Determinants and Preferences Revealed for Cassava Flour in the City Province of Kinshasa

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Abstract
The aim of this study is to investigate the factors that determine interest in cassava in the city of Kinshasa. Thus, using the method based on the analysis of basic properties and applied to logistic regression, we selected 354 households and more for the period from 17 May 2023 to 24 July 2023.
The results showed that global and individual factors affect the taste of cassava flour but not in the same way. Individual factors, family size, sex of respondent, marital status and number of school-age children affect preference for cassava flour; and global factors such as marketing mix are positively affected.

Keywords: Revealed preference theory, cardinal utility and ordinal utility

1. Introduction

In recent years, the food system has undergone significant and rapid change. Various factors such as demographics, politics, society, technology, economics and culture have led to the creation of a new type of food production. Food processors and supermarkets dominate the market, as part of the global food system (Belletti, et al., 2020).

The economic system is constantly evolving, and the introduction of the concept of economic democracy in decision-making has also changed consumer behaviour and demands. From this point of view, De Maricourt, quoted by Mbwinga (2018), sees entrepreneurship as the key to economic democracy. It must help create an economic system based on the choices of the greatest number by understanding their desires and needs, in order to transform them into strategic objectives for production, progress and business development (De Maricourt, 1987).

In fact, economic democracy, also known as democracy, is considered as an economic theory that proposes the delegation of decision-making power by corporate managers and shareholders and by the majority of stakeholders, such as workers, consumers, suppliers, local residents and the public and future generations (Casper-Futterman et al., 2017).

There is currently a well-known and proven method of production that can meet consumers' expectations for food, without endangering their health, protecting the environment, including the diversity of life, and maintaining a farm in many people, of good quality and pleasant to live on (Barbot, 2020).

These modes of production may take different forms and be called different things (agriculture, farmers, organic, sustainable, etc.), but they all aim to promote sustainable farming and sustainable practices.

The role of cassava flour in the system's economy is so important that it is now impossible to avoid studying this product. This research therefore seeks to answer the following questions:

What are the determining factors of preference for the cassava flour industry? And more specifically, which ones have had a significant impact?

In order to address this question in detail, our research has chosen a hypothetico-deductive approach based on economic theory. The aim is therefore to study the factors that determine producers' preference for cassava flour and at the same time to identify those that influence the preference for cassava flour over other flours. The aim of the study is to provide the Congolese people with an assessment of the productivity of the cassava sector.

In order to achieve this objective, the study is organised as follows: In addition to the introduction and conclusion, we have a theoretical framework and an analysis of the work, followed by a "methodology" and finally the results and discussion.

I. Conceptual Framework and Literature Review

I.1. Utility preference theory
I.1.1. Definition
In economics, utility refers to the satisfaction (monetary or non-monetary) that an economic activity (buying, selling) brings to an individual. Marginal value refers to the surplus resulting from recycling the material.

Utility is the characteristic of something that provides a relatively good measure of the well-being or satisfaction provided by consumption, or the benefit obtained by using real or quantitative services. It is related to and different from consumer needs.

1.1.2. Various measures
In the neoclassical school, one of the important things in consumer theory is to create a demand function that can be equal to the producers' supply function.

The desired function can be created using the cardinal utility, which allows measurement and comparison, or the ordinal utility, which is less practical to use.

1.1.2.1. Ordinal utility theory

This hypothesis argues that the buyer is able to prioritize the various selections of items according to his inclinations and choices, without needing to assess importance.

So, depending on his tastes and preferences, he can express one of three alternative judgements:

- He prefers basket X to basket Y (X > Y)

- He prefers basket Y to basket X (Y > X)

- He is indifferent to both baskets (X = Y)

So, if X is the name of the basket, 1 represents good 1 (e.g. millet) and 2 represents good 2 (e.g. rice)

X1 is the quantity of good 1 (e.g. 2 kg of m²)

X2 is the quantity of good 2 (e.g. 5 kg of rice)

A basket X containing x1 units of good 1 and x2 units of good 2 will be denoted X=(x1, x2)

A basket Y containing y1 units of good 1 and y2 units of good 2 will be marked Y=(y2, y2)

1.1.2.2. The properties (or axioms) of the preference-indifference relationship
The postulates of the preference-indifference relationship are completeness, self-reflexivity and transitivity.

a) *The completeness axiom*
If a buyer is faced with two baskets X and Y containing different quantities of products, he can always say:

- I prefer X to Y, noted X>Y

- I prefer Y to X, noted Y>X

- I am indifferent between the two, noted X=Y

b) *The axiom of reflexivity*
Whatever a basket X is, it is preferred or indifferent to itself, denoted $X \geq Y$

c) *The transitivity axiom*
In the presence of three baskets X, Y, and Z comprising various quantities of goods:

- If X is preferred or indifferent to Y, then $X \geq Y$

- If Y is preferred or indifferent to Z, then $Y \geq Z$

- Then X will be preferred or indifferent to Z, noted $X \geq Z$

If a consumer respects these three axioms, he will be able to rank all the baskets of goods presented to him according to his preferences.

d) *The assumptions of the preference-indifference relationship*
Two hypotheses complete the three axioms above.

➢ **The hypothesis that preferences are not saturated.**
This is where the consumer likes more rather than less. If a basket X contains a greater quantity of at least one of the two goods than a basket Y, then basket X will be strictly preferred to basket Y.

$$\forall x = (x_1, x_2) \text{ and } x = (y_1, y_2); if\ x_1 = y_1 and\ x_2 > y_1 and\ x_2 = y_2, x > y$$

$$X \cong Y \cong Z \cong T, \quad X \cong Y \sim V$$

Basket X is preferred to all other baskets. The closer consumers are to this basket, the greater their satisfaction.

➢ **The convexity of preferences hypothesis**
Wants consumers to like mixes, i.e. they like diversified baskets. It is the distance from X that enables the different baskets to be compared.

We call this basket X the ideal point or the saturation point.

Assuming two baskets of goods X and Y deemed equivalent by a consumer, if X contains more good 1 and less good 2 and Y more good 2 and less good 1, the consumer will prefer a basket Z made up of a fraction α of basket X and a fraction (1α) of basket Y.

$$P = aM + (1-a)N, \forall a \in [0,1]\ Si\ M = N\ then\ P \geq M\ et\ Z \geq N$$

If basket P is strictly preferred to baskets M and N, we say that consumer preferences are strictly convex.

I.2. Indifference curves and their properties
Like-Dislike relationships can be represented graphically in the form of a "Dislike" curve.
An indifference curve is where all collections (or baskets) of products offer the same level of customer satisfaction. The consumer (or indifference) is equal to the basket of goods belonging to the same indifference segment.

To construct an indifference curve, we make the following assumptions:

- Baskets contain only two goods;
- The goods are perfectly divisible, desirable and substitutable.

$Y \sim Y. Z \approx Z \rightarrow Z \approx Y.$

$Y \sim X \approx T \sim V \rightarrow Y \approx T \, et \, Y \approx V$

Indifference curves have four properties:
P1: By virtue of the axioms of non-saturation and transitivity, the further the indifference curve is from the origin of the axes, the higher the level of consumer satisfaction.

Any shift from one indifference curve to another means a change in consumer well-being.

P2: By virtue of the non-saturation axiom, indifference curves are decreasing curves.
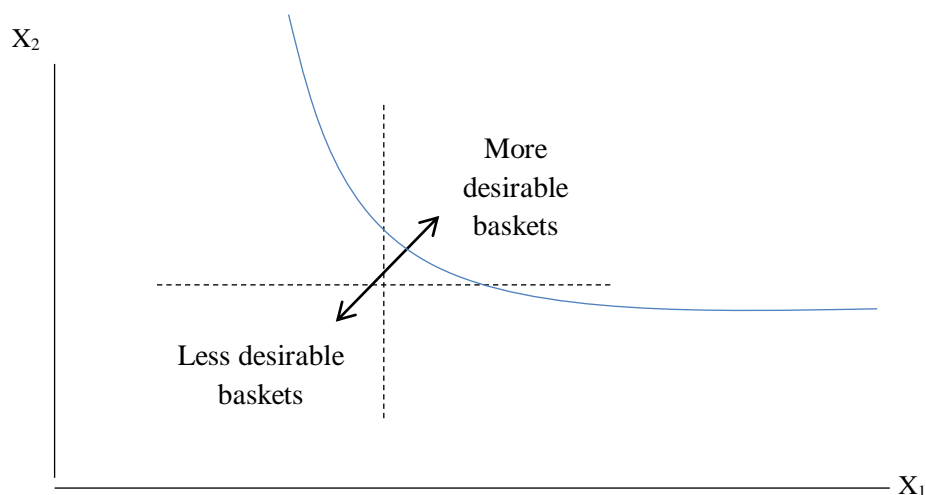
P3: By virtue of the transitivity axiom, **the indifference curves cannot cross**.

$A = B and A = C therefore B = C, Knowing that C > B$

B and C do not belong to the same indifference curve.

P4: By virtue of the axiom of strict convexity, the indifference curves are strictly convex with respect to the origin of the axes.

Mathematically, the TMS1, 2 is written as:

$$TMS_{1,2} = -\frac{\Delta x_2}{\Delta x_1}$$

When Δx1 is infinitesimally small, i.e. tends towards

$$\text{TMS} = \lim_{\Delta x_1 \to 0} -\frac{\Delta x_2}{\Delta x_1} = -\frac{dx_2}{dx_1}$$

Graphically, when Δx1 tends towards 0, the MSD is equal to the absolute value of the slope of the tangent line to the indifference curve at a particular point.

The MSD decreases as we move from left to right along a curve.

I.3. The utility function
Let U be the utility function and X a basket of goods. The utility of the basket X will be denoted **U(X)**.

The utility function therefore provides an algebraic expression of consumer preferences. A utility function associates with each basket X, a positive number called the "Utility" of the basket.

For two baskets X and Y, we have the following equivalences:

- X = Y if and only if U(X) = U(Y) ;

- And X > Y if and only if U(X) > U(Y).

U(X) depends on the quantities of good 1 (x1) and good 2 (x2) which are the arguments of the function **U**.

$$\forall x = (x_1.x_2); U(x) = U(x_1.x_2)$$

Examples of consumer utility functions
Cobb-Douglas utility functions represent normal basket preferences where goods are substitutable.

$$U(x_1.x_2) = x_1^a.x_2^\beta \text{ where } a \text{ and } \beta \text{ are positive parameters}$$

In the case of perfectly complementary goods, utility functions are represented as angled straight lines.

I.4. Revealed Preference Theory
A method of analysing the choices made by individuals, known as the revealed preference hypothesis, was introduced by the economist **P.A. SAMUELSON in 1938**. This theory is often

used to analyse the impact of consumer policies and behaviour. The revealed preference model assumes that consumers' purchasing behaviour can be determined by their preferences.

Revealed preference theory emerged in response to existing theories of consumer demand, which were based on a declining marginal rate of substitution (MSR). This decreasing MSR was based on the assumption that consumers make consumption decisions to maximise their utility. Although this assumption was not controversial, the underlying utility functions could not be measured with great certainty. Revealed preference theory reconciled demand theory by defining utility functions based on observations of consumer behaviour.

Thus, the use of revealed preferences makes it possible to assess people's preferences on the basis of their perceived preferences, which is different from methods designed to measure preferences or benefits directly, such as stated preferences. Economics, an obvious subject, faces the difficulties of not finding interest. Therefore, as proponents of revealed interest theory, "actions say more than words about what people really want".

I.4.1. Motivation
Revealed choice theory seeks to understand consumers' preferences for different goods, taking into account their budgetary constraints. For example, if a consumer prefers product A to product B, the latter being cheaper, this shows a direct preference for A over B. We assume that the consumer's interest remains constant over the period observed, i.e. that he will not change his mind, and that he will not switch his interest between A and B.

To explain this concept, let's take the example of a person who chooses two apples and three bananas rather than three apples and two bananas, which is more affordable. In this case, the first set takes over from the second. It is assumed that this set will be preferred to the second set and that the consumer will choose the second set if the first set is not affordable.

1.4.2. Definition and theory
Suppose there are two goods, a and b, available in a given budget. If we see that the choice is a rather than b, then a is considered to be exactly preferred to b.

If package b is directly preferred to budget package B, then WARP says that package a cannot be positively chosen to be b in any budget package B'. This rule will apply even if the package is elsewhere in the pink zone. Package c will not violate WARP even if it is selected from budget package B', as it is not in the pink region.

Let there be two packages of goods, a and b, available in a budget set. If we find that a is chosen over b, then a is (directly) revealed to be preferred to b.

1.4.3. The weak axiom of revealed preference (WARP)
WARP satisfaction is important to ensure that consumers stay true to their preferences. If we choose one product over another set b, because both are cheaper, this means that the consumer prefers a to b. According to WARP, if preferences remain the same, there is no situation (within

a defined budget) where n simply prefers b to a. By choosing a over b when both tents are cheaper, the consumer reveals that his preferences are such that he will never choose b over a as long as prices remain constant.

Similarly, if we choose a over b in one budget arrangement where both options are available, but b is preferred in another budget arrangement, then this cannot be considered as having power in that budget set. This WARP statement can be formulated in a more literal and general way.

Such as: Completeness: the strong axiom of revealed preferences (SARP)

The strong revealed preference principle (SARP) is similar to the weak revealed preference principle, except that the buyer has no chance of being indifferent between the two options. In other words, if WARP is satisfied, SARP continues and ends.

If A chooses B directly and B chooses C directly, then A is considered to be choosing C. It is possible for A and C (correctly and indirectly) to select each other at the same time, creating a "loop". ". In mathematical terms, this means that transitivity is violated. The change is important because it can reveal more information when comparing two different budget constraints.

1.4.4. Generalised axiom of revealed preference (GARP)
The data set shows a budget constraint that includes two types of consumption, namely a and b. Both groups managed to maximise their profits, undermining the SARP while respecting the GARP.

The general principle of revealed interest is a set of strict principles of revealed interest. It is the last sign that must be respected for consistency, ensuring that customer preferences do not change.

This axiom takes into account situations where two or more consumption packages offer equal utility, as long as prices remain constant. This includes the case where the majority of the consumption group receives increased energy [4].

The database respects the general principles of interest disclosed insofar as it does not contradict them. This means that if one food is preferred over another, then the costs required to obtain that food, given that prices remain constant, cannot be greater than those required to obtain another.[6]

In order to respect the principle of revealed interest in general, it is important that the data does not show the cycle of interest. Therefore, when considering the tent {A, B, C}, the revealed option will be a path that is not a legal cycle, so if, then "interesting cycles" will be excluded when and -maintain transitivity.

Since the global revealed interest principle is closely related to the strict revealed interest principle, it is easy to show that any SARP situation can imply the global principle, but that the global principle cannot imply the strict strength of the principle. This is because the general principle corresponds to a multi-cost search function, whereas SARP corresponds to a single-cost

search function. Thus, this generalisation principle allows for a smooth curve and a neutral curve, as shown by **Hal R Varian (1982)**.

II. Methodological Approach
II.1. Data collection and sources.
Gathering information using research methods involves collecting data to answer specific research questions. The most commonly used research methods are interviews, questionnaires, internet research and field research. These methods are used to collect data on subjects such as participants' attitudes, opinions, behaviours and experiences. It is very important to choose the appropriate research method depending on the research question and sample design.

II.2. Sampling and sample size
The sample is determined according to the accuracy required (95% in this case), the time and human resources available, and the number of indicators to be analysed, based on the results of previous analyses and a company. Consequently, we maintain a minimum of 384 based on this formula :

$$N = \frac{pq}{\varepsilon^2}$$

II.3. Logistic regression model and various validation tests

In general, the logistic regression of $Y \epsilon [0,1] p$ on explanatory variables $\{X_1, X_2, \ldots, X_p\}$, consists in considering that:

1. The law of Y knowing $X_1 = x_1 \ldots, X_p = x_p$ is a Bernoulli distribution with parameters $p(x_1 \ldots, x_p)$ dependent on $x_1 \ldots, x_p$:
$$Y/X_1 = x_1 \ldots, X_p = x_p = \mathcal{B}\left(p(x_1 \ldots, x_p)\right)$$

2. The probability $p(x_1 \ldots, x_p)$ can be written as:

$$p(x_1 \ldots, x_p) = P(Y = 1/X_1 = x_1 \ldots, X_p = x_p) = \frac{exp(\beta_1 x_1 + \cdots + \beta_p x_p)}{1 + exp(\beta_1 x_1 + \cdots + \beta_p x_p)}$$

Note that if we want the model to contain a constant, we assume that $X_1 = 1$, as in the case under study.

With the logit function, the function defined on $[0,1]$ and with values in $\mathbb{R}$:

$$logit\ (x) = ln\left(\frac{x}{1-x}\right)$$

Case of a single explanatory variable

The mathematical expression of the logistic model, in the case of a single variable X, is as follows: $P(M = 1|X) = P(X)$ where $P(X)$ is the logistic function:

$$P(X) = \frac{1}{1 + e^{-(\alpha + \beta x)}}$$

II.4. Validation of the model using various statistical tests

When a significance test is performed to evaluate a parameter (Student's test), the null hypothesis can be verified for all the parameters (or for some of the parameters) using :

- the Wald test ;
- the score test ;
- the likelihood ratio or deviance test.

The test considered here is :

$$\begin{cases} H_0: \beta_1 = \cdots = \beta_q = 0 \\ H_1: there\, are\, j \in \{1, \dots, q\} such\, that\, \beta_j \neq 0 \end{cases}$$

There is no loss of generality, and we note that it is possible to reorder the explanatory variables, and therefore to test any combination of q variables.

It can be shown that the test statistics considered all converge to the distribution $\chi^2(q)$.

under H_0. The hypothesis H_0 at the test level if the statistics calculated on the sample are greater than the quantile of order $1 - \alpha$ of the law $\chi^2(q) : \chi^2_{q,1-\alpha}$

For the purposes of our research, we have used the following diagram to represent our model:

Figure 3.1: Logical framework of the logistics modelling conceptual diagram
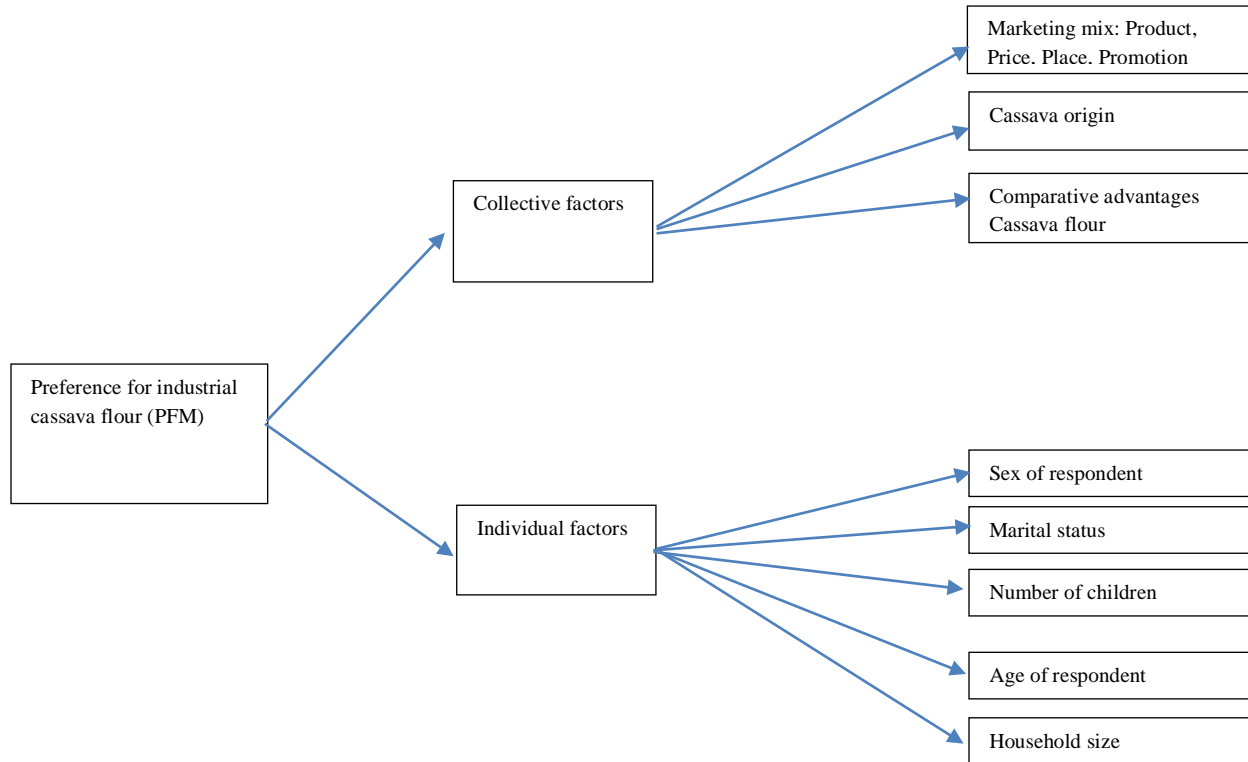
Source: Author, based on ACM results

Hence the following relationship:

$$y_i = \alpha_0 + \alpha_i \sum_{i=1}^{n} X_i + \varepsilon_i \,(1)$$

Where

$y_i = PFM$

$PFM = f(FC, FI)\,(2)$

$PFM = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_1' X_1' + \alpha_2' X_2' + \alpha_3' X_3' + \alpha_4' X_4' + \alpha_5' X_5' \,(3)$

Hence:

X_1 = Mixed marketing variable

X_2 = Origin of cassava

X_3 = Comparative advantage of cassava flour

X_1' = Sex of respondent

X_2' = Marital status

X_3' = Number of school-age children

X_4' = Age of respondent

X_5' = Household size

Variables	Meaning	Expected signs
PFM	Explained	(+)
X_1	Explanatory	(+)
X_2	Explanatory	(+)
X_3	Explanatory	(+)
X_1'	Explanatory	(+)
X_2'	Explanatory	(+)
X_3'	Explanatory	(+)
X_4'	Explanatory	(+)
X_5'	Explanatory	(+)

III. Main Results, Analysis and Discussion

III.1. Principal Component analysis
MCA is useful for visualizing correlations between variables, and for identifying homogeneous groups or atypical observations, especially profiles that seem to be "hidden" within a data set.

Graph 1: Projection of individuals on the two household size factors
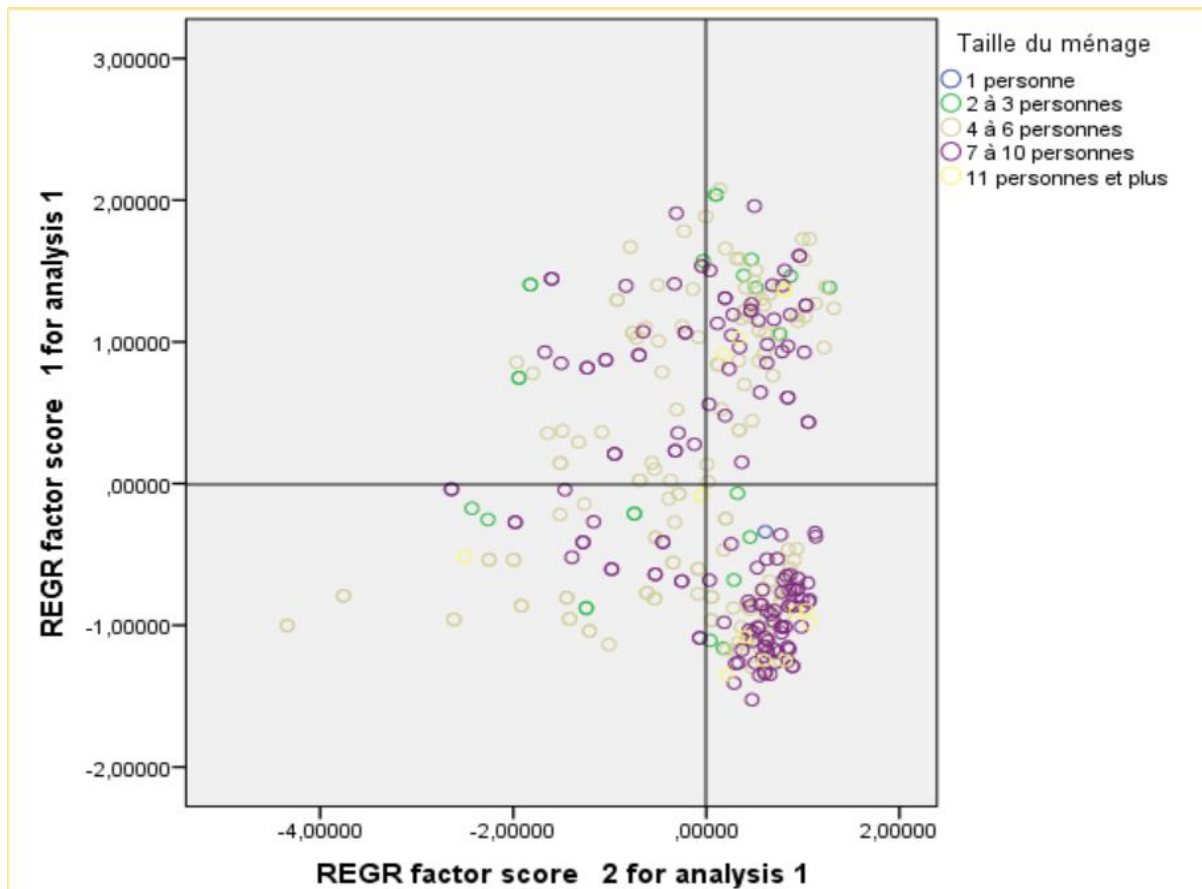
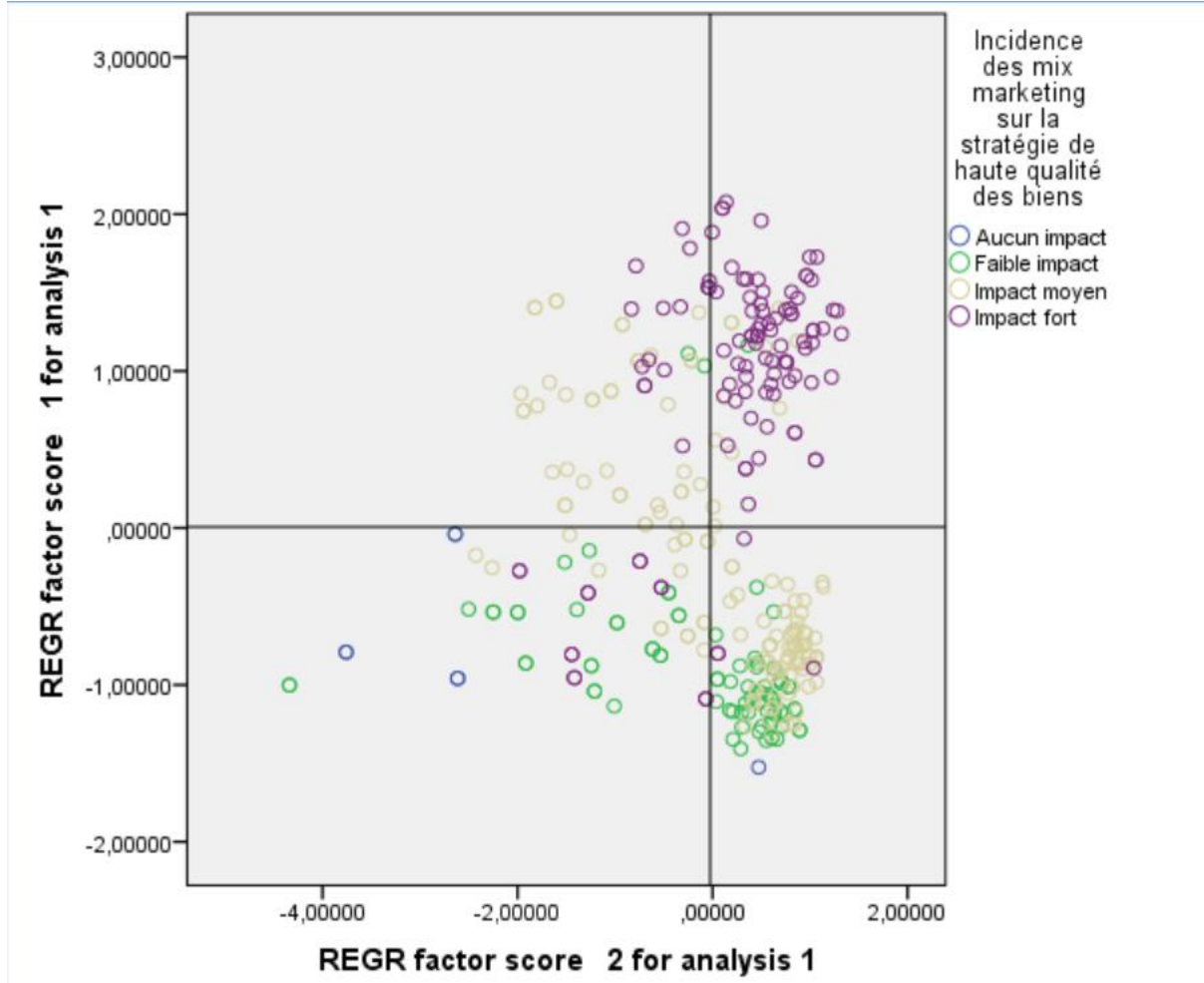Source: Author, based on study data using SPSS v.26 software

Interpretation:
In business, for the market to be real, it's important that the objects present in the market not only have the intention to buy, but also the ability to buy. Marketing decisions and buying opportunities vary according to the characteristics of the target market. To this end, it is important to analyze variables such as family size. In the Tshangu region, there are families made up of just one person, while others are made up of 2-3 people, or even 4-6 or more. However, it is important to bear in mind that as the number of family members increases, so does the burden on the head of the household to meet their needs.

Comment:
In terms of family size, Tshangu families have an average of 10 members, while the largest families range from 7 to 10 or even more than 11. Given the poor economic situation, the use of cassava as a staple food is a low-cost strategy of reasonable quality.

Graph 2: Projection of individuals on the two factors on the impact of marketing mixes on the high-quality strategy

Source: Author, based on study data using SPSS v.26 software

Interpretation:

The main task of any manufacturer is to identify the needs and desires of the target market and provide the desired satisfaction in a practical way, as consumers have become the main element of the economic concept. In fact, in the area studied, there is a large family that ignores this change by favoring quantity over quality due to its low income. This change in behavior therefore has little impact on this type of family. Another group of families with no money may be looking, when deciding what to buy, for a high-quality product that gives a good impression and flexibility, since this type may represent half the population of this region. However, although low, another type with high purchasing power swears by product quality when it comes to deciding what to buy, whatever the price; this change therefore has a strong impact on this type of family.

Comment: in terms of economic democracy, the people of Tshangu have a low to moderate demand for variable product quality.

Graph 5: Projection of individuals on the two factors on the economic advantage of cassava flour
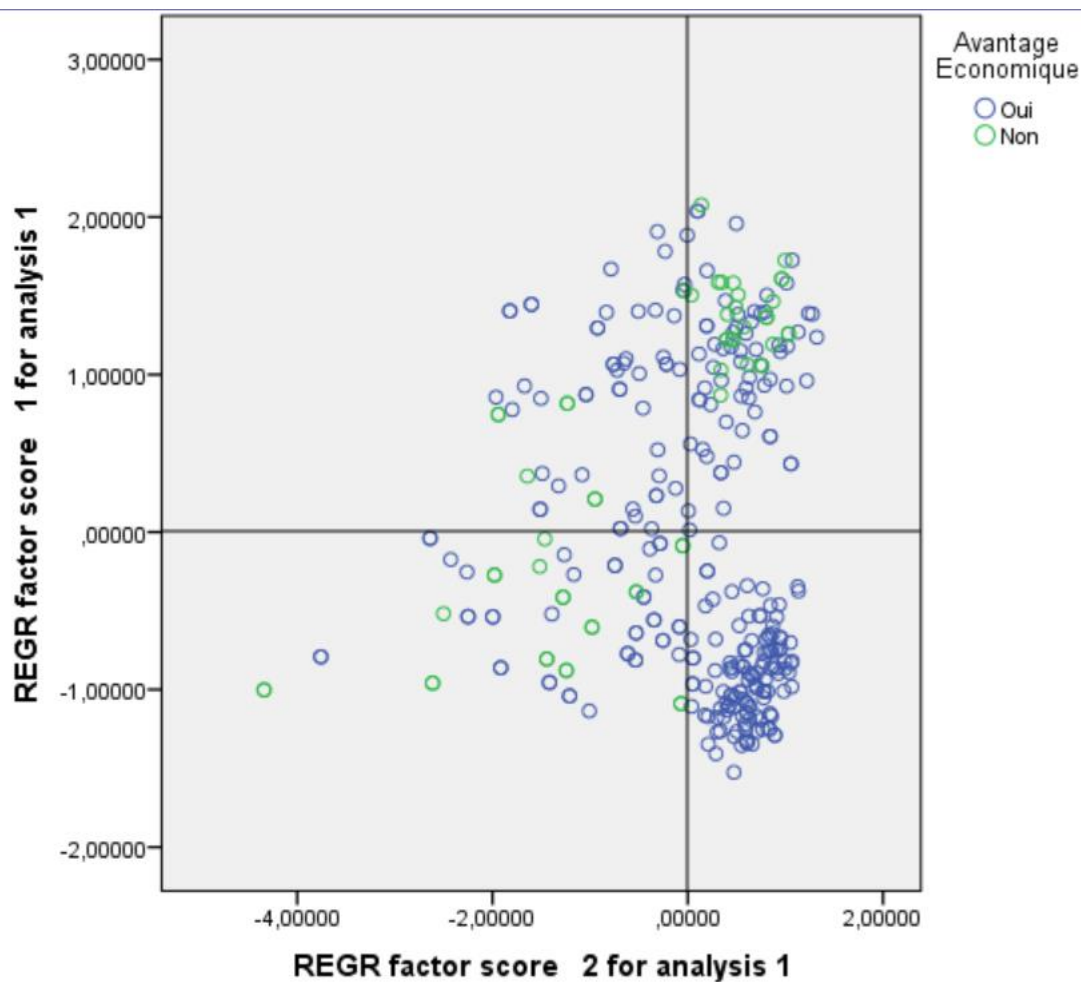
Source: Author, based on study data using SPSS v.26 software

Interpretation:

The figures studied confirm the superior economic impact of producers' (local or foreign) interest in cassava flour, in terms of good prices, in contrast to current stock market results. Proximity to markets also offers advantages such as product availability on store shelves. Other economic advantages include the use of environmentally-friendly packaging and the availability of mass-transportable products.

Graph 6: Projection of individuals on the two factors in the absence of seasonality
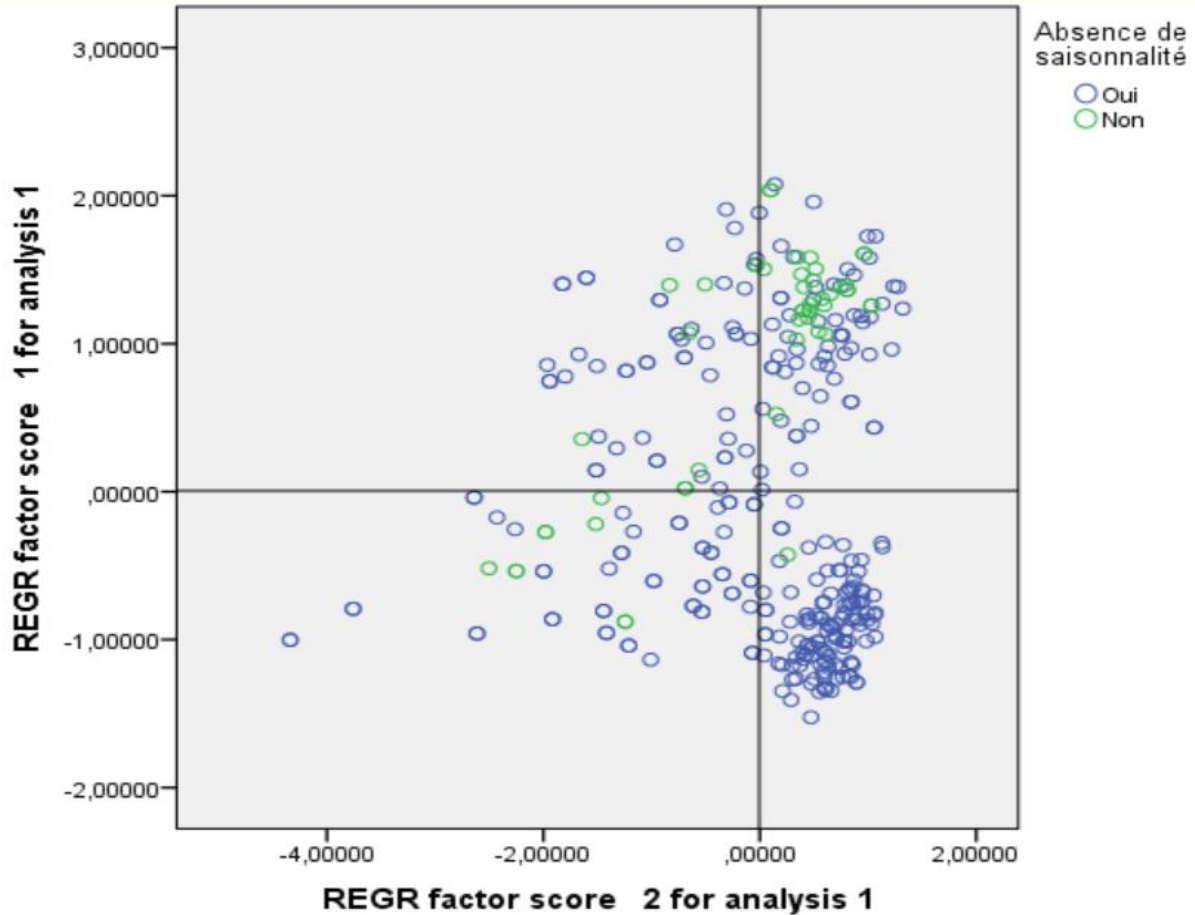
Source: Author, based on study data using SPSS v.26 software

Interpretation:
The population of Tshangu is still very good because of the great economic benefits related to the quality of cassava flour produced by producers (local or foreign) indeed, there is no time to give those who invent to increase their profit, a good profit. It's not like the current business experience on the page. There's also the advantage of proximity to the market, i.e. the availability of products on store shelves.

III.2. Model Estimation Results and Significance Test

III.2.1. Model estimation result
The measurement method chosen for this study is the maximum likelihood (ML) method. This choice is supported by the fact that:

- In logistic regression, horizontal correlations are also used to express the mathematical expectation of the dependent variable as a function of the independent variable. However, the residuals obtained with this strategy do not follow a normal distribution.
- The choice of encoding method is completely arbitrary. For the purposes of this study, we have opted for two numbers, where 0 and 1 represent the values of the dependent variable. This encoding process does not affect the estimation results, as the probability is calculated on the basis of the probability P rather than the conditional expectation.

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
Sexedelenquêté(1)	,668	2912,780	12,000	1	,004	3,720E+21	,000	.
Tranchedâgedelenquêté			,482	4	,975			
Tranchedâgedelenquêté(1)	1,815	36302,159	,000	1	,016	45,380	,000	.
Tranchedâgedelenquêté(2)	2,629	36701,372	24,020	1	,005	3,576E+21	,000	.
Tranchedâgedelenquêté(3)	1,202	36701,373	4,000	1	,003	1,726E+22	,000	.
Tranchedâgedelenquêté(4)	-37,972	45371,149	56,000	1	,003	,000	,000	.
Statutmatrimonial			,000	4	,000			
Statutmatrimonial(1)	1,073	5691,303	17,400	1	,002	2,925	,000	.
Statutmatrimonial(2)	58,627	31069,273	23,006	1	,004	2,893E+25	,000	.
Statutmatrimonial(3)	-15,255	3742,562	7,170	1	,017	,000	,000	.
Statutmatrimonial(4)	-15,333	22737,004	4,000	1	,025	,000	,000	.
Modedapprovisionnementeneau(1)	-1,554	2,843	8,299	1	,585	,211	,001	55,608
Tailleduménage			32,264	4	,020			
Tailleduménage(1)	-32,253	67897,843	43,040	1	,023	,000	,000	.
Tailleduménage(2)	-38,729	17884,797	52,005	1	,002	,000	,000	.
Tailleduménage(3)	-22,828	59725,738	16,004	1	,011	,000	,000	.
Tailleduménage(4)	1,349	2,626	45,264	1	,003	3,852	,022	661,625
Modedéclairage(1)	135,868	61056,945	55,003	1	,002	1,016E+059	,000	.
Nombredenfantenâgedescolarité			1,185	3	,757			
Nombredenfantenâgedescolarité(1)	37,132	18427,656	,000	1	,998	1,338E+16	,000	.
Nombredenfantenâgedescolarité(2)	39,558	18427,656	16,004	1	,998	1,512E+17	,000	.
Nombredenfantenâgedescolarité(3)	33,488	52610,586	,000	1	,999	3,495E+14	,000	.
Stratégiedeprixbas			,000	3	1,000			
Stratégiedeprixbas(1)	82,081	4747,426	,000	1	,986	4,440E+35	,000	.
Stratégiedeprixbas(2)	29,002	1841,672	,000	1	,987	3,941E+12	,000	.
Stratégiedeprixbas(3)	66,377	15193,468	,000	1	,997	6,715E+28	,000	.
Stratégiedehautequalitédesbiens			,588	3	,899			
Stratégiedehautequalitédesbiens(1)	-38,428	7552,870	,000	1	,996	,000	,000	.
Stratégiedehautequalitédesbiens(2)	-2,223	2,900	,588	1	,443	,108	,000	31,850
Stratégiedehautequalitédesbiens(3)	18,262	14275,325	,000	1	,999	85333660,24	,000	.
Stratégiedemaindoeuvrequalifiée			,423	3	,935			
Stratégiedemaindoeuvrequalifiée(1)	-31,217	1841,677	,000	1	,986	,000	,000	.
Stratégiedemaindoeuvrequalifiée(2)	-29,488	1841,674	,000	1	,987	,000	,000	.
Stratégiedemaindoeuvrequalifiée(3)	42,780	53795,846	,000	1	,999	3,795E+18	,000	.
StratégiedinnovationetNTIC			,000	3	1,000			
StratégiedinnovationetNTIC(1)	8,513	17193,012	,000	1	1,000	4980,705	,000	.
StratégiedinnovationetNTIC(2)	39,193	17354,661	,000	1	,998	1,050E+17	,000	.
StratégiedinnovationetNTIC(3)	-99,266	53710,948	,000	1	,999	,000	,000	.

Table 1: Estimation of the logistic model

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
Step 1ª	StratégiederechercheNTIC(5)	99,188	59718,948	,000	1	,999	,000	,000	
	Stratégiederecherchedesnouvellesopportunités			,000	3	1,000			
	Stratégiederecherchedesnouvellesopportunités(1)	28,605	17574,066	,000	1	,999	2,650E+12	,000	.
	Stratégiederecherchedesnouvellesopportunités(2)	-6,614	45368,813	,000	1	1,000	,001	,000	.
	Stratégiederecherchedesnouvellesopportunités(3)	66,693	76636,088	,000	1	,999	9,217E+28	,000	.
	Stratégiedebonnesrelationsaveclespartenairesfinanciers			,000	3	1,000			
	Stratégiedebonnesrelationsaveclespartenairesfinanciers(1)	-15,735	7277,642	,000	1	,998	,000	,000	.
	Stratégiedebonnesrelationsaveclespartenairesfinanciers(2)	16,357	30593,630	,000	1	1,000	12699152,36	,000	.
	Stratégiedebonnesrelationsaveclespartenairesfinanciers(3)	-149,357	119430,736	,000	1	,999	,000	,000	.
	Quelleestlafréquencederenouvellementdestock			,004	4	1,000			
	Quelleestlafréquencederenouvellementdestock(1)	-176,277	147767,755	,000	1	,999	,000	,000	.
	Quelleestlafréquencederenouvellementdestock(2)	-176,388	147767,756	,000	1	,999	,000	,000	.
	Quelleestlafréquencederenouvellementdestock(3)	-238,705	181014,345	,000	1	,999	,000	,000	.
	Quelleestlafréquencederenouvellementdestock(4)	-226,239	170274,759	,000	1	,999	,000	,000	.
	Quelleestlaquantitérécemmentachetée			,000	46	1,000			
	Quelleestlaquantitérécemmentachetée(1)	-18,685	40485,754	8,010	1	,026	,000	,000	.
	Quelleestlaquantitérécemmentachetée(2)	30,226	79979,993	11,010	1	,047	1,340E+13	,000	.
	Quelleestlaquantitérécemmentachetée(3)	-40,008	48434,274	6,010	1	,034	,000	,000	.
	Quelleestlaquantitérécemmentachetée(4)	-20,338	91604,361	8,007	1	,082	,000	,000	.
	Quelleestlaquantitérécemmentachetée(5)	-117,757	55970,231	2,167	1	,083	,000	,000	.
	Quelleestlaquantitérécemmentachetée(6)	37,387	29201,269	6,470	1	,049	1,725E+16	,000	.
	Lieudapprovisionnementoùachetezvoushabituellementvotrefarinedefr			,000	5	1,000			
	Lieudapprovisionnementoùachetezvoushabituellementvotrefarinedefr(1)	107,675	136758,570	,000	1	,999	5,789E+046	,000	.
	Lieudapprovisionnementoùachetezvoushabituellementvotrefarinedefr(2)	77,210	57630,926	,000	1	,999	3,401E+33	,000	.
	Lieudapprovisionnementoùachetezvoushabituellementvotrefarinedefr(3)	34,194	29535,227	,000	1	,999	7,085E+14	,000	.
	Lieudapprovisionnementoùachetezvoushabituellementvotrefarinedefr(4)	-14,568	1351,952	,000	1	,991	,000	,000	.
	Lieudapprovisionnementoùachetezvoushabituellementvotrefarinedefr(5)	44,169	29146,937	,000	1	,999	1,521E+19	,000	.
	Economique(1)	1,094	17684,922	,000	1	,034	2,988	,000	.
	Créationdesemplois			,000	2	1,000			
	Créationdesemplois(1)	-82,724	103281,890	,000	1	,024	,000	,000	.
	Créationdesemplois(2)	1,718	75677,012	,000	1	,042	5,576	,000	.
	Absencedesaisonnalité			,000	2	,040			
	Absencedesaisonnalité(1)	-20,395	89265,779	,000	1	,011	,000	,000	.
	Absencedesaisonnalité(2)	16,943	72269,756	,000	1	,041	1,594	,000	.
	StabilitédesPrix			,000	2	,000			
	StabilitédesPrix(1)	-21,674	54983,042	,000	1	,011	,000	,000	.
	StabilitédesPrix(2)	-12,587	38111,139	,000	1	,007	,000	,000	.
	DisponibilitéduProduitmêmecontresaison			,000	2	1,000			
	DisponibilitéduProduitmêmecontresaison(1)	34,106	37077,219	,000	1	,027	6,488E+14	,000	.
	DisponibilitéduProduitmêmecontresaison(2)	39,164	51453,473	,000	1	,014	1,020E+17	,000	.
	Hygiénique			,000	2	,000			
	Hygiénique(1)	-1,656	18345,083	,000	1	,019	,191	,000	.
	Hygiénique(2)	-26,966	43127,842	,000	1	,025	,000	,000	.
	Constant	-97,986	191098,864	,000	1	1,000	,000		

a. Variable(s) entered on step 1: Sexedelenquêté, Tranchedâgedelenquêté, Statutmatrimonial, Modedapprovisionnementeneau, Tailleduménage, Modedéclairage, Nombredenfantenâgedescolarité, Stratégiedeprixbas, Stratégiedehautequalitédesbiens, Stratégiedemaindoeuvrequalifiée, StratégiedinnovationetNTIC, Stratégiederecherchedesnouvellesopportunités, Stratégiedebonnesrelationsaveclespartenairesfinanciers, Quelleestlafréquencederenouvellementdestock, Quelleestlaquantitérécemmentachetée, Lieudapprovisionnementoùachetezvoushabituellementvotrefarinedefr, Economique, Créationdesemplois, Absencedesaisonnalité, StabilitédesPrix, DisponibilitéduProduitmêmecontresaison, Hygiénique, start.

Source: Author, estimation using SPSS v.26 software

This table gives us an idea of the impact of important elements of economic democracy on PFM. We note that both global and individual factors have an impact on PFM. Some factors have a negative impact, such as people aged 60 and over, families between 2 and over 11 people, job creation, rising prices, good deals, skilled labor - skilled workers, the presence of time and cleanliness. Other variables also have a negative impact, such as gender, age 24-60, married and divorced people, number of students, new market opportunities, NTIC plan, lack of time, availability of products in Off Time and supply areas. These results support our first hypothesis.

III.2.2. Overall significance test of the model

We're still making the same assumptions:

$$L = -2\ln\left(\frac{lac}{lsc}\right) = -2(LL_{ac} - LL_{sc})\text{tends towards}X^2a, n$$

$$LR\ Stat = 19{,}80$$

$$Prob = 0{,}0186$$

Examining the potential of this reduced model, we find that the variables in the model have general significance, which collectively and independently have a positive effect on thinking about PFM. The results support our first hypothesis that collective and individual factors have a positive effect on attitudes towards PFM.

III.2.3. Model fit and specification testing

This test assumes that the model is well specified and that no independent variable can be found that is statistically significant.

H0: Model is fully specified

H1: The model is not fully specified.

Table 4.85. Model fit and specification tests

```
Logistic model for OpinionPRR

                 -------- True --------
Classified |          D              ~D   |       Total
-----------+-----------------------------+-----------
    +      |          40             3    |          43
    -      |          1              2    |          3
-----------+-----------------------------+-----------
  Total    |          41             5    |          46

Classified + if predicted Pr(D) >= .5
True D defined as OpinionPRR != 0
----------------------------------------------------
Sensitivity                     Pr( +| D)     97.56%
Specificity                     Pr( -|~D)     40.00%
Positive predictive value       Pr( D| +)     93.02%
Negative predictive value       Pr(~D| -)     66.67%
----------------------------------------------------
False + rate for true ~D        Pr( +|~D)     60.00%
False - rate for true D         Pr( -| D)      2.44%
False + rate for classified +   Pr(~D| +)      6.98%
False - rate for classified -   Pr( D| -)     33.33%
----------------------------------------------------
Correctly classified                          91.30%
----------------------------------------------------
```

The proportion of correct predictions is 91.30%.

With a specification of 91.30%, this shows that the reasons why manufacturers prefer cassava flour can be explained by other variables in addition to the 11 we analyzed.

Graphique 4.13. : Graphique de specification et sensibilite
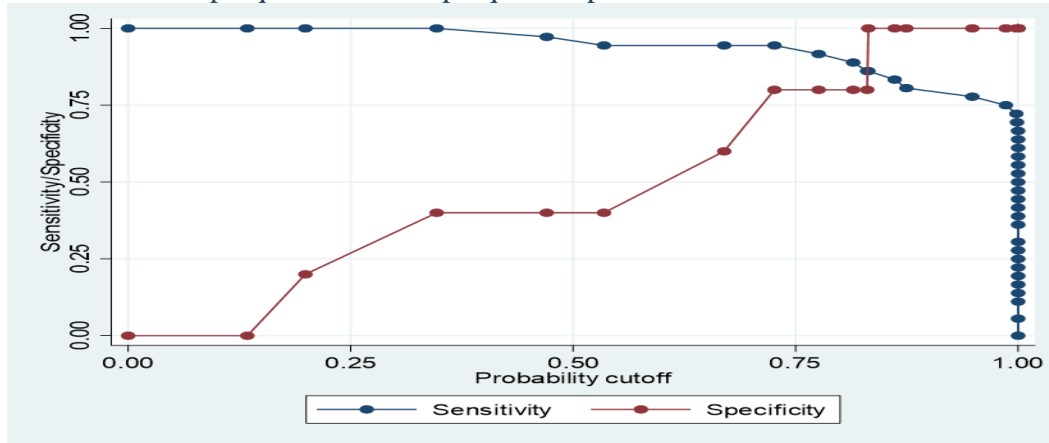


```
. estat gof

Goodness-of-fit test after logistic model
Variable: fd

        Number of observations =      31
Number of covariate patterns =      30
           Pearson chi2(10) =  29.25
              Prob > chi2 = 0.0011
```

Source: Author, our estimates based on stata 17.1 software

This diagram illustrates how the decrease in receptivity can impact the variable under analysis. This decrease is evaluated in terms of an unfavorable variation in an explanatory variable, while a favorable variation is observed in terms of specificity, since certain variables in the model have significance.

Area under ROC curve = 0.9500
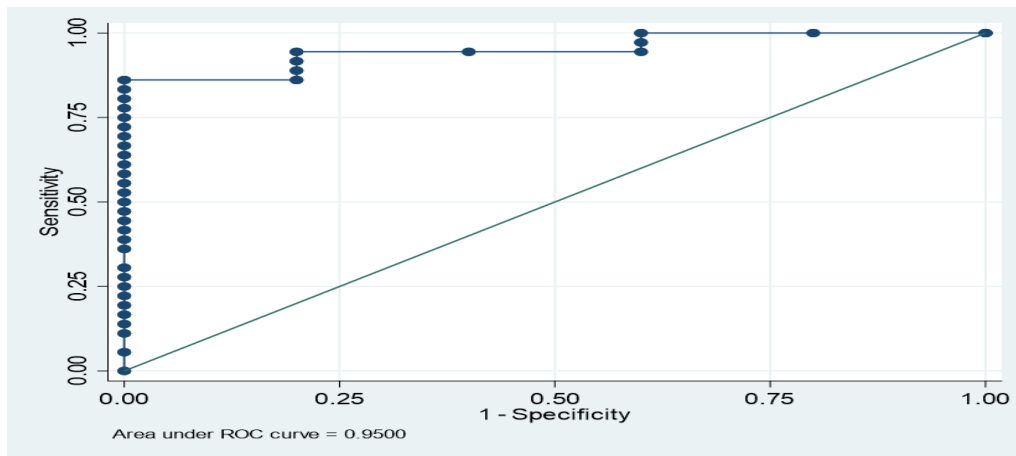
The area under the ROC curve is an estimator of the overall effectiveness of the test; if the test is not informative, the area is ½. If the test is perfectly discriminative, the area will be 1.

```
Logistic model for OpinionPRR

number of observations =        46
area under ROC curve    =    0.9317
```

A more precise rule for assessing this adjustment. For an area between:

0.90 and 1 excellent discrimination
0.80-0.90 good discrimination
0.70-0.80 poor discrimination
0.60-0.70 very poor discrimination
0.50-0.60 poor discrimination

The area given by our analysis is 0.9317, between 0.9 and 1, which is excellent discrimination. So the fit is much more precise.

Conclusion
In this study, we set out to explain the notion of consumer interest in the Democratic Republic of Congo, and more specifically in Kinshasa. In particular, we have confirmed the relationship between individual and collective factors on the one hand, and preference for cassava flour on the other. There is reason to believe that this research has succeeded in identifying the relationship between tobacco addiction and personal belonging. However, collective factors do not affect this variable in the same way. The study indicates that some factors have a negative impact, such as people aged 61 and over, and family sizes of 11 and over. On the other hand, others have a positive effect, such as the sex of the respondent, the number of children in school, the availability of products, family sizes ranging from 4 to 6 people and gender roles.

This study has certain limitations, mainly due to the size of the sample used, and the answers given by respondents may be subjective and have an impact on the final results. Despite this, it provides an initial response to the factors that determine interest in cassava flour in the DRC, and particularly in the city of Kinshasa.

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