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ANALYSIS OF FACTORS INFLUENCING THE INCOME GENERATED BY INFORMAL FRESH PRODUCE TRADERS DURING COVID-19 PANDEMIC IN POLOKWANE LOCAL MUNICIPALITY, SOUTH AFRICA

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Abstract

This study examined factors influencing income generated by 100 informal fresh produce traders in Polokwane Local Municipality during the COVID-19 pandemic in South Africa. An Ordered Probit Model was used to examine the extent to which several factors had affected traders' income, measured on a 5-Point Likert Scale ranging from "very low income" to "very high income". The descriptive results showed that none of the traders had generated "very high income", which is attributable to COVID-19 regulations and restrictions. The empirical results showed that age, education levels, other sources of income, government support, social relief grant, trading license, trading status, time period of contract, and trading stall, increased the probability of generating higher income. These results serve to inform policymakers on the policy strategies to pursue in order to improve the income generated by the informal fresh produce traders.
Keywords: *informal sector; income generation; trade; South Africa*
JEL Codes: *D22, E26, O17*

1. Introduction

Informal trading plays an important part in alleviating poverty and unemployment, particularly in developing countries, by helping individuals to generate income, which also improves their livelihoods (Otoo et al., 2011; Ama et al., 2013; Shaiara et al., 2015; Arias, 2019; Arsene et al., 2020). However, informal street vending activities were severely disrupted by lockdown measures (non-pharmaceutical interventions) that were implemented in South Africa to curb the spread of COVID-19. More so, all informal trading (street vending) activities were prohibited during Alert Level 5 of lockdown. However, some operations were allowed during Alert Level 4 for informal traders with trading licences/permits (Dean, 2020), while operations for informal traders without permits were allowed from Alert Levels 3 to 1. These regulations impacted negatively on the informal sector, particularly the street vendors whose

welfare depends on trading in public spaces, and informal workers, whose jobs are precarious and who depend on daily income for survival.

In response to this, the government developed various support packages to provide financial support to small and informal businesses. These include the Debt Relief Finance Scheme for tax relief, a Debt Restructuring Facility (SEFA-funded loans) for payment moratoria, and a Business Growth/Resilience Facility for small- and medium-sized businesses that locally supply or manufacture food items. Other packages include a credit guarantee scheme (COVID-19 Loan Guarantee Scheme) for operational and other costs through bank loans and a Spaza Support Scheme for permit-holding, owner-managed South African spaza shops (South African Government, 2020a). However, certain criteria must be met for businesses to benefit, which could hinder informal traders from benefiting from these support packages.

Against this backdrop, this study strives to provide a better understanding of the extent to which several factors influenced the income generated by informal fresh produce traders during the COVID-19 pandemic in South Africa. An identification of those factors would assist policymakers in developing strategies that are necessary to improve the income generated by informal traders. Thus, this study contributes to knowledge and policymaking in two ways.

First, it contributes to literature by providing insight into how the incomes generated by informal fresh produce traders had been affected by the COVID-19 pandemic. Second, it contributes to policymaking by proposing strategies necessary to improve the income generated by informal traders, which contributes towards achieving food security, alleviation of poverty and general improvement in wellbeing.

The rest of this paper is structured as follows. Section 2 presents a literature review, which covers an overview, definition and classification of the informal sector. The regulations applying to the informal sector and the support programmes for small and informal businesses during the COVID-19 pandemic, together with a review of related literature, are also presented in this section. Section 3 describes the research methods, and covers a description of the study area and the methods used to collect data. Both the descriptive and empirical results are presented in Section 4. Section 5 covers a summary of the results, their implications, policy recommendations, and recommendations for future research.

2. Literature Review

2.1 Informal Sector: Overview, Characteristics and Definition

The informal sector encompasses mainly unrecorded, unrecognized and unregulated small-scale business activities (Suharto, 2003). Thus, informal traders exist in the so-called 'shadow economy', 'hidden economy', or 'black economy' – as actors in the sector operate outside the formal economy and are engaged in economic activities that are often unrecorded and undetected by the monetary/financial, statistical, legal and regulatory institutions. These factors have led to the common-held misconception that individuals participate in the informal sector deliberately to avoid taxes and compliance with standards and other regulatory requirements. This misconception has led to attacks on the traders that are driven by the view that informal traders are operating illegally by evading taxes, standards and regulatory requirements (Schneider, 2015; Hassan & Schneider, 2016; Williams & Schneider, 2016).

Several characteristics of the informal sector distinguish it from the formal sector. These include ease of entry into the business sector, utilisation of locally available raw materials, small-scale processing of products, labour-intensive activities, utilisation of skills that usually lie outside the formal educational systems, and operation in unregulated, uncontrolled and competitive markets (Nieman & Nieuwenhuizen, 2009).

Because of the multifaceted nature of the informal sector and the fact that informal activities are unregistered and unrecorded, it is almost impossible to define the informal sector using statistical or quantitative parameters. From this perspective, this study defines the informal sector in line with Statistics South Africa (Stats SA) as "production units in an economy that are not registered with a tax or a licensing authority and are costly to monitor and regulate". The study further defines informal traders as "enterprises/businesses that are not incorporated and not registered for taxation" (Stats SA, 2019).

2.2 Regulations and Support Programmes during COVID-19

In South Africa, the COVID-19 pandemic lockdown started at Alert Level 5, the country's first lockdown level experienced, from 26 March (midnight) to 30 April 2020 (South African Government, 2020b). This level was the most stringent lockdown level, which entailed the implementation of severe restrictions on how individuals, businesses, institutions and society should operate to contain the rate of transmission of the virus (Lefophane, 2020). For this reason, all street vending activities that the informal traders were engaged in were prohibited.

As the country moved to the lower Alert Level 4 from 01 May to 30 May 2020 (South African Government, 2020b), only informal traders with trading licences/permits were allowed to operate (Dean, 2020). It was during Alert Levels 5 and 4 that the informal food supply chain was severely disrupted, as the procurement of food goods was obstructed owing to the prohibition of movement of persons without specific licences (HSRC, 2020) and the prohibition of street vending without trading licences/permits. Afterwards, informal traders, with and without trading licences, were allowed to operate from Alert Levels 3 to 1. However, under all these Levels, informal food traders had to maintain a social distance of 1 to 1.5 metres between people, and always had to cover their faces with a cloth or a mask and sanitise their hands to prevent the spread of COVID-19.

As the lockdown advanced, the R500 Billion Stimulus Package was introduced in April 2020 to support the health system and address the economic and social welfare losses caused by the lockdown. Parts of the package were allocated for social safety net programmes for the poor, and financial support to small and informal businesses. It was through the stimulus package and other interventions that the Department of Small Business and Development, the department responsible for small business support, and other institutions developed various support packages to support small and informal businesses. These include the Debt Relief Finance Scheme for tax relief, the Debt Restructuring Facility (Small Enterprise Finance Agency (SEFA)-funded loans) for payment moratoria, and the Business Growth/Resilience Facility for SMMEs that locally supply or manufacture food items. Other packages include a credit guarantee scheme (COVID-19 Loan Guarantee Scheme) for operational costs and other costs through bank loans and the Spaza Support Scheme for permit-holding, owner-managed South African Spaza shops (South African Government, 2020a).

However, certain criteria must be met, which could hinder informal traders from benefiting from these support packages. For instance, to qualify for tax relief through the Debt Relief Finance Scheme, small and informal businesses must be tax compliant, comply with the Unemployment Insurance Fund (UIF), be registered with the Companies and Intellectual Property Commission (CIPC), be 100% South African-owned, and have 70% South African employees (South African Government, 2020a). Moreover, the COVID-19 Loan Guarantee Scheme is administered through commercial banks. This means that small and informal businesses must satisfy banks' risk criteria, such as providing sureties, proving their ability to repay loans, registration with the South African Revenue Service (SARS), and providing financial information such as financial or bank statements (National Treasury, 2020; Banking Association of South Africa, 2021). In addition, the Spaza Support Scheme is designed for

permit-holding, owner-managed South African Spaza shops, to the exclusion of informal street vendors.

These requirements and the manner in which the support packages are administered could hinder the informal traders from benefiting due to five factors, as follows. First, South African informal traders are unlikely to benefit from the Spaza Support Scheme, as most of the Spaza shops in South Africa are foreign-owned (Kgaphola et al., 2019). Second, by nature, informal traders are informal, meaning that they are not registered with the CIPC and are not compliant with the SARS and the UIF. This automatically excludes them from qualifying for the Debt Relief Finance Scheme and the Debt Restructuring Facility. Third, most informal traders may not meet the requirements for the Business Growth/Resilience Facility, as it is designed for small and informal businesses that locally supply or manufacture food items. Fourth, most informal traders may not qualify for the Spaza Support Scheme, as they are trading through street vending rather than Spaza shops. Fifth and lastly, most of the informal traders might not qualify for the COVID-19 Loan Guarantee Scheme, as they can hardly satisfy banks' risk criteria for loans.

2.3 Review of Related Studies

Several studies have analysed the relationships between various factors and the profitability of informal trading. These studies have been conducted mostly in the context of developing countries, as there is a dearth of South African studies regarding this aspect. This review aims to underline the main findings deduced from previous empirical studies to identify the gap in the literature that the current study intends to fill. Special attention is given to the main findings regarding the factors reported to have influenced the income or profitability of informal trading.

The main findings deduced from the review of previous studies can be summarised in four points, which indicate the gaps in the literature that this study intends to fill. First, some of the previous studies are descriptive in nature (Dhungel & Dhungel, 2011; Fundie et al., 2015). As such, they cannot provide empirical evidence of the extent to which several factors have affected income generated by informal traders; hence, the need for this study. Second, the findings from some studies (Dipeolu et al., 2010; Otoo et al., 2011; Fundie et al., 2015) suggest that the income generated by informal traders differs across locations. This is attributable to the different trading environments in which the informal traders operate, such as the infrastructural, legal and institutional factors underpinning informal trading across countries and locations.

As such, the findings from these studies cannot provide an understanding of how infrastructural, legal and institutional factors underpinning informal trading have affected the income generated by the informal traders in this study. Third, the reviewed studies were conducted before the COVID-19 pandemic outbreak. From this perspective, the findings from these studies cannot provide an understanding of how the informal traders under study have been affected by the COVID-19 pandemic. Fourth and lastly, few studies have analysed the impact of COVID-19 on street vending. The notable study is by Arsene et al. (2020) who investigated the perceptions of street vendors regarding the impact of COVID-19 on street vending and the reasons for carrying on street trading during COVID-19 in Bukavu, Eastern DR Congo. However, as with some of the previous (Dhungel & Dhungel, 2011; Fundie et al., 2015), its findings cannot provide an understanding of the income generated by informal traders, as it is descriptive in nature. In other words, it cannot provide empirical evidence of the extent to which informal traders had been affected by the COVID-19 pandemic. Moreover, the study focused on the impact of COVID-19 on street vending and not on the income generated by street vendors; hence, the need for this study.

3. Research Methods

3.1 Study Area

This study used primary data, which were collected in selected areas of the Polokwane Local Municipality of Capricorn District in Limpopo Province, South Africa. Polokwane Municipality was chosen as it is the economic hub of Limpopo Province, with a central business district (CBD), and is the only Municipality in the province that hosts a city, namely Polokwane – the capital city of Limpopo Province. Three areas that are highly concentrated in street vending activities in Polokwane Municipality were selected (purposefully) as the study area. These areas are (1) Mankweng Unit A (32.6 km from Polokwane), (2) Paledi (28.7 km from Polokwane), and (3) Polokwane CBD (Indian Plaza [northern part of Polokwane CBD] and the Polokwane taxi rank [Polokwane Central]).

3.2 Sampling

A purposive sampling technique was used to collect data owing to the lack of a database on the informal traders in Polokwane Municipality, particularly regarding informal fresh produce traders. Informal fresh produce traders were identified through observation (i.e. vending site walkthrough). A total sample size of 100 informal fresh produce traders were interviewed, including those selling from fixed stalls along the street and the pavements. Fresh produce traders were preferred since fruits and vegetables are the most commonly traded commodities by street vendors (Arsene et al., 2020; WIEGO, 2020).

3.3 Data Collection

Data from the informal fresh produce traders were collected through face-to-face interviews, using a structured questionnaire. The questionnaire was divided into three main parts, consisting of the traders' socio-economic characteristics, income generation during COVID-19 pandemic, and informal trading during COVID-19 pandemic. The questionnaire was pre-tested, according to the guidelines published by GAO (2019), to improve the reliability and validity of the data collected. In line with ethical standards, the respondents were asked for consent, and given assurance that the information collected will be used only for the purpose of the research and will be treated with confidentiality.

4. Results and Discussion

4.1 Descriptive Results

This section presents the descriptive statistics for the socio-economic characteristics of the informal fresh produce traders in the study area. The descriptive statistics for other variables, which are thought to influence the income generated by informal fresh produce traders during COVID-19 pandemic, are also presented in this section. The results are presented in Table 1 below.

Table 1. Descriptive Statistics for the Predictor Variables

Categorical Variables			
Variable	**Category**	**Frequency (100)**	**Percentage (100%)**
Age (AGE)	Below 21	3	3%
	21–25	17	17%
	26–35	36	36%
	36–40	28	28%
	Above 40	16	16%
Marital Status (MRTL)	Single	54	54%
	Married	28	28%
	Widowed	11	11%
	Divorced	7	7%
Gender (GEND)	Male	40	40%
	Female	60	60%
Education Level (EDL)	No education	16	16%
	Primary	14	14%
	Secondary	49	49%
	Tertiary	21	21%
Other Sources of Income (OSINC)	Yes	34	34%
	No	66	66%
Household Head income (HHHINC)	<R5000	33	33%
	R5000–R6000	35	35%
	R7000–R8000	20	20%
	R8000–R9000	11	11%
	>R9000	1	1%
Government Support (GOVS)	Yes	6	6%
	No	94	94%
Social Relief Grant (SRG)	Yes	52	52%
	No	48	48%
Trading Licence (TL)	Yes	44	44%
	No	64	64%
Perishability (PRSB)	Yes	62	62%
	No	38	38%
Type of Goods Sold (TGS)	Fresh produce	40	40%
	Both fresh & non-fresh produce	60	60%
Type of Fresh Produce (TFP)	Vegetable only	23	23%
	Fruits only	09	09%
	Both vegetables & fruits	68	68%
Trading Status (TS)	Full-time trader	86	86%
	Part-time trader	14	14%
Contract with Supplier (CT)	Yes	69	69%
	No	31	31%
Time Period of Contract (TPC)	Long-term	70	70%
	Short-term	30	30%
Supply Shortage (SS)	Yes	59	59%
	No	41	41%

Trading Area (TA)	Mankweng	36	36%	
	Paledi	21	21%	
	Polokwane CBD	43	43%	
Pricing Method (PRMTD)	Value-based	20	20%	
	Competitive	33	33%	
	Price-skimming	18	18%	
	Cost-plus	24	22%	
	Penetration	03	03%	
	Economy	0	0%	
	Dynamic	02	02%	
Trading Stall (TRDS)	Yes	74	74%	
	No	26	26%	
Continuous Variables				
Variable	**Min**	**Max**	**Mean**	**St. Deviation**
Number of dependants	0	7	2	1.431
Household size (HHS)	1	15	5	1.914
Trading hours (TH)	7	9	6	0.638

Source: Computed from survey data (2021). Note: Min=Minimum; Max=Maximum; St. Deviation = Standard Deviation

The descriptive statistics showed that, in terms of age (AGE), the majority of the informal fresh produce traders (56%) were young people (less than 35), while fewer of them (44%) were older persons (above 35 years), implying that even young people are resorting to informal trading for livelihood generation. In the case of gender (GEND), 60% of the informal fresh produce traders were females and 40% were male, signifying that women participate more in informal trading than men do.

Regarding other sources of income (OSINC), besides informal trading, 34% reported that they had other sources of income, while 66% did not have other sources of income. These statistics suggest that informal trading is the main source of income for a majority of the informal fresh produce traders. Concerning educational level (EDL), 53% of the informal fresh produce traders were educated, as they reported that they had completed secondary and tertiary education levels, while 47% were not, as they had only received primary education. This finding signifies that even educated people are resorting to informal trading probably because of a lack of job opportunities.

Regarding government support (GOVS), very few respondents had received government support during the COVID-19 pandemic (6%), while the majority did not receive government support during COVID-19 (94%). This suggests that most of the informal fresh produce traders had not benefited from the economic support packages that had been introduced during the COVID-19 pandemic to support SMMEs. More specifically, the results suggest that most of them had not benefited from the Debt Relief Finance Scheme, the COVID-19 Loan Guarantee Scheme, the Spaza Support Scheme, or the Debt Restructuring Facility and Business Growth/Resilience Facility. This is attributable to four reasons, described as follows.

First, the informal traders under study trade through street vending rather than Spaza shops, which disqualifies them from benefiting from the Spaza Support Scheme. Second, informal traders, by classification, are not registered with the CIPC and are non-compliant with the SARS and the UIF, implying that they do not qualify for the Debt Relief Finance Scheme and Debt Restructuring Facility. Third, the informal traders under study do not meet the requirements for the Business Growth/Resilience Facility, as it is designed for small and informal businesses that locally supply or manufacture food items. Fourth and lastly, it is

highly unlikely that the informal fresh produce traders would meet the requirements set out by banks for them to qualify for the COVID-19 Loan Guarantee Scheme. In summary, the requirements and the manner in which the support packages are administered could have hindered the informal fresh produce traders from benefiting from the COVID-19 economic support packages for SMMEs.

However, the majority of the traders under study received the Social Relief of Distress Grant (SRG) (52%), while fewer of them did not (48%). This signifies that, while most of the informal fresh produce traders did not have access to economic support packages, they had access to the SRG grant of R350. The difference in access between the two economic support packages is attributed to the criteria and requirements for qualification, as well as the channels through which such support services are acquired (banks).

Regarding the income of the household head (HHHINC), the majority of the informal traders reported that their heads of household earn monthly incomes of between R5 000 and R6 000 (35%), while very few reported that their heads of household earn incomes of more than R9 000 (1%). These results suggest that the majority of the heads of households of informal fresh produce traders earn low incomes. This could explain why some of them resort to informal trading to generate income or supplement the income of the head of the household.

In terms of holding a trading licence (TL) during the COVID-19 pandemic, 44% of the respondents reported that they had trading licences/permits, while 64% reported that they had no trading licences/permits. This signifies that the majority of the informal fresh produce traders did not trade during Alert Level 4, as only traders with licences/permits were allowed to trade during Alert Level 4.

Regarding the perishability of their fresh produce (PRSB), 62% of the respondents reported they had experienced perishability of their produce during COVID-19, while the remaining 38% did not experience perishability. The perishability of produce experienced by the majority of the informal fresh produce traders is attributable to the decline in demand for fresh produce during lockdown, as people purchased food products with longer shelf lives because of the ban on the movement of people and the threat posed by the virus (Ogunkola et al., 2021).

In terms of the nature of their informal trading (TGS), 40% of the respondents were involved in trading of fresh produce, while 60% were involved in trading of both fresh and non-fresh produce. This suggests that the majority of the informal fresh produce traders were also involved in the trading of non-fresh produce to diversify their income.

Concerning the extent of their diversification (TFP), 9% of the respondents were involved in the trading of fruits only, 23% vegetables only, while 68% of the respondents were involved in the trading of both fruits and vegetables. This suggests that most of the informal fresh produce traders were diversifying their income through the sale of both fruits and vegetables.

Regarding their trading status (TS), 86% of the respondents were involved in informal trading on a full-time basis, relative to 14% who were involved in informal trading on a part-time basis. This indicates that informal trading is a form of full-time employment for the majority of the fresh produce traders in the study area.

As regards holding a contract (CT), 69% of the respondents reported that they had a contract with suppliers, relative to 31% who did not have a contract with suppliers, suggesting that the majority of the informal traders were supplied with stock under agreements with suppliers. In terms of the period of their contracts (TPC), 70% of those with contracts had long-term contracts with suppliers, relative to 30% who had short-term contracts with suppliers. This signifies that the majority of the informal fresh produce traders agree with suppliers to supply their stock over longer periods of time.

Concerning supply shortage (SS), 59% of the respondents reported that they had experienced supply shortages, while 41% did not, indicating that most of the informal traders had experienced supply shortages during COVID-19. The supply shortages experienced by the majority of the traders are attributable to the prohibition of movement of persons without

specific licences, which disrupted the informal supply chain (HSRC, 2020), resulting in supply shortages of stock.

In the context of trading area (TA), 43% of the respondents were trading in Polokwane CBD, 36% in Mankweng, and 21% in Paledi, indicating that the Polokwane CBD is highly concentrated with informal fresh produce traders. The higher concentration of fresh produce traders is attributable to the fact that the Polokwane CBD is the commercial and business centre of Polokwane City. Hence, there are more informal fresh produce traders in the CBD, relative to Mankweng Township and rural Paledi.

In terms of the pricing method (PRMTD) used, the majority of the respondents used a competitive-pricing method (33%), followed by value-based pricing (20%), cost-plus pricing (24%), a price-skimming method (18%), a penetration method (3%), and a dynamic method (2%). None of the respondents used an economy-pricing method. This indicates that the majority of the informal fresh traders used a competitive-pricing method when determining the selling price of their produce, while very few of them used a dynamic pricing method.

Regarding the use of a trading stall (TRDS), 74% of the respondents had trading stalls, relative to 36% who did not, indicating that the majority of the informal produce traders used trading stalls for selling their fresh produce. However, it should be noted that the trading stalls, in most cases, simply constitute shade materials and tables for displaying fruits and vegetables, and not built market stalls per se.

The descriptive statistics results for the continuous variables are included in Table 1, alongside the categorical variables. The statistics show that the average number of dependents was 2, while the minimum and maximum numbers of dependents were 0 and 7, respectively. This suggests that, on average, the majority of the informal fresh produce traders had lower numbers of dependants.

The results further showed that the average household size (HHS) of the respondents was 5 people per household, with a minimum household size of 3 and a maximum household size of 15 people per household. This implies that the informal fresh produce traders under study had, on average, household sizes on the larger side, as the average household size (5) was above the national average of 3 people per household (Africa geoportal, 2022). The average number of trading hours (TH) undertaken by the respondents was 6 hours per day, with a minimum of 7 hours of trading and a maximum of 9 trading hours. This suggests that some of the informal fresh produce traders were trading in line with the maximum normal working time of 9 hours per day (i.e. for those working 5 days per week).

4.2 Empirical Results

In the empirical model, the dependent variable is the perceived income generated by the respondents, rated on a 1–5 Likert scale. Following Busch (1993), respondents were asked to specify their income generated during the COVID-19 pandemic by way of an ordinal 5-Point Likert Scale, representing five levels of income generated: (1) very low income, (2) low income (3) moderate income, (4) high income and (5) very high income. Thus, income generated is a discrete variable that takes the form of a multiple response variable that has an ordinal ranking. Considering the discrete nature and ordinal ranking of the income-generated variable, an Ordered Probit Model was used in the empirical analysis.

In particular, the dependent variable, income generated, is a categorical variable that follows a sequential order in which the "low income" generated is higher than "very low income", "moderate income" is higher than "low income", "high income" is higher than "moderate income" and "very high income" is higher than "high income". The model is set up around a latent regression that begins with the following equation:

$$Y_{it} = \quad \beta x_i + \varepsilon_i \tag{1}$$

where Y* is an informal trader's latent (unobserved) income generated, X' is a vector of factors thought to influence income generated, β is a vector of coefficients representing the relationship between income generated and variables in *X*, and ε is an identically and independently distributed error term with a mean of zero and variance of one. In line with Badirwang (2012), since there are five potential responses for the dependent variable, income generated, Y*, the observed y_i is described as:

$$y_i = t \ \ if \ \theta_{t\text{-}1} \le 1 \ y * < \ \theta_t \ for \ t = 1, 2, 3, 4, 5 \tag{2}$$

Model (2) is a general model and can be re-formulated into five specific equations reflecting each threshold parameter (Long & Freese, 2006; Greene & Hensher, 2010) as follows:

$$
\begin{aligned}
&Y = 1 \ \ if \ Y \ < \ \mu_1 \\
&Y = 2 \ \ if \ \mu_1 < \ Y \ < \ \mu_2 \\
&Y = 3 \ \ if \ \mu_2 < \ Y \ < \ \mu_3 \\
&Y = 4 \ \ if \ \mu_3 < \ Y \ < \ \mu_4 \\
&Y = 5 \ \ if \ \mu_4 < \ Y \ < \ \mu_5 \\
&Y = j, \ \ if \ \ \mu_{j\text{-}1} < \ Y \ < \ \mu_j, \ and \ \mu_0 = -\infty, \mu_m = \ \infty
\end{aligned}
\tag{3}
$$

The θ are unknown parameters to be estimated with β. Using Equation 1 and substituting it into Equation 2, we can specify the probability of observing one of the five categories of income generated as follows:

$$
\begin{aligned}
&Prob \ (y = 0|X) = F(X'\ \beta) \\
&Prob \ (y = 1|X) = F(\mu_3 - X'\ \beta) - f(X'\ \beta) \\
&Prob \ (y = 2|X) = F(\mu_3 - X'\ \beta) - f(\mu_3 - X'\ \beta) \\
&Prob \ (Y = J \mid x) = 1 - F(\mu_j - 1 - X'\ \beta) \\
&Prob \ [Y = j] = Pr[\mu_j - 1 \ < \ y_i * < \ \mu] = F(\mu_j - x_i'\beta) - F(\mu_j\text{-}1 - x_i * B)
\end{aligned}
\tag{4}
$$

$$
\begin{aligned}
&Prob \ [\mu_j < \ Y \le \mu_j + 1] = Pr[Y \le \mu_j + 1] - Pr[Y \le \mu_j] = F * (\mu_j + 1) - F * (\mu_j) \\
&Prob \ (Y = J \mid x) = 1 - F \ (\mu_j - 1 - X'\ \beta)
\end{aligned}
\tag{5}
$$

Several predictor variables (factors) that are thought to influence the income generated by informal traders can be augmented in the empirical model. Thus, the Ordered Probit Model was used to determine the relationship between the income generated by informal fresh produce traders and several factors, which is described as follows:

$$Y * = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 \ldots \ldots \ldots \ldots + \beta_{25} X_{25} + \varepsilon \tag{6}$$

$$
\begin{aligned}
Y_i = {}& \beta_0 + \beta_{1\text{AGE}} + \beta_{2\text{MRTL}} + \beta_{3\text{GEND}} + \beta_{4\text{HHS}} + \beta_{5\text{EDL}} + \beta_{6\text{OSINC}} + \beta_{7\text{GOVS}} + \beta_{8\text{SRG}} + \beta_{9\text{HHHINC}} + \\
& \beta_{10\text{TL}} + \beta_{11\text{PRS}}B + \beta_{12\text{TRDS}} + \beta_{13\text{LEXPT}} + \beta_{14\text{TGS}} + \beta_{15\text{TFP}} + \beta_{16\text{TH}} + \beta_{17\text{TP}} + \beta_{18\text{CT}} + \beta_{19\text{TOC}} + \beta_{20\text{TPC}} + \\
& \beta_{21\text{SS}} + \beta_{22\text{SC}} + \beta_{23\text{TA}} + \beta_{24\text{PRMTD}} + \beta_{25\text{PRMT}} + \varepsilon
\end{aligned}
\tag{7}
$$

where Y_i = dependent variable (categorical) variable representing income generated by informal traders during the COVID-19 pandemic; rated on a 5-Point Likert Scale ranging from "very low income" to "very high income". The results for the dependent variable are presented in Table 2.

Table 2. Descriptive Results for the Dependent Variable

Income Generated (INC)	Frequency (100)	Percentage (100%)
Very low	30	30%
Low	27	27%
Moderate	24	24%
High	19	19%
Very high	0	0%

The results for income generated are that the majority of the informal fresh produce traders under study reported that they had generated very low income (30%), while the remaining 70% reported that they had generated incomes ranging from low incomes to high incomes. This means that none of the respondents had generated very high income, suggesting that the fresh produce traders did not generate much income from informal trading during the COVID-19 pandemic. This is attributable to three reasons, as follows.

First, informal trading (street vending) activities were prohibited during Alert Level 5, while the majority of the informal fresh produce traders still did not trade during Alert Level 4 (64%), as only traders with licences/permits were allowed to trade during Alert Level 4. Second, most of the informal fresh produce traders reported that they had experienced supply shortages (59%) because of the disruption in the procurement of fresh produce that was attributable to the prohibition of movement of persons without specific licences (HSRC, 2020). Third, most of the informal fresh produce traders had experienced perishability in their stocks because of a decline in demand for fresh produce, as people then preferred to purchase food products with longer shelf lives due to the ban on the movement of people and the threat posed by the virus (Ogunkola et al., 2021). Overall, fresh produce traders did not generate much income from informal trading during the COVID-19 pandemic because of their lack of trading licences/permits during Alert Levels 5 and 4 of the lockdown, supply shortages and the perishability of their fresh produce.

Ordered Probit Model and Marginal Effects Results

Given the ordinal ranking of the income generated variable, an Ordered Probit Model was used to examine the extent to which several factors had influenced the income generated by informal fresh produce traders during the COVID-19 pandemic. The results indicating the estimated coefficients, standard errors, t-statistics and levels of significance are presented in Table 3.

The analysis was undertaken by using the Statistical Package for the Social Sciences (SPSS). The Ordered Probit Model was also used to derive the predicted probabilities and marginal effects for the four levels of income, evaluated at the average of the data.[1] The analyses were undertaken using STATA. The results for the predicted probabilities and the marginal effects are shown in Table 4.

The values for the marginal effects for the four levels of income generated are equal to zero, while the values for the predicted probabilities for equal to one, as per default. The results for the estimated coefficients (Table 3) and marginal effects (Table 4) are discussed concurrently. From the twenty-five predictor variables that were included in the empirical analysis, ten variables were significant, as shown in Table 3. Consequently, the discussion of the results for the coefficients and marginal effects is limited to the significant variables, which are discussed below.

Table 3. Ordered Probit Model Results

Variables	Estimates	Standard Errors	T-Statistics
Age (AGE)	0,692	0,245	2,824***
Marital status (MRTL)	-0,104	0,228	-0,456
Gender (GEND)	0,177	0,739	0,240
Household size (HHS)	-0,028	0,199	-0,141
Education level (EDL)	0,886	0,399	2,221**
Other sources of income (OSINC)	0,829	0,406	2,042**
Government support (GOVS)	0,729	0,247	2,951***
Social relieve grant (SRG)	0,689	0,307	2,244**
Household head income (HHHINC)	-0,617	0,213	-2,897***
Trading licence (TL)	0,547	0,237	2,308**
Perishability (PRSB)	0,146	0,328	0,445
Type of goods sold (TGS)	0,044	0,386	0,114
Type of fresh produce (TFP)	0,122	0,477	0,256
Trading hours (TH)	0,71	0,38	1,868
Trading status (TS)	0,799	0,324	2,466***
Contract (CT)	-1,936	1,546	-1,252
Time period of contract (TPC)	0,618	0,256	2,414***
Supply shortage (SS)	-0,554	0,273	-2,029**
Trading area (TA)	-0,384	0,443	-0,867
Pricing method (PRMTD)	0,38	0,309	1,230
Trading stall (TRDS)	0,968	0,403	2,402***
Model Summary			
(-2) log-likelihood			133.191
Pseudo R-square			
Cox and Nell			0.69
Nagelkerke			0.63

Source: Computed from survey data (2021). Note: $*p < 0.1$ $**p < 0.05$. $***p < 0.01$.

Table 4. Predicted Probabilities and Marginal Effects

Income Category	INC=1	INC=2	INC=3	INC=4
Predicted Probability	0.247	0.340	0.285	0.128
Variable	**Marginal Effects**			
AGE	-0.004	-0.001	0.004	0.001
EDL	-0.011	-0.002	0.006	0.007
OSINC	-0.040	-0.045	0.060	0.025
GOVS	-0.326	-0.031	0.220	0.137
SRG	-0.006	-0.088	0.076	0.018
HHHINC	0.061	0.014	-0.035	-0.040
TL	-0.091	-0.022	0.075	0.038
TS	-0,018	-0,009	0,0145	0,0125
TPC	-0.038	-0.009	0.022	0.025
SS	0.141	0.080	-0.114	-0.107
TRDS	-0.040	-0.073	0.105	0.008

Age (AGE)

The coefficient estimate for age (AGE) is positive and statistically significant at 1% level of significance, indicating that older informal traders are more likely to generate higher income, compared with younger informal traders. The marginal effects for the AGE variable are negative for the first two categories of income, but positive for the rest of the income categories. This signifies that being an older informal trader decreases the probability of generating very low to low income and increases the probability of generating moderate to high income. The implication is that older informal fresh produce traders are more likely to have generated moderate to high income. Comparatively, younger traders are more likely to have generated very low to low income.

Education Level (EDL)

The education level (EDL) variable is positive and statistically significant at 5% level of significance, signifying that informal traders with higher levels of education are more likely to generate higher income. The EDL variable has negative marginal effects for the first two categories of income, but positive effects for the last two categories. This signifies that being educated increases the probability of generating moderate to high income and decreases the probability of generating very low to low income. Specifically, informal fresh produce traders with higher levels of education are more likely to have generated moderate to high income. Inversely, those with higher levels of education are more likely to have generated moderate to high income.

Other Sources of Income (OSINC)

The variable for other sources of income (OSINC) has a positive coefficient, and is statistically significant at 5%, suggesting that informal fresh produce traders with other sources of income are more likely to generate higher income. The marginal effects for the OSINC variable are negative for the first two categories of income, but positive for the other two categories. This suggests that having other sources of income decreases the probability of generating very low to low income and increases the probability of generating moderate to high income. In other words, informal traders with other sources of income are more likely to have generated moderate to high income. Comparatively, those without other sources of income are more likely to have generated very low to low income.

Government Support (GOVS)

The government support (GOVS) variable is statistically significant at 1%, and is positive, which implies that informal traders who received government support during the COVID-19 pandemic are more likely to have generated higher incomes. The GOVS variable has negative marginal effects for the first and second categories of income generated and positive effects for the other two categories. This signifies that receiving government support decreases the probability of generating very low to low income and increases the probability of generating moderate to high income. The implication is that informal fresh produce traders who received government support during the COVID-19 pandemic are more likely to have generated moderate to high incomes. On the contrary, those who did not receive government support are more likely to have generated very low to low income.

Social Relief Grant (SRG)

The social relief grant (SRG) variable has a positive coefficient of estimate, and is statistically significant at 5% level of significance. The marginal effects for the SRG variable are negative for the first two categories of income, but positive for the remaining two categories. This indicates that being a receiver of the SRG R350 grant decreases the probability of generating very low to low income, and increases the probability of generating moderate to high income. Alternatively stated, informal traders who had received the SRG R350 grant during the COVID-19 pandemic are more likely to have generated moderate to high income. On the other hand, those who did not receive the SRG R350 grant are more likely to have generated very low to low income.

Household Head Income (HHHINC)

The household head income (HHHINC) variable is negative and statistically significant at 1% level of significance. The HHHINC variable has positive marginal effects for the first two categories of income and negative effects for the other two categories. This suggests that having higher levels of income increases the probability of generating very low to low income and decreases the probability of generating moderate to high income from informal trading. More specifically, informal traders with higher household incomes are more likely to generate very low to low income. On the other hand, those with lower household incomes are more likely to generate moderate to high income from informal trading.

Trading License (TL)

The trading license (TL) variable is statistically significant at 5% level of significance, and is positive, suggesting that informal fresh produce traders with trading licenses are more likely to generate higher incomes, compared with those without trading licenses. The marginal effects for TL are negative for the first and second categories of income and positive for the remaining two categories. This means that having a trading license reduces the probability of generating very low to low income, but increases the probability of generating moderate to high income. Put differently, informal fresh produce traders with trading licenses are more likely to have generated moderate to high income, while those without licenses are more likely to have generated very low to low income.

Trading Status (TS)

The coefficient of estimate for trading status (TS) variable is statistically significant at 1%, and has a positive coefficient, indicating that fresh produce traders who are involved in informal trading on a full-time basis are more likely to generate higher income. The marginal effects for TS variable are negative for the first two categories of income and positive for the remaining two categories. This shows that being a full-time trader reduces the probability of generating very low to low income, and increases the probability of generating moderate to high income. In other words, informal fresh produce traders who are trading on a full-time basis are more likely to generate moderate to high income. Conversely, those trading on a part-time basis are more likely to generate very low to low income.

Time Period of Contract (TPC)

The time period of contract (TPC) variable has a positive coefficient of estimate, and is statistically significant at a 1% level of significance, indicating that the probability of generating higher income increases as the time period of the contract increases. The marginal effects for the TPC variable are negative for the first two categories of income, but positive for the last two categories. This signifies that having a long-term contract with a supplier reduces the probability of generating very low to low income, and increases the probability of

generating moderate to high income. This means that informal traders with long-term contracts are more likely to have generated moderate to high income, while those with short-term contracts are more likely to have generated very low to low income.

Supply Shortage (SS)

The supply shortage (SS) variable is statistically significant at 5% level of significance, and is negative. This suggests that informal fresh produce traders who have experienced supply shortages are less likely to generate higher incomes, compared with those who did not experience supply shortages. The marginal effects for SS are positive for the first and second categories of income and negative for the remaining two categories. This means that supply shortage increases the probability of generating very low to low income, but decreases the probability of generating moderate to high income. Put differently, informal fresh produce traders who have experienced supply shortages are more likely to have generated very low to low income, while those who did not experience supply shortages are more likely to have generated moderate to high income.

Trading Stall (TRDS)

The trading stall (TRDS) variable is statistically significant at 1% level of significance, and has a positive coefficient of estimate, indicating that having a trading stall increases the probability of generating higher levels of income. The TRDS variable has negative marginal effects for the first two categories of income, but positive effects for the other two categories. This indicates that having a trading stall reduces the probability of generating very low to low income, and increases the probability of generating moderate to high income. In other words, informal fresh produce traders with trading stalls are more likely to have generated moderate to high incomes, while those without trading stalls are more likely to have generated very low to low incomes.

5. Conclusion

5.1 Summary, Implications and Recommendations

The lockdown regulations (non-pharmaceutical measures), which were implemented in South Africa to curb the spread of COVID-19, have severely disrupted the informal food chain, and have impacted negatively on informal street vending activities. Given this, this study aimed at analysing the factors that influenced the income generated by the informal fresh produce traders under study during the COVID-19 pandemic. To achieve this, purposive sampling was applied to collect primary data from 100 informal fresh produce traders in three study areas in the jurisdiction of Polokwane Local Municipality that are highly concentrated in street vending.

An Ordered Probit Model was used to examine the extent to which several factors had affected the income generated by informal traders, measured on a 5-Point Likert Scale ranging from "very low income to "very high income". The descriptive findings are that none of the informal fresh produce traders had generated "very high income", but rather incomes ranging from "very low income" to "high income". The suggestion is that the informal fresh produce traders did not generate much income from informal trading during the COVID-19 pandemic. This is attributed to (1) the prohibition of informal trading during Alert Level 5, (2) lack of trading licences/permits during Alert Level 4, (3) supply shortages experienced during the COVID-19 pandemic, and (4) the perishability of fresh produce during the COVID-19 pandemic.

The empirical results are as follows. It was found that older informal fresh produce traders with higher levels of experience were more likely to have generated moderate to high incomes

than younger traders with lower levels of experience. The implication is that it takes time for informal fresh produce traders to build a customer base and loyalty. Therefore, younger traders have to explore options necessary to build customer base and loyalty, such as the provision of exceptional service, asking existing customers to refer potential customers, requesting feedback on the service offered, and using the feedback to continually improve their services.

It was also found that the informal fresh produce traders with higher levels of education were more likely to have generated moderate to high income, relative to those with lower levels of education. Therefore, the government should introduce educational programmes for traders with lower levels of education to improve their marketing, communication and business skills, which are necessary to improve sales, and ultimately the income generated from the sale of fresh produce. Informal fresh produce traders who had received the SRG R350 grant were more likely to have generated moderate to high income. Therefore, the government should continue to provide the SRG R350 Grant to the informal fresh produce traders, as it would contribute towards improving their incomes.

The fact that most of the informal fresh produce traders had benefited from the SRG R350 grant, while very few of them had benefited from the formal economic support packages, calls for the government to relax the requirements for accessing the COVID-19 economic support packages and how the support packages are provided. This can be achieved through the relaxation of stringent requirements such as registration with CIPC and SARS, compliance with UIF formalities, and by administering the packages in a similar manner by which the social grants are administered.

It was further found that the informal fresh produce traders with trading licenses were more likely to have generated moderate to higher income. Therefore, the municipal/city authorities should issue trading licenses to qualifying informal fresh produce traders to enable them to trade at a specified municipal area, stand or spot.[2] There is also a need for the municipal/city authorities to provide trading infrastructure such as trading stalls, as those with trading stalls were more likely to have generated moderate to higher income.

5.2 Delimitations and Areas for Further Analysis

The study has several delimitations, which necessitate further analysis. Lockdown in South Africa has been implemented in five different levels (Alert Level 5 to Alert Level 1), with higher levels reflecting higher restrictions and lower levels reflecting lower restrictions. As such, the income generated by the informal fresh produce traders would vary depending on the lockdown level in force. However, the study could not capture the level of income generated per lockdown level; hence, the need for conducting a similar study with a focus on all the lockdown levels. The sample size was limited to 100 informal fresh produce traders in selected areas of Polokwane Municipality due to resource and time constraints. Hence, there is a need to extend the study to other municipalities in the Limpopo Province, and across South Africa, for a generalisation of the results to be made.

This study cannot provide an information base on the profitability of informal trading conducted during the COVID-19 pandemic, as it focused on income generated rather than on profitability; hence, there is a need for a similar study to be conducted with a focus on profitability. It was found that most of the informal traders had not benefited from the COVID-19 economic support packages, which calls for a future study to be conducted on factors affecting awareness about and access to the available economic support packages.

It is worth noting that most of the informal fresh produce traders under study did not generate much income, which is attributable to variables related to the COVID-19 pandemic: (1) the prohibition of informal trading during Alert Level 5, (2) the lack of trading licences/permits held during Alert Level 4, (3) the supply shortages experienced during the

COVID-19 pandemic, and (4) the perishability of fresh produce experienced during the pandemic. Hence, there is a need for a future study to be conducted on the income generated by the informal fresh produce traders after the lockdown regulations were lifted – when all informal fresh produce traders were permitted to trade freely.

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[1] Four levels of income were used, instead of five, since no trader had generated "very high income".

[2] This does not negate that municipalities do not have a monopoly over all trading areas, as some trading areas are privately owned. As such, not all informal traders require permits from the municipality, implying that they can still trade without trading licenses through lease agreements with private property owners.