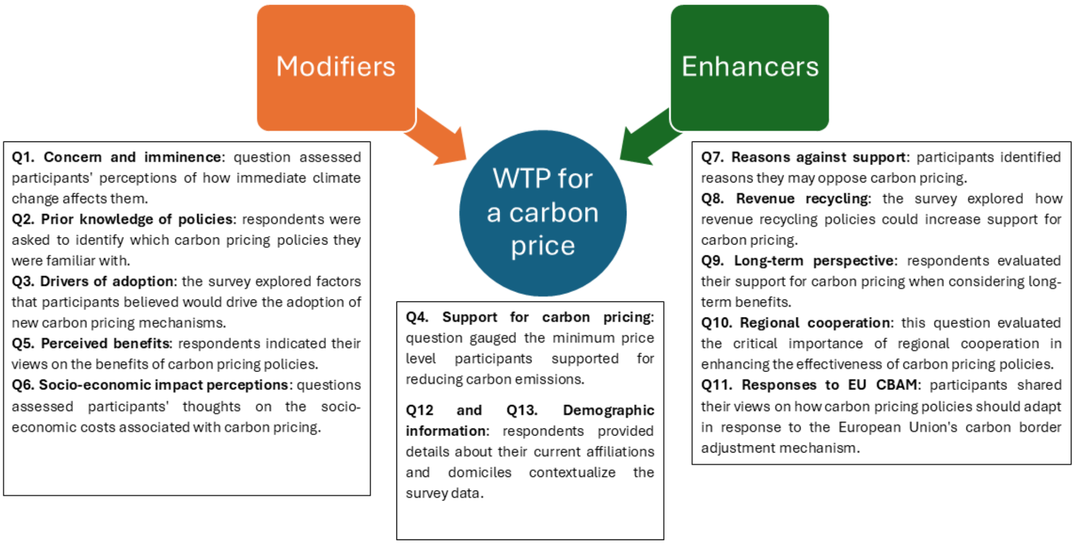
This review revealed that the following variables are most frequently used in the studies analysing WTP for carbon pricing: incentivising low-carbon and clean energy development (ICED), change in industrial/individual consumer behaviour (CIICB), reduction in taxes, help to low-income households (HLIH), prior knowledge about carbon tax, current affiliation, and current domicile. However, in almost all the above studies, data on information related to the influence of carbon pricing were only collected from individual adults, not from industry or government officials. This study fills a gap in the literature by carrying out a primary survey involving individual households, industry, and government officials.

3. Methodology

Survey method

The Regional Survey on WTP for a Carbon Price aimed to gauge public acceptance of carbon pricing policies across ASEAN and East Asia, with a focus on concerns regarding climate change, awareness of carbon pricing policies, the perceived benefits and costs of such policies, and the overall support for carbon pricing mechanisms. The questionnaire used in the survey consists of 13 questions and was made available in English as well as seven national languages in ASEAN. The questions were formulated to reflect the driving and enhancing factors of carbon pricing as a policy instrument. The driving factors capture the external costs of emissions that the public pays for, such as damage to crops from drought, healthcare costs from heat, and loss of property from flooding and sea level rise. The enhancing factors, on the other hand, reflect incentives that increase public WTP for a higher carbon price, due to the co-benefits that the carbon price offers, such as the use of its revenue to fund low-carbon technology, leading to less pollution. A price on carbon helps shift the burden for the damage from climate change back to those who are responsible for it and who can avoid it. To enhance the adoption of carbon pricing, the revenue generated from a carbon price could be recycled by firms for adopting low-carbon technologies – to support their employees and other vulnerable communities by providing benefits such as health insurance. The questionnaire consisted of 13 structured questions organised into three themes, i.e. modifiers, WTP price, and enhancers of carbon pricing policies worldwide, focusing on the ASEAN region. Modifiers aim to examine factors that control respondents' WTP for a carbon price, represented by Q1, Q2, Q3, Q5, and Q6. Enhancers, on the other hand, are questions (Q7–Q11) aimed at investigating factors that could help boost respondents' WTP for a carbon price. Figure 1 shows the structure of the WTP questionnaire. Details of the multiple-choice questions are presented in Appendix A.

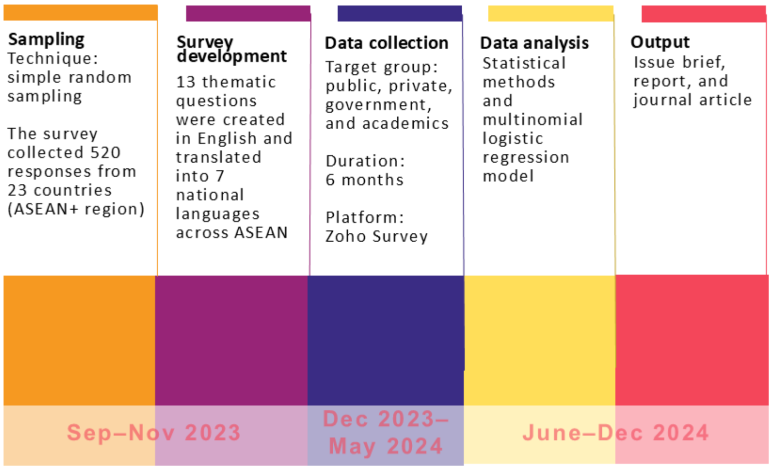
Figure 1: Structure of Willingness to Pay for a Carbon Questionnaire



CBAM = Carbon Border Adjustment Mechanism, EU = European Union, WTP = willingness to pay.
Source: Authors.

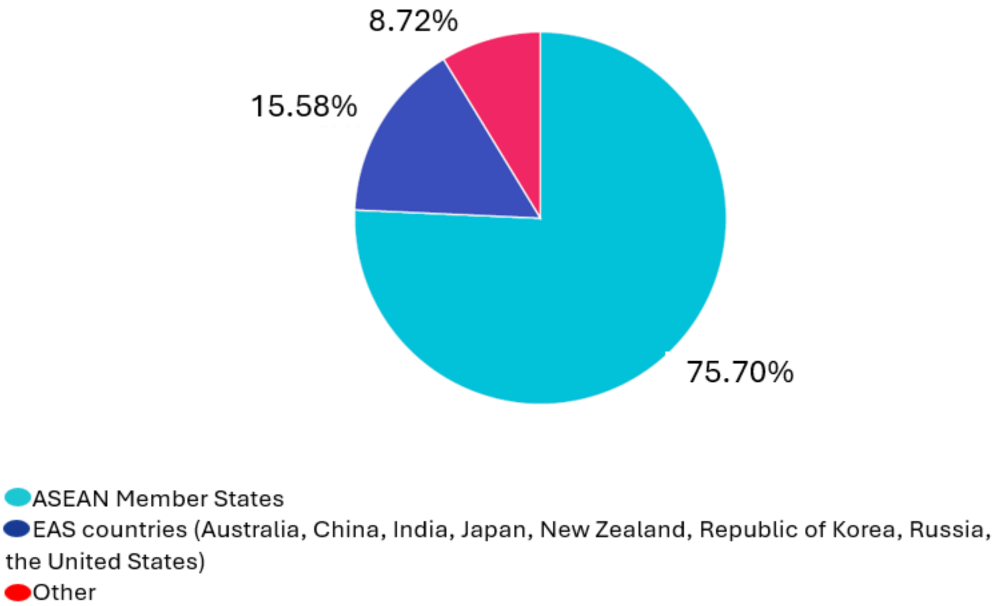
From 14 December 2023 to 13 May 2024, the survey received 520 completed responses. Figure 2 elaborates on the steps involved in conducting the survey. After completing peer reviews to assess the validity and accuracy of the questionnaire with experts in carbon markets, the questionnaire was distributed. The survey used simple random sampling, allowing individuals from a diverse consumer population across the ASEAN+ region – including public, private, government, and academic groups – to have equal opportunities to participate. All 520 responses were complete, with no partial responses. All survey respondents were further categorised based on the regional position of their institutions, falling into the categories of ASEAN, the East Asia Summit (EAS), and the rest. As shown by Figure 3, most of the respondents were based in the ASEAN region (about 75%), followed by respondents from the EAS region excluding ASEAN (16%), and the global group (8%).

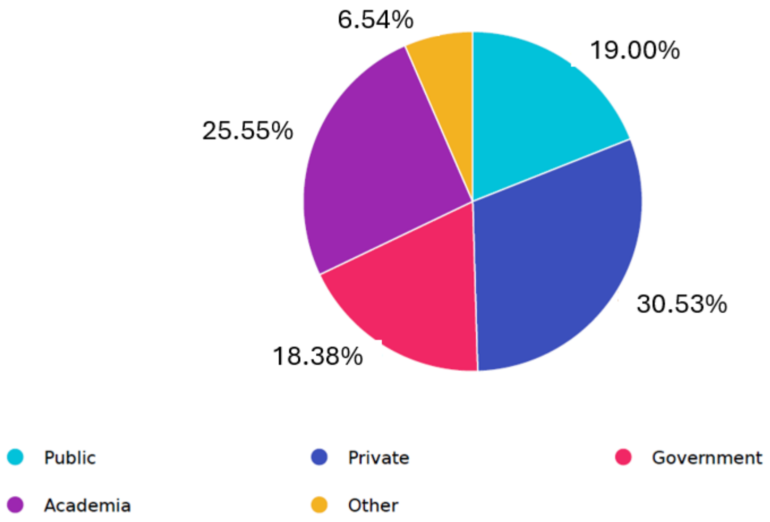
Figure 2: Overview of the Steps Involved in the Survey Design and Implementation



ASEAN = Association of Southeast Asian Nations.
Note: The ASEAN+ region includes ASEAN Member States plus Australia, China, India, Japan, New Zealand, the Republic of Korea, Russia, the United States, and other countries.
Source: Authors.

Figure 3: Overview of Survey Respondents





ASEAN = Association of Southeast Asian Nations, EAS = East Asia Summit.
Source: Authors.

The survey was conducted online using the Zoho survey, which facilitated wide accessibility and support for multiple languages. Respondents were recruited organically through various channels, including posts on social media, professional networks, and organisational contacts, leading to a total of around 1,000 survey visits per month. Quantitative data were analysed using statistical methods to determine response distributions and correlations.

Theoretical model

The crucial role of public opinion in implementing public policies has been the subject of intense debate and increasing interest in identifying the enhanced and limiting determinants of social preferences towards public policy. Several studies have demonstrated that community participation is a key instrument in implementing public policies to improve quality of life and promote overall economic development at the micro level (Ahmad and Talib, 2015; Mayeda and Boyd, 2020; Hammerle, Best, and Crosby, 2021).

Revealed and stated preference theories are two economic approaches to understanding consumer behaviour. While revealed preference theory uses ex-post-consumer behaviour to infer their preferences, the stated preference theory asks consumers directly about their preferences. Hence, the stated preference theory relies on surveys and hypothetical ex-ante scenarios to understand consumer behaviour, on which the present study is designed. Drawing on the stated preference theory in the context of carbon pricing, a multiple-group logistic regression, also called an MLRM,[1] can be formulated to facilitate gauging the perceptions of consumers and industries on accepting the amount of carbon tax with different possible outcomes. The probability of influence of multiple independent variables with enhancing or limiting attributes selected from the above literature review on the dependent variable of interest, which is the amount of the carbon price, can be predicted empirically using the contingent valuation method drawn from the survey data. Thus, the empirical model facilitates quantifying the probability of a respondent's decision to belong to other categories compared with the probability of belonging to the reference category, conditional on the values of the explanatory variables.[2] In logistic regression, the explanatory variables need not be normally distributed, linearly related, or of equal variance within each category. The explanatory variables can also be any mix of continuous, discrete, and dichotomous variables.

Let y be the dependent variable having r>2 unique categories, which are regressed on a set of m independent variables, $x_1, x_2, \ldots x_m$. The categories of y are represented by the values 1, 2, ... r. In the MLRM, the dependent variable, y $= \left(\frac{p_r}{p_1}\right)$, which is the ratio of the probability of the occurrence of the choice category, 'r' compared to the reference category, '1', is given a logarithmic transformation and it is named as logit (y) = $ln(y) = ln\left(\frac{p_r}{p_1}\right)$. The quantities $p_1, p_2, \ldots p_r$ represent the prior probabilities of the relevant categories 1, 2, …r respectively. Considering category 1 as the reference group, the regression coefficients $\beta_{11}, \beta_{12}, \ldots \beta_{1m}$ for the reference group are set to 0. The choice of the reference category or of the control category is arbitrary. This leaves $(r - 1)$ equations in the MLRM.

Then, the MLRM is defined for the (r-1) equations as follows:

$$ln\left(\frac{p_r}{p_1}\right) = \beta_{0r} + \sum_{k=1}^{m} \beta_{rk} x_{rk} \quad r = 2,3, \ldots R \text{ categories} \tag{1}$$

Where:

- (ln) denotes the natural logarithm.
- (p_r) denotes the probability of belonging to the 'r-th' specific category of the dependent variable.
- (p_1) denotes the probability of belonging to a reference category.

---

[1] Choice models are typically derived under an assumption of utility-maximising behaviour by the decision maker (Train, 2009). The decision makers derive a certain utility, such as a profit or other benefit or, in this study, choices of various WTPs from each possible choice. The multinomial logistic regression is a special case of McFadden's choice model.

[2] When there are only case-specific variables in the model and when the choice sets are balanced, which means every case has the same alternatives, then multinomial logistic regression gives the same results as McFadden's choice model (Cameron and Trivedi, 2005).

- (β_0) is the intercept term. With the assumption that the priors are not equal, the values of the intercepts in the MLRM equation will change for each category.
- ($\beta_1, \beta_2, \dots \beta_m$) are the coefficients of the independent variables ($x_1, x_2, \dots x_m$), which indicate the relationship between each independent variable and $ln\left(\frac{p_r}{p_1}\right)$ of belonging to the 'r-th' specific category compared with the reference category. The MLRM generates separate sets of coefficients for each category, comparing them with the reference category.

Assumptions:

1. The dependent variable should be measured at the nominal level with more than or equal to three categories.
2. The independent variables should be either continuous, ordinal, or nominal, including dichotomous variables. However, ordinal independent variables must be treated as being either continuous or categorical.
3. Observations should be independent, and the dependent variable should have mutually exclusive and exhaustive categories in the sense that no individual can be in two different categories.
4. Independent variables should be free from multicollinearity.
5. Any continuous independent variables and the logit transformation of the dependent variable should be linearly related.
6. The outcome categories for the model have the property of independence of irrelevant alternatives. This assumption requires that the inclusion or exclusion of categories does not affect the relative risks associated with the regressors in the remaining categories.

The above-defined MNRM in Equation (1) is estimated by the maximum likelihood methods via Stata software. The core of the analysis is to identify which independent variables are enhancing or limiting the probability of belonging to the choice category compared with the reference category. In other words, respectively, the independent variable x is called a probability enhancing factor and probability limiting factor to be in the choice category compared with the reference category. However, the estimates of β coefficients do not convey this decision. The estimates only indicate how a one-unit change in independent variables x affects the 'logarithm of the odds, $ln\left(\frac{p_r}{p_1}\right)$,' when the other variables in the model are held constant. It does not indicate the relationship between an independent variable and the predicted probability of a specific outcome. It is argued in the literature that to draw valid conclusions about the direction and magnitude of the relationship between an independent variable and a dependent variable in an MLRM, it is necessary to calculate additional measures, particularly marginal effects (Bowen and Wiersema, 2004). Estimating marginal effects would facilitate gauging the impact of the individual independent variables on the probability of belonging to a choice category compared with the reference category.[3] This can be done using continuous or discrete calculations. As in this study, many independent variables are dichotomous. Calculating marginal effects for dichotomous independent variables involves first estimating Equation (2) to calculate the predicted probabilities of being in each of the choice categories, including the reference category, when the dichotomous variable is 0. Then the same estimation procedure for Equation (2) is repeated to get predicted probabilities by changing the dichotomous variable from 0 to 1. Now the marginal effect for each choice category of the dependent variable is the difference between the predicted probabilities when the variable is 1 and when it is 0.

Data

An online questionnaire was developed and used to collect the primary data from 520 participants from industrialists, consumers, academics, government officials, and other non-profit organisations working on climate change. The participants are from ASEAN and East Asia. The primary survey is the first of its kind covering East Asia and ASEAN.

4. Results and Discussions

In this study, the dependant variable is carbon pricing, and it has five categories: no price (\$0) (category 1); <US\$5 (category 2); US\$5–US\$10 (category 3); US\$11–US\$25 (category 4); and >US\$25 (category 5). 'No price (0)' (category 1) is the reference category. Drawing on the literature review relevant to the present study, the following eight independent variables are used in the empirical model: ICED, CIICB, reduction in taxes, HLIH, prior knowledge about carbon tax, current affiliation, current domicile, and supporting the policy yielding the long-term benefits. The selected variables reflect the developmental status, structure of the economy, and other socio-economic factors influencing respondents' WTP preferences.

---

[3] However, the literature has cautioned that the marginal effects are not constant across the range of the concerned independent variable. Nevertheless, the average marginal effects obtained from the range of the concerned independent variable is used in this study to eliminate this drawback. In discrete choice models, such as the MLRM with multiple outcomes, this has the consequence that the marginal effects may be positive for some values of the independent variable and negative for other values (Greene, 2003). Furthermore, the marginal effects may be significant for some values while insignificant for others or even change from negative to positive.

$$ln\left(\frac{p_r}{p_1}\right) = \beta_{0r} + \sum_{k=1}^{8} \beta_{rk} x_{rk} \quad r = 2,3,4,5 \text{ categories} \tag{2}$$

Table 1 provides the definition of variables, unit of measurement, and descriptive statistics.

Table 1: Descriptions and Descriptive Statistics of Variables Used in the MLRM

Type of variable	Variable	Description	Mean	Std. dev.	Min	Max
Dependent variable	Carbon pricing	Multinomial variable (five categories: 1: no price ($0); 2: <US$5, 3: US$5–US$10, 4: US$11–US$25, and 5: >US$25.	2.5154	1.1940	1	5
Independent variables						
Drivers of carbon pricing mechanism*	ICED	If the response is 'incentivising clean energy development', then the value is = 1, otherwise = 0	0.7750	0.4180	0	1
	CIICB	If the response is 'change industrial/individual consumption behaviour', then the value is = 1, otherwise = 0	0.7192	0.4498	0	1
Revenue recycling	Reducing other taxes	If the response is 'reducing other taxes on businesses and individuals', then the value is = 1, otherwise = 0	0.5212	0.5000	0	1
	HLIH	If the response is 'helping low-income households and small businesses', then the value is = 1, otherwise = 0	0.6865	0.4643	0	1
Prior knowledge of public policies on carbon pricing	Carbon tax	If the response is 'carbon tax', then the value is = 1, otherwise = 0	0.8135	0.3899	0	1
Current affiliation (other category is reference category)	Academia	If the response is 'academia', then the value is = 1, otherwise = 0	0.1577	0.3648	0	1
	Government	If the response is 'government', then the value is = 1, otherwise = 0	0.1135	0.3175	0	1
	Private	If the response is 'private', then the value is = 1, otherwise = 0	0.1885	0.3915	0	1
	Public	If the response is 'public', then the value is = 1, otherwise = 0	0.1173	0.3221	0	1
	Others/No response	If the response is 'others & not responded', then the value is = 1, otherwise = 0	0.4231	0.4945	0	1
Current domicile (other countries category is reference category)	ASEAN	If the response is 'ASEAN', then the value is = 1, otherwise = 0	0.4673	0.4994	0	1
	EAS	If the response is 'EAS', then the value is = 1, otherwise = 0	0.1096	0.3127	0	1
	Other	If the response is 'other countries', then the value is = 1, otherwise = 0	0.0404	0.1970	0	1
	No response	If the response is 'not responded', then the value is = 1, otherwise = 0	0.3827	0.4865	0	1
Supporting the policy which yields the long-	Support	If the response is 'support', then the value is = 1, otherwise = 0	0.8404	0.3666	0	1
	Oppose	If the response is 'oppose', then the value is = 1, otherwise = 0	0.0327	0.1780	0	1

Type of variable	Variable	Description	Mean	Std. dev.	Min	Max
term benefits	None	If the response is 'neither support nor oppose', then the value is = 1, otherwise = 0	0.1269	0.3332	0	1

ASEAN = Association of Southeast Asian Nations, CIICB = change in industrial/individual consumer behaviour, EAS = East Asia Summit, HLIH = help to low-income households, ICED = incentivising clean energy development.

* The variable Carbon Border Adjustment Mechanism (selected by 36% respondents) was included in an earlier version, but the coefficient was not statistically significant and hence was dropped from the empirical model. The variables ICED and CIICB were selected by 77.5% and 71.9%, respectively.

Source: Authors' estimation based on the primary data analysis.

The estimation of the MLRM was done using the Stata Version 17 software, and the results of the estimation of coefficients of independent variables along with their marginal effects on the dependent variable categories are given in Table 2.

Table 2: Determinants of Choices of Carbon Pricing – Results of Multinomial Logit Regression Model and Marginal Effects

Type of independent variable	Independent variable	<US$5			US$5–US$10			US$11–US$25			>US$25		
		MLRM coef.	Marginal effects		MLRM coef.	Marginal effects		MLRM coef.	Marginal effects		MLRM coef.	Marginal effects	
			Measure	%		Measure	%		Measure	%		Measure	%
Enhancing carbon pricing mechanisms	*ICED*	1.426** (0.471)	0.055	5.5	1.414** (0.479)	0.064	6.4	1.238** (0.492)	0.007	0.7	0.790 (0.505)	-0.064	-6.4
	CIICB	-0.693 (0.543)	0.040	4.0	-0.900* (0.544)	-0.002	-0.2	-1.034* (0.561)	-0.027	-2.7	-1.243** (0.578)	-0.056	-5.6
Revenue recycling	*Reducing other taxes*	-0.769* (0.434)	-0.013	-1.3	-0.642 (0.429)	0.027	2.7	-1.108** (0.449)	-0.081	-8.1	-0.534 (0.458)	0.032	3.2
	HLIH	0.097 (0.429)	-0.081	-8.1	0.378 (0.428)	-0.029	-2.9	0.614 (0.451)	0.026	2.6	1.148** (0.480)	0.107	10.7
Prior knowledge of public policies on carbon pricing	*Carbon tax*	-0.047 (0.586)	-0.057	-5.7	-0.071 (0.586)	-0.088	-8.8	0.000 (0.602)	-0.053	-5.3	1.526** (0.711)	0.210	21.0
Current affiliation (other category is reference category)	*Academia*	-12.98*** (0.867)	-0.071	-7.1	-13.762*** (0.775)	-0.247	-24.7	-14.104*** (0.810)	-0.220	-22.0	-13.634*** (0.906)	-0.124	-12.4
	Government	-12.03*** (1.331)	-0.148	-14.8	-12.380*** (1.289)	-0.232	-23.2	-12.251*** (1.313)	-0.112	-11.2	-12.167*** (1.355)	-0.103	-10.3
	Private	-13.73*** (0.824)	-0.221	-22.1	-13.770*** (0.706)	-0.229	-22.9	-13.785*** (0.753)	-0.140	-14.0	-13.404*** (0.826)	-0.078	-7.8
	Public	-12.87*** (0.961)	-0.212	-21.2	-12.728*** (0.854)	-0.167	-16.7	-12.833*** (0.875)	-0.116	-11.6	-12.899*** (0.966)	-0.131	-13.1
Current domicile (No response category is reference category)	*ASEAN*	13.83*** (0.796)	0.107	10.7	14.229*** (0.689)	0.199	19.9	14.581*** (0.726)	0.192	19.2	13.972*** (0.810)	0.085	8.5
	EAS	13.13*** (0.792)	0.183	18.3	12.998*** (0.667)	0.143	14.3	13.190*** (0.713)	0.117	11.7	13.087*** (0.808)	0.111	11.1
	Other	11.41*** (1.204)	-0.010	-1.0	12.396*** (0.999)	0.136	13.6	13.029*** (1.077)	0.208	20.8	12.914*** (1.123)	0.186	18.6
Supporting the policy which yields the long-term benefits	*Support*	0.748 (0.519)	-0.118	-11.8	1.123** (0.511	-0.031	-3.1	2.251*** (0.637)	0.159	15.9	1.726** (0.600)	0.070	7.0
	Oppose	-0.811 (0.806)	0.099	9.9	-2.763** (1.172)	-0.277	-27.7	-1.516 (1.218)	-0.030	-3.0	-0.823 (0.932)	0.032	3.2
	Constant	0.686 (0.824)			0.600 (0.789)			-0.667 (0.905)			-1.856* (0.971)		
Log pseudolikelihood		-726.3877											

Type of independent variable	Independent variable	<US$5			US$5–US$10			US$11–US$25			>US$25		
		MLRM coef.	Marginal effects		MLRM coef.	Marginal effects		MLRM coef.	Marginal effects		MLRM coef.	Marginal effects	
			Measure	%		Measure	%		Measure	%		Measure	%
Wald Chi-squared test		1,312.69											
Number of observations		520											

ASEAN = Association of Southeast Asian Nations, CIICB = change in industrial/individual consumer behaviour, EAS = East Asia Summit, HLIH = help to low-income households, ICED = incentivising clean energy development, MLRM = multinomial logistic regression model.

Notes:

1. The dependent variable indicates the choice of carbon pricing such as 1 (if <US$5), 2 (if US$5–US$10), 3 (if US$11–US$25), 4 (if >US$25), and 5 (if no price, i.e. $0). No price ($0) is a reference benchmark category for other choices in this analysis.
2. Figures in parentheses are regression coefficients' standard errors.
3. *** indicates a significance level of 1%, ** indicates a significance level of 5%, and * indicates a significance level of 10%.

Source: Authors' estimation based on the primary data.

At the outset, it is necessary to examine whether the selected independent variables in Equation (2) are relevant to explain the perception of the enhancing and limiting attributes of the sample participants towards supporting or not supporting WTP for a carbon price. The Wald Chi-squared test is a way of testing the significance of the inclusion of the selected explanatory variables in a statistical model. The highly significant large value for the Wald Chi-squared statistic given in Table 2 indicates that the independent variables included in the MLRM are relevant for the empirical analysis. An additional confirmation about the validity of the modelling of the inclusion of independent variables is given by the 'log pseudo likelihood' test, which is a statistical test of the goodness of fit of the model. The test statistics shown in Table 2 are significant, which implies that the null hypothesis of no relationship between independent and dependent variables is rejected.

The empirical estimates of the coefficients of the independent variables are relative to the reference category. It should be noted that most independent variables are dichotomous in this study. Therefore, the interpretation of the coefficients in Table 2 is how the presence or absence of an attribute influences the probability of belonging to each category of the dependent variable compared with belonging to the reference category. The coefficient for this dichotomous variable conveys how much the logarithm of odds of the dependent variable category relate to the reference category change when the variable goes from 0 to 1. If the coefficient is positive, the logarithm of odds increases; if it is negative, the logarithm of odds decreases. The sign and the p-value of each β in Equation (2) provide information on the direction of the effect and statistical significance for a null hypothesis H_0: $\beta = 0$, but expressing results in the logarithm of odds scale is of no practical interest. It is more useful to interpret the coefficients of logistic models on the probability scale because questions are usually focused on understanding the influence of independent variables on the probability of an event. To determine the effect of the independent variable on the dependent variable in the probability scale, it is necessary to compute 'marginal effects', which can be done using continuous or discrete calculations. These marginal effects of independent variables for each choice category are shown in Table 2.

As discussed above, these marginal effects are the changes in predicted probabilities when the dichotomous variable changes from 0 to 1. To make the impact more interpretable and tangible, particularly when communicating to stakeholders including policymakers, it is necessary to interpret the marginal effects in percentage terms. By multiplying these marginal effects measures by 100, the marginal effects of changes in the choice category are expressed in percentage terms. For example, the results in Table 2 reveal that ICED is positive and significant at the 5% level with the marginal effect of (+0.055 x 100) = +5.5% for the category of WTP for a carbon price of less than US$5. Hence, it implies that the ICED policy increases the probability of the respondents' WTP for a carbon price less than US$5 by 5.5% compared with 'no price' for carbon emissions. Now, the interesting question is whether the empirical results in Table 2 facilitate accepting or rejecting the three core null hypotheses. The following subsection provides answers to the question.

Testing of Null Hypothesis 1: The majority of the respondents in ASEAN and East Asia would not be willing to pay a price directly for carbon emissions reduction.

Compared with the carbon pricing reference benchmark category 'no price', the other four categories of <US$5, US$5–US$10, US$11–US$25, and >US$25 are influenced by several factors. In terms of policies concerning ICED, the coefficient is positive and exerts a statistically significant influence on carbon pricing categories below US$25, but not for prices above US$25. It is important to observe that the magnitude of the coefficient is not stable but consistently reduces over the price ranges below US$25. For example, the magnitude decreases from 1.426 for <US$5 to 1.238 for US$11–US$25. As discussed earlier in the 'Theoretical Model' section, these estimates only show the impact of a unit change in independent variables on the 'logarithm of the odds'. They do not indicate the relationship between an independent variable and the predicted probability of a specific outcome, which is the WTP for the carbon price. The marginal effects shown in percentage terms in Table 2 highlight the impact of the variable ICED on price ranges from <US$5 to US$11–US$25 for a carbon price compared with 'no price'. For example, amongst the price ranges, the marginal effect of (+0.064 x 100) = +6.4% for the category of WTP for the carbon price in the range of US$5–US$10 is the largest, followed by the marginal effect of (+0.548 x 100) = 5.5% for the category of WTP <US$5. This implies that the ICED policy increases the probability of the respondents' WTP carbon price in the range of up to US$10 by (6.4% + 5.5%) = 11.9% compared with 'no price' for carbon emissions. It is worth noting that beyond this price range the probability of change in the WTP for carbon compared with 'no price' is either negligible or negative. Hence, the inference from these results confirms the rejection of the null hypothesis 1.

What are the enhancing factors to WTP for carbon pricing? Clearly, the ICED policy variable is an enhancing factor to WTP for carbon prices up to US$10. Another enhancing factor that is positive and statistically significant identified in Table 2 is 'current domicile', which is classified as ASEAN, EAS, and other countries. On combining these two enhancing factors, it is interesting to find out which economies are in the group of WTP carbon price in the range of up to US$10 compared with 'no price' for carbon emissions. The interaction variables between ICED and domicile classifications would answer the above question. However, the interaction variable resulted in producing statistically insignificant coefficients, indicating that there is no observable valid difference between different economies in the selected region. Nevertheless, the following conjecture can be made drawing on the results of marginal effects for these economies shown in Table 2. East Asia appears to have the highest probability (18.3% + 14.3%) = 32.6% of WTP for a carbon price up to US$10 compared with 'no price' for carbon, followed by ASEAN (10.7% + 19.9%) = 30.6%. Nevertheless, the East Asian countries seem to have the highest probability (18%) of WTP for a carbon price <US$5 than that of 'no price'. The next crucial question is which stakeholder groups in East Asia and ASEAN (for a carbon price of up to US$10) reveal the highest probability. Unfortunately, all the stakeholder groups across the selected region appear to be the limiting factors because their marginal effects are negative, which is puzzling. Further, the interaction terms between domicile and current affiliation were not significant. This necessitates more data requirements and further deeper analysis, which could not be undertaken due to time and resource constraints.

Testing of Null Hypothesis 2: Any form of revenue recycling is not perceived by respondents in ASEAN and East Asia as an important policy tool to implement carbon pricing.

The coefficients from Table 2 indicate that the CIICB variable negatively affects carbon pricing mechanisms across the categories, from US$5–US$10 to >US$25. While these MLRM coefficients are significant (Table 2), the marginal effects (Table 2) indicate that a one-unit increase in the CIICB reduces WTP over the above cited range of carbon prices by –0.2%, –2.7%, and –5.6%, respectively. Hence, the variable CIICB acts as a limiting factor to WTP for the current data set. This result is in conformity with the results of Hammerle, Best, and Crosby (2021) in the case of Australia, where the respondents did not reveal a preference for any policies that intervened in their private consumption behaviour. It is interesting to understand why even the individual respondents, who expressed their WTP for a carbon price up to US$10, reveal that they are not willing to change their consumption behaviour. To understand this crucial situation, first it is necessary to examine what economic theory says about changing consumption behaviour in general, and with reference to carbon prices in particular

Changing consumption patterns is often a challenge. Habits, which are mostly tied to convenience, are deep-rooted due to factors such as economic incentives and personal values (Sharma, Nguyen, and Grote, 2018). People often need strong incentives or a significant change in their environment to change their consumption patterns. Implementing a carbon price aims to change consumption behaviour by making the cost of carbon emissions more explicit. By putting a price on carbon, it creates an economic incentive for individuals and businesses to reduce their carbon footprint. The crucial factor is to ensure that the carbon price is set at a level that influences consumption behaviour without causing undue hardship. When it costs more to emit carbon, there is a stronger push to find cleaner, more sustainable alternatives. Here, the availability of and access to such sustainable alternatives to the public and businesses play a crucial role. According to a recent report by McKinsey (2024), a successful transition to net zero by 2050 will require the creation of 1,000 start-ups valued at $1 billion or more, and 300 start-ups valued at $10 billion or more in sustainable energy and related technologies by 2030 (McKinsey Sustainability, 2024). This is a massive challenge for the scale-up journey for climate tech companies.

What strategies or financial incentives need to be implemented to increase support for carbon pricing? Respondents' answers to question 8 (increasing support for carbon pricing through revenue recycling) in this study facilitate examination of their perception of the effectiveness of receiving financial incentives to influence their WTP. Table 2 indicates that, under the revenue recycling category, the 'helping low-income households and small businesses' variable has a positive and significant impact only on the highest carbon pricing category of >US$25 rather than the 'no price' category. Thus, 'helping low-income households and small businesses' in that pricing category acts as an enhancing factor for WTP. The rest of the pricing categories from <US$5 to US$11–US$25 are not statistically significant, which means financial incentives do not seem to influence their WTP. This result reemphasises the respondents' disclosure of their WTP up to US$10 when the policy of 'incentivising clean energy development' is guaranteed. This result is in conformity with earlier studies of Carattini, Carvalho, and Fankhauser (2018) and Maestre-Andrés, Drews, and van den Bergh (2019), which empirically showed that green spending is the most popular form of revenue recycling for increasing stakeholder acceptance of carbon pricing. In other words, the respondents are willing to pay up to US$10 with a low preference for any financial incentives for low-income households, but a higher preference for providing subsidies for clean energy development in the form of revenue recycling compared with 'no price' for carbon emissions. Although this result is contradictory to that of Hammerle, Best, and Crosby (2021), it is in conformity with the findings of Muth, Weiner, and Lakócai (2024). Nevertheless, the marginal effects of the highest pricing category of >US$25 is 10.8%, which indicates that a one-unit change in providing a financial incentive in the form of revenue recycling would result in 10% more WTP compared with the 'no price' category.

Another variable under the revenue recycling strategy considered is ‘reducing other taxes’ on small businesses and low-income households. This variable shows negative influences on WTP acting as a limiting factor, which is statistically significant for only two carbon pricing categories: <US$5 (–0.769) and US$11–US$25 (–1.108). The marginal effects (Table 2) also show that a one-unit change in this variable would reduce WTP by 1.3% and 8.1%, respectively, for the pricing category of <US$5 and US$11–US$25 compared with the ‘no pricing’ category. Hence, the overall inference is that the null hypothesis 2 is not rejected, as any methods of revenue recycling are not perceived by respondents in ASEAN and East Asia as an important policy tool to implement carbon pricing.

Testing of Null Hypothesis 3: Regional harmonisation of carbon pricing is not perceived as a crucial supporting instrument to mitigate negative impacts of the CBAM in ASEAN and East Asia.

The goal of the CBAM is to reduce GHG emissions and support the global transition to net zero by 2050. It addresses the carbon pricing disparity between domestic and imported goods by imposing prices on the embedded carbon in certain imports, ensuring these imports bear a carbon price like that of domestically manufactured products under the EU Emissions Trading System. As a result, domestic carbon pricing is directly proportional to the CBAM.

However, this study has not directly captured the ex post negative effects of the CBAM, as the mechanism had not yet been implemented when the survey was undertaken. The ex ante question of whether regional cooperation mitigates its negative impact is examined in this study. The responses to question 9 (considering the long-term benefits, such as improved quality of life and economic resilience, alongside short-term costs, such as expensive energy prices and temporary loss of competitiveness for small businesses associated with the introduction of carbon pricing policies, to what extent do you support or oppose such a policy?) is used as a proxy variable to capture the negative impact of the CBAM. This variable categorises responses into three groups: support, oppose, and neither support nor oppose. Here, the category of ‘neither support nor oppose’ is the reference category.

As an independent variable, regional cooperation is measured through responses that capture agreement, disagreement, or neutrality regarding support for carbon pricing. Here, the reference category is ‘neither support nor oppose (coded 3)’. To test this hypothesis, a multinomial logistic model is employed. The model’s descriptive statistics and regression results along with marginal effects are provided in Tables 3 and 4, respectively.

Table 3: Variable Descriptions and Descriptive Statistics of Variables

Type of variable	Variable	Description	Mean	Std. Dev.	Min	Max
Dependent variable	Supporting carbon price policies	Multinomial variable (three categories: support = 1, oppose = 2, and neither support nor oppose = 3)	1.2865	0.6776	1	3
Independent variable	Regional cooperation on carbon pricing policies will be effective	Binary variable (If the response is 'agree', then the value is = 1, otherwise = 0)	0.8192	0.3852	0	1
		Binary variable (If the response is 'disagree', then the value is = 1, otherwise = 0)	0.0865	0.2814	0	1
		Binary variable (If the response is 'neither agree nor disagree', then the value is = 1, otherwise = 0)	0.0942	0.2924	0	1

Note: *** indicates a significance level of 1%, ** indicates a significance level of 5%, and * indicates a significance level of 10%.
Source: Authors' estimation based on the primary results.

The results of the multinomial logit model in Table 4 show that regional cooperation supports the harmonising carbon pricing mechanism across the region. For instance, when the respondents selected the choice of 'agree' for regional cooperation with the dependent variable carbon pricing, there is a higher likelihood of enjoying long-term benefits of economic resilience along with short-term costs of temporary loss of competitiveness to small businesses due to the implementation of the CBAM indicated by the coefficient (1.064). The marginal effect reveals that a one-unit increase in the 'agree' variable leads to a 22% increase in support for carbon pricing. Since carbon pricing is used as a proxy for the CBAM, this suggests that regional cooperation in harmonising the carbon price supports the implementation of the CBAM, potentially reducing any negative impacts associated with it. Hence, the inference is that the core null hypothesis 3 is rejected.

Table 4: Determinants of Impact of CBAM – Results of MLRM and Marginal Effects

Independent variable	Categories	MLRM coef.	Marginal effects	
			Measure	%
Regional cooperation on carbon pricing policies will be effective	***Support***			
	Agree	1.064** (0.3720)	0.2178	21.8
	Disagree	0.754 (0.5579)	0.1025	10.2
	Constant	0.981** (0.3388)		
	Oppose			
	Agree	-1.050 (0.6692)	-0.0856	-8.6
	Disagree	0.693 (0.8070)	0.0091	0.9
	Constant	-0.875 (0.5328)		
Log pseudolikelihood		-259.377		
Wald Chi-squared test		22.82		
Number of observations		520		

CBAM = Carbon Border Adjustment Mechanism, MLRM = multinomial logistic regression model.
Notes: Figures in parentheses are standard errors of the estimates. ** indicates a significance level of 5%.
Source: Authors' estimation based on the primary data.

5. Conclusions and Recommendations

It has been acknowledged by policymakers and stakeholders around the world that carbon pricing, which does not draw on government budgets, has high potential to reduce CO_2 emissions, stimulate innovation in low-carbon technologies, and create a level playing field for industries to sustain their competitiveness. The necessary condition for the successful implementation of the carbon pricing process is identifying a carbon price. However, the necessary and sufficient condition to identify a carbon price is by eliciting consumers' WTP for a carbon price to reduce CO_2 emissions. The stated revealed preference theoretical approach is the most appropriate tool for gauging WTP when prices do not exist or do not reflect actual costs in the market. This study has provided quantitative analyses of identifying the enhancing and limiting factors influencing stakeholders' perception of their WTP for a carbon price. Unlike other studies reviewed on carbon pricing, data for empirical analysis were drawn from a primary survey of 520 respondents from stakeholders – including industry and government officials. This sample of respondents represented different socio-economic characteristics, including their affiliations and residency status in ASEAN and East Asia.

Many countries in ASEAN and East Asia are working on carbon pricing mechanisms, either through a direct carbon tax or through a carbon market. It remains to be seen whether government proposals will have enough traction, and it is too early to predict whether the policy proposals on new carbon pricing can be enacted with full public acceptance. Given that this survey provides some insight into the extent to which different categories of stakeholders are willing to bear the costs of carbon emission reductions within the region, the findings may prove relevant to policy debates and dialogue.

The study tested three core hypotheses regarding WTP for carbon pricing. While the first and third hypotheses were rejected, the second was not, suggesting that stakeholders in ASEAN and East Asia are aware of climate change issues and support a carbon price of up to US$10. Most stakeholders viewed revenue recycling as essential for offsetting the negative carbon impacts of cross-border carbon pricing. However, their preference for higher WTP was primarily tied to incentivising domestic clean energy development rather than providing financial support to low-income households. The importance of regional cooperation in harmonising carbon prices in ASEAN and East Asia towards eliminating the negative impact of the EU CBAM cannot be overemphasised. One feasible policy suggestion here is to make available sufficient low-carbon technologies, which are not yet satisfactorily available, and to make access to such facilities available to stakeholders including low-income households.

It is imperative for policymakers that the introduction of appropriate carbon pricing not only help to meet enhanced decarbonisation goals but also bring about significant economic competitiveness and social benefits as short-term negative impacts are also recognised (Walch, Cameron, and Mital, 2018; Albrini, Khymych, and Ščasný, 2020; Timilsina, 2022). Establishing appropriate carbon pricing at national, regional, and global levels is crucial and can be achieved through international dialogue, harmonisation of emerging carbon pricing instruments, and the development of standards for both compliance and voluntary carbon markets. To be sufficiently informative, consumer surveys also need to be thorough enough to include the estimated impacts of carbon pricing against the variance to analyse the systematic response propensity. Higher prices for emission reduction are also affected by how carbon pricing is implemented. Programme costs and benefits of climate actions strongly affect consumer preferences, which may also vary with neighbourhood characteristics such as education, access to amenities, and household income. Aggregating those parameters up to the implied firm-level WTP for a specific carbon pricing programme will provide more insights into the overall welfare effects of such new policy instruments.

References

Ahmad, M.S. and N.B.A. Talib (2015), 'Empirical Investigation of Community Empowerment and Sustainable Development: Quantitatively Improving Qualitative Model', *Quality and Quantity*, 49, pp.637–55.

Alberini, A. and M. Horvath (2021), ‘All Car Taxes Are Not Created Equal: Evidence from Germany’, *Energy Economics*, 100(C), 105329.

Alberini, A., O. Khymych, and M. Ščasný (2020), ‘Responsiveness to Energy Price Changes When Salience Is High: Residential Natural Gas Demand in Ukraine’, *Energy Policy*, 144, 111534.

Beiser-McGrath, L.F. and T. Bernauer (2019), ‘Could Revenue Recycling Make Effective Carbon Taxation Politically Feasible?’, *Science Advances,* 5(9): eaax3323.

Bowen, H.P. and M.F. Wiersema (2004), ‘Modeling Limited Dependent Variables: Methods and Guidelines for Researchers in Strategic Management’, *Research Methodology in Strategy and Management*, 1, pp.87–134.

Cameron, A.C. and P.K. Trivedi (2005), *Microeconometrics: Methods and Applications*, Cambridge, UK: Cambridge University Press.

Carattini, S., M. Carvalho, and S. Fankhauser (2018), ‘Overcoming Public Resistance to Carbon Taxes’, *Climate Change,* 9(5): e531.

Greene, W.H. (2003), *Econometric Analysis*, Fifth Edition, Upper Saddle River, NJ: Prentice Hall.

Hammerle, M., R. Best, and P. Crosby (2021), ‘Public Acceptance of Carbon Taxes in Australia’, *Energy Economics*, 101, 105420.

Kaenzig, R. (2021), ‘The Economic Consequences of Putting a Price on Carbon’, London Business School, September (mimeo). https://www.ecb.europa.eu/press/conferences/ecbforum/shared/pdf/2021/kaenzig_paper.en.pdf

Klenert, D., L. Mattauch, E. Combet, O. Edenhofer, C. Hepburn, R. Rafaty, and N. Stern (2018), ‘Making Carbon Pricing Work for Citizens’, *Nature Climate Change,* 8, pp.669–77.

Konc, T. S. Drews, I. Savin, and J.C.J.M. van den Bergh (2022), ‘Co-Dynamics of Climate Policy Stringency and Public Support’, *Global Environmental Change*, 74, 102528.

McKinsey Sustainability (2024), ‘Creating a How-To Guide for Climate Tech Start-Ups and Scale-Ups’. https://www.mckinsey.com/capabilities/sustainability/our-insights/creating-a-how-to-guide-for-climate-tech-start-ups-and-scale-ups#/

Maestre-Andrés, S., S. Drews, and J. van den Bergh (2019), ‘Perceived Fairness and Public Acceptability of Carbon Pricing: A Review of the Literature’, *Climate Policy,* 19(9), pp.1186–1204.

Mayeda, A.M. and A.D. Boyd (2020), ‘Factors Influencing Public Perceptions of Hydropower Projects: A Systematic Literature Review’, *Renewable and Sustainable Energy Reviews*, 121(C), 109713.

Muth, D., C. Weiner, and C. Lakócai (2024), 'Public Support and Willingness to Pay for a Carbon Tax in Hungary: Can Revenue Recycling Make a Difference?', *Energy, Sustainability and Society*, 14, 30.

Sharma, R., T.T. Nguyen, and U. Grote (2018), 'Changing Consumption Patterns – Drivers and the Environmental Impact', *Sustainability*, 10(11), 4190.

Stiglitz, J., J. Fitoussi, and M. Durand (2018), *Beyond GDP: Measuring What Counts for Economic and Social Performance*, Paris: Organisation for Economic Co-operation and Development (OECD).

Timilsina, G.R. (2022), 'Carbon Taxes', *Journal of Economic Literature*, 60(4), pp.1456–1502.

Train, K.E. (2009), *Discrete Choice Methods with Simulation*, 2nd edition, Cambridge, UK: Cambridge University Press.

Walch, R., T.A. Cameron, and S. Mital (2018), 'Determinants of Willingness-to-Pay for Internal Carbon Pricing Programs', University of Oregon Discussion Paper Series.

Appendix A

List of Questions Used in the Questionnaire

Question	Answer	Format
1. Which of the following comes closest to your view on how climate change is affecting you?	▪ In the immediate future ▪ 5–10 years ▪ 11–25 years ▪ Won't affect me	Multiple choice (one answer)
2. Which of the following policy pathways on carbon pricing have you heard about?	▪ Carbon tax ▪ Emission trading systems ▪ Phasing out fossil fuel subsidies ▪ Incentivising renewable energy sources ▪ European Union (EU) Carbon Border Adjustment Mechanism (CBAM)	Multiple choice (many answers)
3.Which of the following factors do you believe will drive the adoption of new carbon pricing mechanisms?	▪ Regulatory initiatives to reduce carbon emissions ▪ Co-benefit of local environmental protection ▪ Incentivise clean energy development ▪ Change industrial/individual consumption behaviour ▪ Imposition of CBAM by EU	Multiple choice (many answers)
4.Thinking about the impacts of carbon pricing policy, what price level do you think would be the minimum to reduce carbon emissions – to what extent do you support such a policy in your country?	▪ <US$5 ▪ US$5–US$10 ▪ US$11–US$25 ▪ >US$25 ▪ No price	Multiple choice (one answers)
5.What are your thoughts on the benefits of carbon pricing for you?	▪ Better air quality ▪ Better public health ▪ More investment in clean energy ▪ Green growth ▪ Long-term prosperity ▪ Other (Please specify)	Multiple choice (many answers)
6.What do you think about the economic costs of carbon pricing policies?	▪ More expensive energy ▪ Higher cost of living ▪ Job losses ▪ Small businesses impacted disproportionally	Multiple choice (many answers)
7.What do you think are the reasons for not supporting carbon pricing?	▪ Perception that climate risk is not real ▪ It is an ineffective climate change mitigation policy instrument ▪ Expensive for developing countries ▪ Increases income inequality ▪ Loss of industrial competitiveness ▪ Not politically feasible	Multiple choice (many answers)

Question	Answer	Format
8. A carbon pricing mechanism, if accompanied by any of the following revenue recycling policies, will increase your support?	▪ Reducing income taxes on businesses and individuals ▪ Assisting workers in affected industries ▪ Reducing other taxes on businesses and individuals ▪ Helping low-income households and small business ▪ Improving social services and safety networks	Multiple choice (many answers)
9. Considering the long-term benefits, such as improved quality of life and economic resilience, alongside short-term costs, such as expensive energy prices and temporary loss of competitiveness to small businesses, associated with the introduction of carbon pricing policies, to what extent do you support or oppose such a policy?	▪ Support ▪ Oppose ▪ Neither support nor oppose	Multiple choice (one answers)
10. Carbon pricing policies will only be effective if all countries adopt them in a coordinated way.	▪ Agree ▪ Disagree ▪ Neither agree nor disagree	Multiple choice (one answer)
11. How should carbon pricing policies respond to the EU CBAM?	▪ Strengthen domestic carbon pricing policies ▪ CBAM should accompany international revenue recycling to help developing countries ▪ Comply with CBAM regulations as an opportunity to reduce carbon footprint ▪ Support industries; build technological capacity and capability to comply with CBAM	Multiple choice (many answers)
12. Please select one group that best describes your current affiliation.	▪ Public ▪ Private ▪ Government ▪ Academia ▪ Other (please specify)	Multiple choice (one answer)
13. Please select a region that includes the country of your current domicile.	▪ ASEAN (Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Viet Nam) ▪ East Asia Summit (EAS) countries (Australia, China, India, Japan, New Zealand, Republic of Korea, Russia, the United States) ▪ Other (Please specify)	Multiple choice (one answer)

ASEAN = Association of Southeast Asian Nations.
Source: Authors.

ERIA Discussion Paper Series

No.	Author(s)	Title	Year
2024-02 (No. 548)	Bhupendra Kumar Singh, Venkatachalam Anbumozhi, Rakesh Kumar Agarwal	India-ASEAN Power Trading and Regional Grid Connectivity: Status, Challenges, and Policy Innovations Required for Acceleration	May 2025
2024-01 (No. 547)	David Christian and Lili Yan Ing	Trajectory of Southeast Asian Production Fragmentation	May 2025
2024-39 (No. 546)	Sanja Samirana Pattnayak	Digitalisation, Exports, and Firm Performance: A Case of Indian Manufacturing	March 2025
2024-38 (No. 545)	Ju Hyun Pyun and Jong-in Sun	Global Pandemic Shocks, Foreign Exposure and Firm Productivity: Evidence from Korean Firm-level Data	March 2025
2024-37 (No. 544)	Abhishek Kumar, Apra Sinha, and Gazi Salah Uddin	Revenue and Cost Uncertainties and Market Power	March 2025
2024-36 (No. 543)	Md Lutfur Rahman and Sudipta Rose	Firm-level Climate Vulnerability and Corporate Risk-taking: International Evidence	March 2025
2024-35 (No. 542)	Alloysius Joko Purwanto, Ridwan Dewayanto Rusli, Hafis Pratama Rendra Graha, Sirichai Koonaphapdeelert, Reza Miftahul Ulum, Citra Endah Nur Setyawati, Nadiya Pranindita, Ryan Wiratama Bhaskara	Carbon Emission Reduction Potential of Hydrogen Production for Large-Scale Industrial Facilities in Southeast Asia	February 2025
2024-34 (No. 541)	Masahito Ambashi, Naoyuki Haraoka, Fukunari Kimura, Yasuyuki Sawada, Masakazu Toyoda, Shujiro Urata	New Industrial Policies to Achieve Sustainable Asia-Wide Economic Development	February 2025
2024-33 (No. 540)	Rui Augusto Gomes	Leveraging ASEAN Membership for Timor-Leste's Development: Issues and Recommendations	January 2025

ERIA discussion papers from previous years can be found at:

http://www.eria.org/publications/category/discussion-papers