WILLINGNESS TO PAY CARBON TAX BY SMES IN EKITI STATE, NIGERIA: A Comparative Study of Agricultural and Non-Agricultural Sectors

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ABSTRACT

This study assessed the willingness to pay carbon tax among small and medium-sized enterprises in the agricultural and non-agricultural sectors in Ekiti State, Nigeria. Primary data was collected from 320 respondents through a questionnaire. Descriptive and inferential statistics were used to analyse the data. The results revealed that only one quarter of the SME operators were willing to pay the carbon emission tax. It was found that attitude of small businesses toward the environment, size of the business, the industry, annual turnover, and education level of the business manager were the most important factors determining willingness to pay carbon tax. The t-test showed no statistically significant difference in the willingness to pay of agricultural and non-agricultural small businesses. The study recommends that the Ekiti State government establish robust legislation and foster collaboration among SMEs.

Keywords: Willingness-to-pay, Carbon Tax, Small and Medium Enterprises (SMEs), Contingent Valuation Model, Poisson Regression, Ekiti State

JEL classification: Q58

1. Introduction

The problem of climate change received global attention from the United Nations at the 2021 UN Climate Change Conference of the Parties (COP26) in Glasgow (Arora & Mishra, 2021). The United Nations Framework Convention on Climate Change (UNFCCC) and other treaties geared toward developing nations, especially West African countries, are aimed at reducing GHG emissions (Shirani et al., 2023; Akujor et al., 2022). The COP26 aimed to ensure that UN countries re-affirm their commitment to securing a net-zero limit of carbon emissions by mid-century, to keep the 1.5-degree limit within reach, conserve the natural ecosystem, protect communities, and mobilize finance to compensate the environment (Ibrahim, 2022; Padhee and Whitbread 2022 and Dutt 2022).

In October 2021, Nigeria's National Assembly passed the Climate Change Act 2021, which President Muhammadu Buhari signed into law barely a week after the conference. This Act was aimed at establishing a framework to achieve low GHG emissions, integrate climate change actions into national plans and programmes, and calculate the cost of carbon emissions from all fuel-powered engines in the environment. In addition to establishing the National Council on Climate Change (NCCC), responsible for implementing policies and decisions related to climate change in Nigeria, collaborating with the Federal Inland Revenue Service (FIRS) is crucial in formulating a strategy for a carbon tax in Nigeria. It is proposed that the tax proceeds will be used to establish a climate change fund.

Researchers have explored various environmental policy instruments to reduce human environmental impact (Liao, 2018). Such impacts are associated with air pollution, greenhouse emissions, deforestation, and global warming (Campbell-Lendrum & Prüss-Ustün, 2019). Particularly in developing countries, SMEs tend to underestimate the value of the ecosystem, either by disregarding the carbon emissions into the atmosphere or by failing to provide environmental compensation through carbon emission taxes (Rashid, 2022; Hazra & Shee, 2021; Zahra & Wright, 2016).

Agricultural and non-agricultural sectors have contributed immensely to global greenhouse gas (GHG) emissions (Tongwane & Moeletsi, 2018; Hussain et al., 2019). In Nigeria, small and medium-size enterprises (SMEs) in these sectors rely heavily on fossil fuels to power their machines and

equipment. Hussain et al. (2019) stated that agricultural activities like land use and tillage operations account for one-fifth of global anthropogenic GHG emissions. The share of non-agricultural SMEs like artisans and motorists in total GHG emissions is much higher, as this sector is the third largest contributor after the energy and industrial sectors (Hussain et al., 2019). Carbon sequestration, a natural way of buffering this emission, requires a combined and comprehensive environmental policy instrument like a carbon tax to mitigate both carbon emitters' contributions to climate change adequately. The carbon tax has been a formidable environmental tool used in developed countries to protect the earth and discourage the use of fuel-powered engines by firms and SMEs (Akinrinlola, 2022).

Fossil fuels are Nigeria's primary energy source, and agricultural and non-agricultural SMEs rely on them (Hussain et al., 2019). Fuels that need combustion, such as coal, natural gas, and gasoline, constantly release greenhouse gases into the atmosphere. The SDG targets include climate action, responsible consumption and production, and achieving net-zero carbon emissions for sustainable development by 2060. These include environmental goals, economic growth, climate change, sustainable cities, and inexpensive, clean energy. SMEs contribute significantly to the global economy, and their actions can significantly impact the environment. Manufacturing, forestry, agriculture, transportation, and energy production have resulted in higher GHG emissions from SMEs and cars that use fossil fuels for production and services (Tongwane & Moeletsi, 2018). Since many SMEs have limited resources, they may see the carbon tax as an extra expense. Adopting sustainable practices, however, may also help SMEs in other ways, such as higher brand recognition, more accessible access to green funding, and better competitiveness in international markets.

Sustainable Development Goals 7 and 12 state that responsible consumption and production are necessary for improved economic integration and a cleaner environment and to close the gap in current research by considering the relationship between carbon emissions, willingness to pay, SMEs, and motorists in Nigeria. These days, there is a global trend in the willingness of SMEs, drivers, and other motorists to pay carbon taxes (Shaari, Abdul-Rahim and Afandi, 2020). However, the willingness of SMEs and motorists to counterbalance CO2 outflows may be a later concept in Nigeria,

despite the low-carbon growth development envisaged in many national arrangements. These later climate-alternative arrangements aim to achieve a low-carbon and climate-resilient economy.

This study categorized small businesses in the study area into groups, describing their socioeconomic background, examined what makes small business owners willing to pay a carbon tax, and hypothesized whether there is a statistical difference between agricultural and non-agricultural SMEs in Ekiti State, Nigeria in the willingness to pay a carbon tax.

2. Methodology

The study focused on agricultural and non-agricultural SMEs in Ekiti State, Nigeria. Using Cochrane formula for sample size determination, three hundred and twenty respondents were selected out of the 1880 SMEs that were registered under SMEDAN in Ekiti State (SMEDAN, 2023). A multistage sampling procedure was adopted. The first stage involved the purposive sampling of five (5) Local Government Areas (LGAs): Ado LGA, Ikere LGA, Oye LGA, Ikole LGA, and Ijero LGA. The selection was due to the predominance and institutional presence of SMEs in these LGAs. The second stage involved the purposive sampling of SMEs engaged in production or services, such as transportation, that necessitate the use of fossil fuels. In the third stage, the SME sample was divided into ten groups (Table 1), and a random sampling was used to select ten respondents from each group in Ado LGA since there are more SMEs in the state capital than in other LGAs. Five (5) respondents were randomly sampled from each of the remaining LGAs, except for ten (10) motorists, selected from these other LGAs due to their widespread presence. The process resulted in selecting 100 SMEs in Ado LGA and fifty-five (55) SMEs from each LGA. As a result, three hundred and twenty (320) respondents were selected. This research adopted quantitative methods to obtain both primary and secondary data. Primary data was collected using a well-structured questionnaire. The questionnaires were physically distributed to the targeted SMEs in Ekiti State. The study employed both descriptive and inferential statistics to achieve its objectives. Descriptive statistics and a contingent valuation model were used to describe SMEs' socioeconomic profile and operations and determine their

willingness to pay for a carbon tax in the study area. A one-sample t-test was used to test the hypothesis.

Table 1: Samples of SMEs in the Study Area

Enterprises	Ado	Oye	Ikole	Ijero	Ikere
Agricultural Sector					
(1) Agricultural Production (Irrigation farming, animal production (poultry farms, fish farms, and piggery))	10	5	5	5	5
(2) Agricultural Processing (Cassava processor, rice mills, oil palm processor, frozen food (meat, fish and broilers)	10	5	5	5	5
(3) Cafeteria/Bakery/Confectionaries	10	5	5	5	5
Non-agricultural Sector					
(4) Motorists	10	10	10	10	10
(5) Service (IT, Telecommunication, Photography and Studio)	10	5	5	5	5
(6) Carpentry and furniture making	10	5	5	5	5
(7) Groceries and Supermarket	10	5	5	5	5
(8) Oil and gas sales outlet (filling station selling petrol, kerosene, diesel and gas)	10	5	5	5	5
(9) Fashion and boutique store	10	5	5	5	5
(10) Beauty and salon centre (barbing, hairdressing, pedicure, manicure and makeover etc.).	10	5	5	5	5
Total	100	55	55	55	55

2.1 Contingent Valuation Model (CVM)

A Poisson regression was used to analyse the open-ended CVM and the double-bound CVM. Poisson regression is the simplest count regression model. It was stated according to Gujarati (2004) as:

$$Log\,(E(Y/x)) = \alpha + \beta^i x \quad (1)$$

where $\alpha\ E\ R$ and $\beta\ E\ R^n$ are sometimes written as:

$$\log\left(\left(E\left(\frac{Y}{x}\right)\right) = \theta^i x, \quad (2)$$

where: x is now $(n + 1)$ – a dimensional vector consisting of n independent variables concatenated to β.

Thus, when given a Poisson regression model, θ, and an input vector, x, the predicted mean of the associated Poisson distribution is given by;

$$E(Y/x)) = e^{\theta x}$$

If Y_i are independent observations with corresponding values x_i of the predictor variables, then Θ can be estimated by maximum likelihood.

$$\log(Y_i) = \beta_0 + \beta_i X_i + e_i \quad (3)$$

Y_i = Willingness to pay (maximum willingness to pay)

X_1 = Attitude towards the environment (0= poor; 1= good)

X_2 = SMEs size (Number of employees)

X_3 = SMEs sector (1= manufacturing; 2= power & heating; 3= others)

X_4 = Awareness of carbon mitigation technology (1= yes; 0= No)

X_5 = Awareness of carbon market policy (1= yes; 0= No)

X_6 = Existence of business (years)

X_7 = SMEs annual turnover (naira)

X_8 = Education of SMEs Manager (1=primary, 2=secondary, 3=diploma, 4=degree, 5=masters/PhD, 6=Others)

X_9 = SMEs perception of energy price level (0=low, 1=high)

X_{10} = SMEs perception of competition degree of the market (0=low, 1=high)

X_{11} = SMEs investment in energy-saving technology (Naira)

e_i = Random error

3. Results and Discussion

3.1 Categories of SMEs operation

Figure 1 depicts the categories of small enterprises in the research area and pertinent information about their production needs and willingness to pay

carbon tax emissions. The result examined more non-agricultural firms (72.2%) than agricultural enterprises (27.8%) because, though this is an agricultural region, some farmers look for other forms of income in non-agricultural sectors due to low productivity, restricted access to technology, and fragmented land. In contrast to the deficiency in number of power and heating enterprises (9.7%), firms were actively providing services (55.3%). The fact that most of the study area's entrepreneurial enterprises are non-agricultural companies offering services like transportation, trading, information technology, carpentry, furniture, fashion, and beauty parlours suggests that Ekiti State has yet to experience much industrialization. This finding emphasizes how crucial non-agricultural sectors are in generating revenue.

Similarly, despite Ekiti State's rural nature, non-agricultural firms contribute more to carbon emissions due to their preponderance in the study area. This finding corroborates the assertion by Hussain et al. (2019) that the share of non-agricultural SMEs in total greenhouse gas (GHG) emissions is much higher, as this sector is the third largest contributor. Their findings indicate that agricultural activities such as land use and tillage operations account for 20% of global anthropogenic GHG emissions. Bathaei and Štreimikienė (2023) stated that while agriculture contributes significantly to carbon emissions, the industry frequently needs more incentives to engage in renewable energy due to low-profit margins and financial restrictions; hence, they may be unwilling to pay a carbon tax.

However, Tongwane and Moeletsi (2018) opined that more GHG emissions from manufacturing, forestry, agriculture, transportation, and energy production have come from SMEs and motorists that use fossil fuels in production and rendering services. On the one hand, non-agricultural SMEs may be more ready to invest in green energy and pay carbon taxes due to improved financing, regulatory pressure, and customer demand for environmentally-friendly activities (Agrawal et al., 2023). However, Carattini et al. (2018) found that some agricultural SMEs are concerned about the financial burden of a carbon tax, indicating that they may be unwilling to bear the total cost.

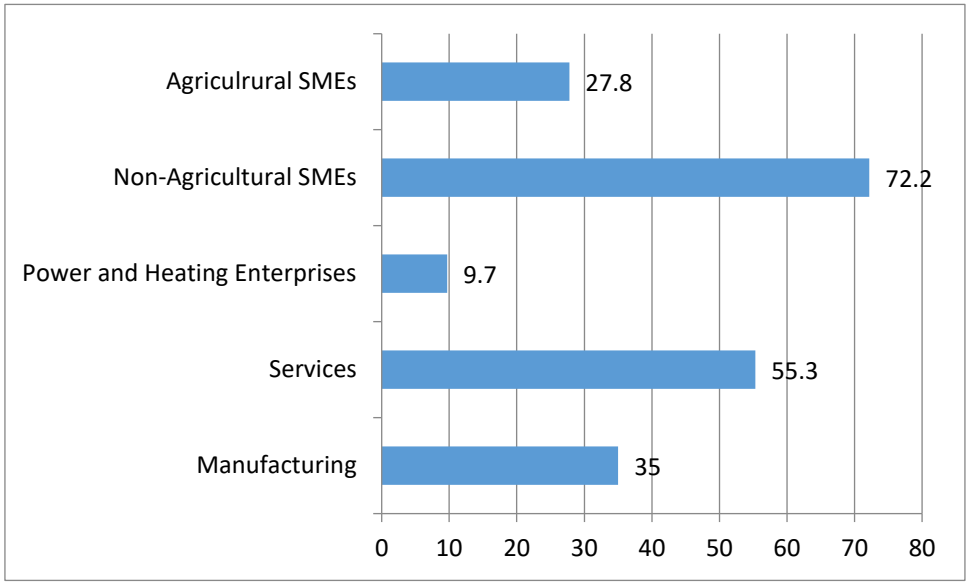

Figure 1: Categories of Small Medium Enterprises

3.2 Socio-economic profile of SME operators

Table 2 displays the outcome based on the respondents' socioeconomic profiles. The average age of the SME operators was 33.4 years, making them younger. This suggests that more individuals in Ekiti State who are still working are becoming motivated to start their own businesses. This finding is consistent with those of Eniola (2020) and Gumel (2017), which contend that the main impetus behind small enterprises in Southwest Nigeria is youth. Numerous variables, such as the region's youthful population, high unemployment rates, and growing entrepreneurial spirit, could be responsible for this development. High unemployment rates have long plagued the area, particularly among young people (Akanle & Omotayo, 2020; Fawole & Ozkan, 2019). Young people find that starting a small business is an appealing way to generate employment possibilities. The youth of Southwest Nigeria are developing an increasingly entrepreneurial mindset and culture. Starting their businesses and being their own bosses attract many young individuals. Maniu et al. (2021) reported that there is a direct relationship between small business owners' age and their use of green energy solutions. This is possible because more senior owners have the means and expertise to

engage in sustainable operations. Shahzad (2020) hypothesized that younger people are typically more inclined to pay for carbon taxes and other forms of environmental protection. Small business owners' desire to pay carbon taxes may depend on several factors, including their age, industry, level of environmental knowledge, and perception of the tax's impact on their company.

Table 2: Descriptive Results of the Socio-economic Profile of Respondents

Socio-economic Variables	Agric. SMEs (N = 89)	Non-Agric. SMEs (N = 231)	Pooled (N = 320)	Mean
	Freq. (%)	Freq. (%)	Freq. (%)	
Age (years)				
< 30	23(25.8)	82(35.5)	105(32.8)	
30 – 39	41(46.1)	115(49.8)	156(48.8)	33.4
40 – 49	15(16.9)	29(12.6)	44(13.8)	
> 49	10(11.2)	5(2.2)	15(4.7)	
Gender				
Male (1)	56(62.9)	136(58.9)	192(60.0)	
Female (0)	33(37.1)	95(41.1)	128(40.0)	
Business Experience (years)				
< 5	23(25.8)	57(24.9)	80(25.0)	
5 – 9	42(47.2)	135(58.4)	177(55.3)	7.1
10 – 14	10(11.2)	19(8.2)	29(9.1)	
15 – 19	7(7.9)	10(4.3)	17(5.3)	
> 19	7(7.9)	10(4.3)	17(5.3)	
Level of Education				
Non-formal Education (0)	9(10.1)	30(12.9)	39(12.2)	
Some Primary (1)	8(8.9)	12(5.2)	20(6.3)	
Primary (2)	9(10.1)	15(6.5)	24(7.5)	
Some Secondary (3)	4(4.5)	10(4.3)	14(4.4)	
Secondary (4)	15(16.9)	36(15.6)	51(15.9)	
OND/NCE (5)	20(22.5)	54(23.4)	74(23.1)	
BSc./HND (6)	16(17.9)	50(21.7)	66(20.6)	
MSC/MBA(7)	8(8.9)	24(10.4)	32(10.0)	

Socio-economic Variables	Agric. SMEs (N = 89)	Non-Agric. SMEs (N = 231)	Pooled (N = 320)	Mean
	Freq. (%)	Freq. (%)	Freq. (%)	
Number of Employees				
< 3	50(56.2)	154(66.8)	204(63.8)	2.5
3 – 5	15(16.9)	60(25.9)	75(23.4)	
6 – 8	11(12.4)	12(5.2)	23(7.2)	
9 – 11	5(5.6)	1(0.4)	6(1.9)	
> 11	8(8.9)	4(1.7)	12(3.8)	
Monthly Income (Naira)				
< 50,000	10(11.2)	38(16.5)	48(15.0)	
< 50,000 – 100,000	49(55.1)	100(43.3)	149(46.6)	92,206.30
100,001 – 150,000	5(65.6)	29(12.6)	34(10.6)	
150,001 – 200,000	6(6.7)	25(10.8)	31(9.7)	
200,001 – 250,000	8(8.9)	10(4.3)	18(5.6)	
250,001 – 300,000	3(3.4)	7(3.0)	10(3.1)	
> 300,000	8(8.9)	22(9.5)	30(9.4)	
Enterprise Competition				
Low (1)	10(11.2)	37(16.0)	47(14.7)	
Moderate (2)	14(15.7)	63(27.3)	77(24.1)	
Relatively High (3)	32(35.9)	70(30.3)	102(31.9)	
Very High (4)	25(28.1)	69(29.9)	94(29.4)	
Daily Fuel Consumption (Litre)				
0	22(24.7)	43(18.6)	65(20.3)	
1 – 7	50(56.2)	125(54.1)	175(54.7)	6.5
7.1 – 14	7(7.9)	39(16.9)	46(14.4)	
14.1 – 21	3(3.4)	14(6.1)	17(5.3)	
> 21	7(7.9)	10(4.3)	17(5.3)	

Source: Field survey, 2024

Table 2 shows that more male (60%) than female (40%) respondents were active in small companies. Oluoch et al. (2022) assert that female small business owners are more likely to pay a carbon emission tax than their male counterparts. However, findings in Goh and Matthew's (2021) research contradicts this assertion. Women's more significant concern for the

environment may explain this discrepancy. Although female entrepreneurs are more inclined to support carbon tax, financial restrictions may impact their willingness to pay. A carbon tax might hurt their returns since small enterprises are often in need of more resources. Regardless of gender, small business owners must balance the need to preserve their financial viability and environmental concerns.

Though 12.2% of the respondents did not have a formal education, there were still a lot of them who were motivated and educated, with the majority having OND/NCE (23.1%) and BSc/HND (20.6%) degrees. Ntanos et al. (2018) and Gangadharan and Saadeh (2018) found a positive correlation between small business owners' willingness to pay a carbon tax and their educational attainment. Owners with more education are more likely to understand carbon reduction's environmental benefits and invest in carbon tax. Accordingly, business owners who have completed more schooling are more likely to be prepared to contribute to the cost of carbon emission-reducing legislation. This confirms what Shaari et al. (2020) found; that respondents' willingness to pay for carbon offsets increased with their education degree.

The study respondents had an average of 7.1 years of company experience. This result indicates the times since the companies have been in operation. More than half of the respondents (55.3%) had between 5 and 9 years of company experience. Dang et al. (2021) reported a positive correlation between company experience and willingness to pay carbon emission taxes. This could result from increasing public awareness of environmental problems and the potential financial benefits of sustainability programmes.

With a mean staff strength of 2.5, most of the respondents (63.8%) employed fewer than three people. This is a sign of how SMEs operate, as most of their operations resemble sole proprietorships or partnerships made up of a few people. According to research by Borms et al. (2023) and Bohatova (2023), small business owners who operate as sole proprietors are typically less eager to pay carbon emission taxes than owners of larger companies. The perceived cost of doing so and the lack of funding to implement carbon-reduction plans may contribute to this. Bamwesigye (2023) asserts that partnerships can positively influence small business owners'

willingness to pay carbon emission taxes. Furthermore, according to Ghorbani et al. (2023), cooperation and knowledge exchange within partnerships may improve comprehension of the benefits of reducing carbon emissions and increase acceptance of the related expenses. Businesses' energy expenses may rise due to carbon taxes, affecting their willingness to pay. Depending on the business's size and industry, the impact could change. The impact of a carbon tax on small enterprises varies according to their industry, emissions, and degree of adaptability. Higher energy prices may result in higher expenses for some businesses, while they may present chances for innovation and carbon footprint reduction for others. Depending on the sector, there will probably be various complex effects on staff strength.

Estimated mean monthly income was ₦92,206.30 (see Table 2). Most respondents (46.6%) made between ₦50,000 and ₦100,000 monthly. Owners of SMEs with steady revenue streams may have a positive attitude towards carbon emission tax payments. Perceptions suggest that participants with higher salaries could be more inclined to pay for carbon offsets than those with lower incomes.

Research by Dang et al. (2021) and Ma et al. (2021) suggests a positive correlation between income and the willingness to pay carbon emission levies. Higher earners are typically more inclined to support environmental protection, consistent with research by Goh and Matthew (2021) and Shaari et al. (2020). This suggests a global trend of income influencing environmental responsibility since people with higher salaries are more likely to purchase carbon offsets. Since low-income people may bear a more significant portion of carbon taxes even when they contribute less to carbon emissions, the relationship between income and willingness to pay carbon taxes raises ethical concerns about justice and equity.

Enterprise competition was either robust (29.4%) or reasonably high (31.9%), indicating market structure and polarization. This illustrates how SMEs in Ekiti State uniformly conduct business. There is a complicated and nuanced relationship between small business owner's willingness to pay a carbon emission tax and their competitors. According to some research (Aghion et al., 2023; Yenipazarli, 2019), customers may be more prepared to pay as companies try to stand out from the competition by implementing eco-friendly methods.

About 20% of respondents spent money on fossil fuels, and SMEs' average daily fuel consumption was 6.5 litres. There is a complicated and multifaceted relationship between small business owners' fossil fuel consumption. While some small businesses are actively transitioning to renewable energy, others continue to rely on fossil fuels due to infrastructure limitations, financial constraints, or an insufficient understanding of renewable energy alternatives. Businesses that use more fuel may be less eager to pay because they feel the tax is a more significant burden.

3.3 Willingness to pay carbon emission tax by SMEs

The result of the respondents' willingness to pay the carbon emission tax is presented in Table 3. The majority (74.4%) of SME operators were unwilling to pay the carbon emission tax. Considering the categories of SMEs in the study area, there is no stringent government regulation guiding this payment, despite the presence of the Ekiti State Environmental Protection Agency (EKSEPA). Road users, a category of SMEs willing to pay, do so because the Federal Road Safety Commission (FRSC) enforces penalties for non-compliance. This result shows that other SMEs, whose operational activities contribute to environmental pollution and do not view the environment as a free rider, also require this regulation. The results of this study align with the findings of Muhammad et al. (2023) on motorists' willingness to pay for carbon reduction in northeastern Nigeria. Their results indicate that about 43% of motorists understand the carbon offset programme.

Past research has indicated that many SMEs emphasize reducing costs rather than implementing sustainability initiatives, especially when confronted with increasing energy prices (Yacob et al., 2019; Prashar, 2019). This can make people reluctant to pay carbon emission taxes, which they may view as an extra financial obligation. Thus, most SME owners need more knowledge about their carbon footprint, hindering their understanding of the consequences of their emissions and the benefits of implementing carbon reduction strategies.

This study generated seven-count scores based on the amounts that respondents were willing to pay. The average willingness to pay for carbon was assessed to be ₦6,890.85. Their reluctance to pay a tax may also stem

from a scarcity of resources, encompassing financial and human capital, which might pose difficulties in allocating funds towards sustainability endeavours. They may not possess the requisite knowledge or workforce to execute the required modifications. Small business owners frequently operate with limited profit margins, and a carbon tax supplementary expense might burden their financial resources. They may be concerned about the impact on their profits and their ability to compete with larger companies that can readily absorb the expense. Although many of the small business owners were reluctant to pay a carbon tax, a significant number also expressed apprehension about environmental issues and acknowledged the imperative to decrease emissions. These SMEs may investigate methods to enhance their sustainability, such as allocating resources towards renewable energy or implementing energy-conserving measures. Small business proprietors may contend that a carbon tax needs to be revised, as it imposes an imbalanced burden on them compared to larger firms. They may promote policies that offer assistance or rewards to facilitate their shift towards a low-carbon economy.

Table 3: Descriptive Results of Respondents' Willingness to Pay for Carbon Tax

Willingness to Pay	**Frequency**	**Percentage**	**Mean**
Yes (1)	82	25.6	
No(0)	236	74.4	
Amount willing to Pay (Naira)			
0	236	74.4	
< 1,000 (1)	2	0.63	
< 2,000 (2)	3	0.94	
< 3,000 (3)	13	4.1	
< 4,000 (4)	1	0.31	
< 5,000 (5)	18	5.6	
< 6000 (6)	20	6.3	
> 6,000 (7)	25	7.8	6,890.85

Source: Field survey, 2024

3.4 Determinants of willingness to pay for carbon tax

Table 4 shows the Poisson regression analysis of the dependent variable, SMEs' maximum willingness to pay (WTP). The results are derived from the data collected from 320 questionnaire participants. The respondents' attitudes towards the environment negatively correlated with their willingness to pay (WTP) a carbon tax, which was statistically significant at the 1% level. This indicates that small and medium-sized enterprises (SMEs) in the research area have a pessimistic view towards sustainability and need to acknowledge the significance of the carbon tax for their future performance. They perceive the environment as a free-rider that does not bear the costs of their actions, and they fail to comprehend the importance of minimizing their ecological footprint and supporting a more sustainable economy. This primarily applies to developing nations with less robust carbon regulations. This corroborates the conclusions made by Tingbani et al. (2021) regarding the limited reaction of SMEs to implementing carbon pricing. Yao et al. (2019) conducted research demonstrating the strong dedication of SMEs to environmental issues, leading them to endorse the implementation of carbon pricing.

Our analysis revealed that the size of SMEs, as determined by the number of employees, has a statistically significant negative coefficient at the 1% level. Therefore, larger SMEs are less likely to shoulder the carbon tax burden. Larger SMEs, with their abundant resources and reduced susceptibility to cost escalations, should be more inclined to accept the imposition of carbon taxes, challenging the initial assumptions. The study by Yao et al. (2019) proves that larger SMEs are more likely to support carbon pricing. Conversely, smaller SMEs may exhibit more reluctance, possibly due to apprehensions over potential financial consequences, as indidcated by Riedel et al. (2021).

The sector to which an SME belongs, such as manufacturing, power, heating, or services, influences its willingness to bear the carbon tax cost. A strong positive link (at the 1% significance level) was found between the SME sector and willingness to pay the carbon price. Research indicates that the willingness of SMEs to pay a carbon tax differs among different industries (Cariola et al., 2020). A study by Zahedi et al. (2019) revealed that those involved in the agricultural sector exhibited a higher inclination to financially contribute towards carbon reduction efforts than individuals in the

transportation sector. According to research, industries with significant greenhouse gas emissions and minimal expenses for reducing them are more willing to endorse implementing a carbon tax (Geroe, 2019). Research conducted by Lin and Jia (2018) and Goh and Matthew (2021) revealed that the transport sector demonstrated the most excellent willingness to pay a carbon tax, with the energy and industrial sectors following closely behind. The power and heating industries contribute significantly to carbon emissions, making them essential focal points for carbon pricing strategies. By imposing a financial burden on activities that produce high levels of carbon, carbon pricing aims to encourage the reduction of emissions.

There was a direct correlation between SMEs' knowledge of carbon mitigation technology and their WTP a carbon tax. Therefore, SMEs with a greater understanding of carbon mitigation technology are more inclined to accept the imposition of carbon taxes. They comprehend these technologies' potential advantages in mitigating emissions and economizing. This is consistent with the research by Yu et al. (2018), which revealed substantial variations in the level of awareness of carbon reduction technology among different populations.

Carbon market policy awareness has a positive coefficient and is statistically significant at the 1% level. These findings indicate that SMEs are more likely to be willing to pay carbon taxes when they have a thorough understanding of carbon market laws. As a result, it is possible to motivate SMEs to actively participate in initiatives aimed at reducing carbon emissions by raising awareness and fostering comprehension of these policies. Research indicates that the level of knowledge about carbon markets among SMEs differs greatly depending on the country and industry (de Jesus Pacheco, 2018; Seth et al., 2018). Developing countries generally have lower levels of awareness, but SMEs in industrialized countries are more likely to know carbon pricing methods.

SMEs' years of existence have demonstrated a statistically significant negative coefficient at the 5% level. This conflicting expectation implies that SMEs with excellent environmental management expertise attempting to reduce carbon emissions are more likely to endorse carbon pricing schemes. Tian et al. (2022) discovered that small enterprises had a crisis due to a significant rise in carbon tax, resulting in a 23% surge in expenses and

postponed reimbursements. This emphasizes the possible economic hardship SMEs may face due to carbon pricing.

At a significance level of 1%, the WTP's carbon tax has a positive and statistically significant association with the annual turnover of SMEs. Therefore, SMEs with enormous revenues are more likely to accept the imposition of a carbon tax, possibly due to their more significant financial resources and increased awareness of environmental concerns. Although specific studies suggest a positive correlation, indicating that SMEs with more significant turnovers are more inclined to make payments, other studies propose either no significant association or a negative one (Owen et al., 2020; Fawcett & Hampton, 2020).

An inverse relationship exists between the educational attainment of SME owners and their willingness to comply with carbon tax payments. SMEs tend to engage in tax evasion or have a lower level of awareness regarding the environmental impact of their operations. Additionally, they are less inclined to endorse legislation that encourages sustainability. The research conducted by Fremstad and Paul (2019) has demonstrated that the quality of education can alleviate the adverse economic consequences of carbon taxes, such as reductions in output and disparities in income distribution.

The views of SME owners on energy prices hurt their WTP carbon taxes. These findings suggest that SMEs are more likely to support measures to reduce carbon emissions when faced with elevated energy expenses. Nigeria is currently contending with eliminating fuel subsidies, which could result in a transition of the economy towards alternate energy sources. According to research by the International Monetary Fund (IMF), implementing a carbon tax of $75 per tonne of CO2 would result in a 10–20% increase in energy prices across most countries (Rydge, 2015). The impact on SMEs would differ depending on their energy usage level and ability to transfer expenses to customers. Based on the research conducted by Cariola et al. (2020), SMEs are likely to be more willing to pay carbon taxes if they expect to use the generated cash for investments in clean energy or other environmental projects.

The perception of market competition among SMEs hurts their WTP the carbon tax. This indicates that certain businesses may be more willing to bear the tax burden than others, contingent upon their capacity to transfer the cost

to customers or mitigate their emissions. Businesses adjusting to the new tax system may gain a competitive edge. Implementing carbon taxes might result in higher production expenses for SMEs, thus diminishing their competitiveness compared to larger corporations with better financial capabilities to invest in environmentally-friendly technologies. This may result in industry consolidation as smaller businesses struggle to compete. The SMEs' investment in energy-saving technologies had a negative coefficient. Therefore, if SMEs invest more in energy-saving technologies, their carbon tax payments will decrease. SMEs are becoming more aware of the economic and environmental advantages of these investments. This trend will likely continue due to increasing energy costs and the growing prevalence of government incentives for energy efficiency.

The widespread adoption of the carbon tax has been attributed to residents' concerns about climate change, low levels of corruption, and comparably high levels of trust (Fairbrother et al., 2019). Similarly, Goh and Matthew (2021) found that marital status, gender, age, income, education, and family size and income all substantially impacted WTP. Walch et al. (2019) found that consumers expressed a positive WTP for green energy, that tends to increase with education level, to be higher for women than for men and that this demand often seems to include a "warm glow effect," where consumers wish to buy at least low levels of renewable-derived electricity but are less willing to pay for higher levels.

Nigerians' willingness to pay the carbon price depends on several things, such as scepticism over the Nigerian government's tax revenue exploitation, which drives citizens' reluctance. Historically, questions about fund transparency and accountability have eroded public trust. Many people oppose all taxes, fees, and levies (Regional Collaboration Center and Federal Minister of Environment, 2023). The many present levies, particularly petroleum taxes, make citizens reluctant to take on further debt. Public acceptability is further hindered by inconsistencies between governments and organizations presenting the prospects and benefits of a carbon tax. Population uncertainty and scepticism are the results of inconsistent policy implementation. Carbon pricing opposition is fuelled by worries about "fairness." Such a charge may disproportionately affect economically disadvantaged people, preventing them from accessing vital energy services.

The continuation of fossil fuel subsidies for gasoline raises two issues. Politically, eliminating these subsidies is complex, and the transport sector's low demand elasticity may limit emission reduction benefits (Regional Collaboration Centre and Federal Ministry of Environment 2023).

Although the carbon price has potential advantages, Lagosians feel that Western nations, which pollute the most, should pay (Croitoru et al., 2020). Residents are also wary of paying the levy because they doubt future state administrations will assist in climate change adaptation and mitigation. By their capitalist nature, enterprises may recoup these sums and more by passing on the burden of these taxes to their customers (Spadaro et al., 2022). As a result, these corporations may continue to pollute without paying the majority of the taxes, putting citizens at economic risk.

Table 4: Poisson Regression Estimates

Variables	Coef.	Std. Err.	Z	P > /Z/
Attitude towards the Environment	-0.3310586	0.0784626	-4.22	0.000***
SME's size	-1.50457	0.0313524	-4.80	0.000***
SME's sector	0.7414638	0.0746335	9.93	0.000***
Awareness of carbon mitigation technology	0.0555296	0.056764	1.00	0.318
Awareness of carbon market policy	0.3478679	0.0718787	4.84	0.000***
Existence of business	-0.0280908	0.013764	-2.04	0.041**
SME's Annual Turnover	6.74e-08	5.82E-09	11.58	0.000***
Education of SME's manager	-0.0788704	0.0297334	-2.65	0.008***
SME's Perception of energy price level	-0.0900139	0.069681	-1.29	0.196
SME's perception of competition degree of the market	-0.0830904	0.0589272	-1.41	0.159
SME's investment in energy saving technology	-1.18e-06	7.53E-07	-1.57	0.117

Notes: Number of obs. = 320, Wald chi2(11) = 452.80, Prob > chi2 = 0.0000, Log likelihood = -523.56928

*** and ** represent significance at 1 and 5% Levels respectively

Source: Field survey, 2024

3.5 Hypothesis testing

The results in Table 5 confirm the acceptance of the hypothesis that there is no significant difference in the willingness to pay carbon taxes between agricultural and non-agricultural SMEs. This indicates that both sectors have an equivalent level of willingness to contribute towards reducing carbon emissions. Various factors such as firm size, income level, and perceived success of carbon mitigation initiatives influence the willingness to pay carbon taxes within the agriculture industry. Smaller firms with lower revenues may exhibit less willingness to pay, whereas larger firms with higher incomes may demonstrate a greater willingness to contribute. Industry type, company size, and environmental awareness influence non-agricultural firms' willingness to pay carbon taxes. Energy-intensive businesses and larger firms are likely to be more willing to pay. In contrast, smaller firms and those in less environmentally sensitive industries are likely to be less willing to contribute.

Table 5: T-Test Results

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
WTP for Carbon Tax	Equal variances assumed	.006	.938	-.020	318	.984	-.00219	.10780
	Equal variances not assumed			-.020	151.015	.984	-.00219	.11096

Source: Field Survey, 2024

4. Conclusion and Recommendations

This study examined the willingness to pay a carbon tax among SMEs in Ekiti State, Nigeria. Overall, non-agricultural enterprises have a substantial presence, primarily engaged in sectors such as transportation, trading,

information technology, carpentry, furniture, and fashion and beauty services. Although the research area is primarily agricultural, the significance of non-agricultural SMEs in generating revenue is growing. Even with the difficulties posed by expensive initial investments, dependence on old-fashioned methods, and unpredictable profitability, some companies are investigating solar energy. Non-agricultural SMEs substantially contribute to the overall amount of greenhouse gas emissions. Their apprehension about the economic strain of a carbon tax may impede their willingness to shoulder the entire expense.

Moreover, many SMEs in Ekiti State, Nigeria, are characterized by youthful passion and a strong drive to establish their own ventures. Consequently, individuals might be more willing to contribute towards carbon taxes and other types of fees aimed at environmental protection. Financial constraints may account for their willingness to pay carbon taxes, negatively impacting their income. As examined in this study, the factors influencing SMEs' willingness to pay carbon tax include their enhanced environmental attitude, SMEs' size and industry affiliation, heightened awareness of carbon market policy, SMEs' turnover, and educational attainment. This study concluded that the willingness to pay a carbon tax is equal between SMEs in the agricultural and non-agricultural sectors. This suggests that both sectors exhibit an equivalent willingness to contribute towards reducing carbon emissions.

The study's findings lead to the following recommendations:

1. Since SMEs do not do their fair share towards protecting the environment and must prepare to pay a significant amount for carbon taxes, the government must implement strict regulations that control the payment of carbon emission taxes. The Ekiti State Environmental Protection Agency (EKSEPA) should collaborate on this.
2. Collaboration and knowledge exchange among SMEs can substantially impact supporting efforts to reduce carbon emissions. Through the exchange of best practices and experiences, businesses can acquire knowledge from one another and formulate more efficient strategies for managing their carbon impact.

3. The Ekiti State government should proactively endorse public-private partnerships (PPPs) to stimulate the implementation of environmentally friendly energy alternatives.
4. The carbon tax policy design can influence SMEs' views. Policies that offer flexibility, such as granting exemptions to small businesses or refunding investments in clean technologies, may be more acceptable to SMEs.
5. The government at all levels should encourage programmes that offer incentives for adopting carbon farming methods, such as tree planting or cover crop usage, to enhance the desire of agricultural companies to comply with a carbon tax. These programmes should provide farmers with financial assistance to cover the costs of applying these methods.
6. The government must allocate a portion of the revenue generated by carbon taxes to support programmes that advance clean energy and sustainable development. This has the potential to establish a positive feedback loop in which implementing carbon pricing stimulates investments in reducing emissions, resulting in more decreases in carbon emissions.

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