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Neutrosophic Analysis of the Determinants of the Restoration of Democracy

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Abstract. The emergence of a republic is characterized by achieving and reaching democracy, in a popular, representative, and responsible way. Although the country has been involved in anti-democratic coups that perpetuate the use of force, guidelines must be drawn to achieve democratic stability. It should be noted that over the years democracy has evolved and even in the 21st century each person, institution or nation has a different way of seeing its meaning. Throughout its republican life, Ecuador has had variations in the stability of democracy in society. Therefore, this paper focuses on analyzing the stability levels of democracy in Ecuadorian society. For the modeling of the study, the use of neutrosophic statistics is necessary due to the variation of the variable. As a result of the study, the deterioration of civil rights was determined as a key neutrosophic factor in the stability of democracy in society.

Keywords: democracy, neutrosophic statistics, society.

1 Introduction

The progress of society is built on fundamental pillars, among them, democracy stands out as progress among nations. A democratic, popular, representative, and responsible government is characterized by the election of authorities through direct and secret elections. Each democratic state is based on the recognition of guarantees or individual freedoms. Among the functions of the State are the executive, the legislative, and the judicial to direct a country that enjoys its rights [1].

The stability of democracy can be affected by causes that threaten the progress of society, such as:

- economic crisis [2],
- impoverishment,
- loss of monetary sovereignty,
- loss of social legitimacy of governments,
- institutions and parties,
- political instability,
- massive social protests,
- resounding fall of presidents,
- subjection to the directing role of the armed forces,
- corruption scandals,
- former rulers imprisoned or prosecuted,
- neoliberalism, and
- populism.

The stability of democracy positively influences society. Democracy allows the emergence and fulfillment of social rights related to family, work, property, education, and culture for marginalized sectors [3]. Minorities in society manage to achieve representation in congress. To achieve democracy, the relation of the electoral court must be independent of the executive, which allows future fraud to be reduced.

The court of Constitutional Guarantees is in charge of interpreting the Constitution, resolving conflicts between the Powers of the State, and determining the constitutionality of laws. Human rights and protection of society. The inclusion in the Electoral Court of political parties creates the necessary conditions for economic, social, and cultural development.

Therefore, the relationship between democracy and society requires defining in the study as:

- Main objective: to analyze the stability levels of democracy in Ecuadorian society.
- Specific objectives:
  - ❖ Factors Influencing the Stability of Democracy in Society
  - ❖ Carry out the measurement and modeling of the variable
  - ❖ Propose solutions to achieve a solid democracy based on the predominant neutrosophic factor

2 Materials and methods

2.1Neutrosophic Statistics

Neutrosophic probabilities and statistics are a generalization of classical and imprecise probabilities and statistics. The Neutrosophic Probability of an event E is the probability that the event E occurs [4], [16], the probability that the event E does not occur, and the probability of indeterminacy (not knowing if the event E occurs or not [5], [9], [15]. In classical probability nsup≤1, while in neutrosophic probability nsup≤3+.

The function that models the neutrosophic probability of a random variable x is called the neutrosophic distribution:

$$NP(x) = (T(x), I(x), F(x)),$$

Where T(x) represents the probability that value x occurs, F(x) represents the probability that value x does not occur, and I(x) represents the undetermined or unknown probability of value x.

Neutrosophic Statistics is the analysis of neutrosophic events and deals with neutrosophic numbers, neutrosophic probability distribution, neutrosophic estimation, neutrosophic regression [6], [10], [11], [14], etc. It refers to a set of data, which is formed totally or partially by data with some degree of indeterminacy and to the methods to analyze them.

Neutrosophic statistical methods allow neutrosophic data (data that may be ambiguous, vague, imprecise, incomplete, or even unknown) to be interpreted and organized to reveal underlying patterns. [18], [19]

Finally, Neutrosophic Logic, Neutrosophic Ensembles, and Neutrosophic Probabilities and Statistics have a wide application in various research fields and constitute a novel study reference in full development.

Neutrosophic Descriptive Statistics comprises all the techniques for summarizing and describing the characteristics of neutrosophic numerical data.

Neutrosophic Numbers are numbers of the form $N = a + bI$ where a and b are real or complex numbers, while "I" is the indeterminacy part of the neutrosophic number N..

The study of neutrosophic statistics refers to a neutrosophic random variable where X_l and $X_u I_N$ represents the lower and correspondingly higher level that the studied variable can reach, in an indeterminate interval $[I_l, I_u]$. Follow the neutrosophic mean of the variable ($\bar{x}_N$) by formulating:

$$X_N = X_l + X_u I_N;\ I_N \in [I_l, I_u] \tag{1}$$

$$\text{Where, } \bar{x}_a = \frac{1}{n_N}\sum_{i=1}^{n_N} X_{il}\ \bar{x}_b = \frac{1}{n_N}\sum_{i=1}^{n_N} X_{iu}\ n_N \in [n_l, n_u] \tag{2}$$

Additionally, for statistical processing, the following formula was used to calculate the neutrosophic random sample size.

$$n = \frac{ZNpq}{E^2(N-1) + Z^2pq} \tag{3}$$

Where, n: is the sample size, Z: the value of the normal distribution with the assigned confidence level, E is: desired sample error, N: is the population size. However, for the calculation of neutral squares (NNS) it can be calculated as follows.

$$\sum_{i=1}^{n} N(X_i - \bar{X}_{iN})^2 = \sum_{i=1}^{n} N\left[\begin{matrix}\min\begin{pmatrix}(a_i + b_iI_L)(\bar{a} + \bar{b}I_L), (a_i + b_iI_L)(\bar{a} + \bar{b}I_U)\\ (a_i + b_iI_U)(\bar{a} + \bar{b}I_L), (a_i + b_iI_U)(\bar{a} + \bar{b}I_U)\end{pmatrix}\\ \max\begin{pmatrix}(a_i + b_iI_L)(\bar{a} + \bar{b}I_L), (a_i + b_iI_L)(\bar{a} + \bar{b}I_U)\\ (a_i + b_iI_U)(\bar{a} + \bar{b}I_L), (a_i + b_iI_U)(\bar{a} + \bar{b}I_U)\end{pmatrix}\end{matrix}\right], I \in [I_L, I_U] \tag{4}$$

Where $a_i = X_l b_i = X_u$. The variance of the neutrosophic sample can be calculated by

$$S_N^2 = \frac{\sum_{i=1}^{n_N}(X_i - \bar{X}_{iN})^2}{n_N};\ S_N^2 \in [S_L^2, S_U^2] \tag{5}$$

The neutrosophic coefficient (NCV) measures the consistency of the variable. The lower the value of the NCV,

the more consistent the performance of the factor is than that of the other factors. The NCV can be calculated as follows.

$$CV_N = \frac{\sqrt{S_N^2}}{\bar{X}_N} \times 100;\ CV_N \in [CV_L, CV_U] \tag{6}$$

The neutrosophic argumentation coefficient evaluates the criteria through Linguistic Terms with SVNN of consensus of justification of the expert opinion, (see table 1).

Linguistic term	SVNN
No Deterioration (NI)	(1,0.05,0)
Almost No Deterioration (ANI)	(0.9,0.12,0.15)
Very Low Deterioration (VLD)	(0.8,0.15,0.25)
Low Deterioration (LD)	(0.7,0.3,0.4)
Slight Deterioration (SD)	(0.6,0.35,0.5)
Deteriorated (D)	(0.5,0.45,0.53)
Fairly Deteriorated (MI)	(0.4,0.5,0.55)
Severely Deteriorated (SI)	(0.3,0.75,0.8)
Very Deteriorated (VI)	(0.2,0.8,0.85)
High Deterioration (HD)	(0.1,0.9,0.95)
Extremely Deteriorated (EI)	(0,0.95,1)

Table 1: Linguistic terms that represent the weight of the factors

3 Method development

3.1 Data Collection

For the study, the sample size of respondents is decided using equation 3, which is taken as 50% or 0.05 probabilities, according to the following results:

The maximum margin of error admitted = 10.0%

- Population size = 460
- Size for a confidence level of 95% …… 80
- Size for a confidence level of 97% …… 94
- Size for a confidence level of 99% …… 122

It is decided to work with 95% confidence, so surveys will be applied to determine the level of stability of democracy in society. To do this, the criteria of 80 respondents from the Universidad de Los Andes are evaluated.

Step 2: Groups of experts: 2 groups of 25 and one of 30 according to their specialty (total 80)

- Group of experts in political terms,
- Group of experts on the history and evolution of democracy in society,
- Group of legal experts.

The variability of the data and criteria obtained conditions the use of neutrosophic statistics. The level of instability of democracy characterized by experts denotes indeterminate random components. The existence of variability of similar responses [7], [8], [12], [13], [17], but with representative neutrosophic degrees makes the use of classical statistics impossible.

3.2 Development of the Method

For the neutrosophic statistical modeling, the experts select five factors as neutrosophic sets and their study subsets (elements associated with the relationship between democracy and society), based on defining the variable to be studied (table 2).

Variable	Coding	Sample factor	Scale
Stability levels of democracy in society	SDS	[0;80]	$[0;\ 1], \forall\ F_n$ RCD = 0 (false) RCD = 1 (True) $DCR \neq 0.5$(Existing indeterminacy in EIS)

Table 2: Characteristics of the variable. Source: own elaboration.

The data obtained may be subject to change based on changes in society and its political activity. The statistical information contributions in university studies of the Universidad de Los Andes recommend that the achievements of democracy in society are subject to change. For the development of the study, the factors that affect the stability of democracy in society were visualized (see table 3).

Factor	root causes	De-gree	Relation between factor and set	Scale	Element Decision Acceptance Range
F1	Impairment of the right to a healthy environment	P	Neutrosophic set: (exploitation of resources; ecosystem risk)	[0 ; 1]	Subsets: • Exploitation level (high, medium, low, or none) • Risk index (high, medium, low, or none)
F2	Impairment of civil rights	E	Neutrosophic set: (repression of society, discrimination)	[0 ; 1]	Subsets: • Repression index (high, medium, low, or none) • Discrimination (occasional, medium, continuous)
F3	political disaffection	O	Neutrosophic set: (political corruption; political credibility)	[0 ; 1]	Subsets: • Corruption (low, medium, high) • Credibility (yes, apparent doubt, no)
F4	Worsening of the economic crisis	G	Neutrosophic set: (indebtedness and corruption)	[0 ; 1]	Subsets: • Debts with creditors (with negative impacts on the economy, non-payment, opening of investments) • Corruption (economic policies for empathy, bribes, for campaign support)
F5	Violation of regulations	C	Neutrosophic set: (constitutional weakness; relaxation of regulations)	[0 ; 1]	Subsets: • Weakness (violation, reforms, or drafts) • Flexibility (legal disability)

Table 3: Factors influencing the stability of democracy in society. Source: own elaboration.

For the development of the neutrosophic statistical study, it is recommended by the experts to analyze the variation in the stability of democracy in different periods in Ecuador. Studies in historical periods are associated, with the statistical bases and the surveys carried out (table 4). The answers must be obtained in neutrosophic terms for the modeling of the variable. Linguistic terms are converted to neutrosophic numbers as appropriate (see table 1).

No	F1	F2	F3	F4	F5
1	[(0.4,0.5,0.55);(1,0.05,0)]	[(0.4,0.5,0.55);(1,0.05,0)]	[(0,0.95,1);(0.1,0.9,0.95)]	[(0.2,0.8,0.85);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.7,0.3,0.4)]
2	[(0.4,0.5,0.55);(1,0.05,0)]	[(0.4,0.5,0.55);(0.7,0.3,0.4)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.3,0.75,0.8);(0.8,0.15,0.25)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]
3	[(0.4,0.5,0.55);(0.6,0.35,0.5)]	[(0.4,0.5,0.55);(0.7,0.3,0.4)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.2,0.8,0.85);(0.6,0.35,0.5)]	[(0.1,0.9,0.95);(0.1,0.9,0.95)]
4	[(0.4,0.5,0.55);(0.6,0.35,0.5)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.1,0.9,0.95);(0.4,0.5,0.55)]
5	[(0,0.95,1);(0.3,0.75,0.8)]	[(0,0.95,1);(0.2,0.8,0.85)]	[(0,0.95,1);(0.1,0.9,0.95)]	[(0,0.95,1);(0.2,0.8,0.85)]	[(0,0.95,1);(0.1,0.9,0.95)]
6	[(0,0.95,1);(0.2,0.8,0.85)]	[(0.2,0.8,0.85);(0.7,0.3,0.4)]	[(0.1,0.9,0.95);(0.2,0.8,0.85)]	[(0.4,0.5,0.55);(1,0.05,0)]	[(0.3,0.75,0.8);(0.8,0.15,0.25)]
7	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.8,0.15,0.25)]	[(0.2,0.8,0.85);(0.7,0.3,0.4)]	[(0.4,0.5,0.55);(0.9,0.12,0.15)]	[(0.1,0.9,0.95);(0.4,0.5,0.55)]
8	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.9,0.12,0.15)]	[(0,0.95,1);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.8,0.15,0.25)]	[(0.1,0.9,0.95);(0.2,0.8,0.85)]

9	[(0.1,0.9,0.95);(0.1,0.9,0.95)]	[(0.4,0.5,0.55);(1,0.05,0)]	[(0.1,0.9,0.95);(0.6,0.35,0.5)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]
10	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0,0.95,1);(0.3,0.75,0.8)]	[(0.1,0.9,0.95);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]
11	[(0.2,0.8,0.85);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(1,0.05,0)]	[(0.1,0.9,0.95);(0.2,0.8,0.85)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.2,0.8,0.85);(0.3,0.75,0.8)]
12	[(0.1,0.9,0.95);(0.1,0.9,0.95)]	[(0.4,0.5,0.55);(0.8,0.15,0.25)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.2,0.8,0.85);(0.6,0.35,0.5)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]
13	[(0,0.95,1);(0.4,0.5,0.55)]	[(0.1,0.9,0.95);(0.3,0.75,0.8)]	[(0.2,0.8,0.85);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.7,0.3,0.4)]	[(0,0.95,1);(0.1,0.9,0.95)]
14	[(0.2,0.8,0.85);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.1,0.9,0.95);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.1,0.9,0.95);(0.6,0.35,0.5)]
15	[(0.2,0.8,0.85);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.8,0.15,0.25)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.3,0.75,0.8);(0.7,0.3,0.4)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]
16	[(0,0.95,1);(0.2,0.8,0.85)]	[(0,0.95,1);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.6,0.35,0.5)]	[(0.1,0.9,0.95);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.7,0.3,0.4)]
17	[(0.4,0.5,0.55);(0.7,0.3,0.4)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0,0.95,1);(0.1,0.9,0.95)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(1,0.05,0)]
18	[(0,0.95,1);(0.2,0.8,0.85)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.7,0.3,0.4)]	[(0.1,0.9,0.95);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.7,0.3,0.4)]
19	[(0.2,0.8,0.85);(0.2,0.8,0.85)]	[(0,0.95,1);(0.3,0.75,0.8)]	[(0.2,0.8,0.85);(0.2,0.8,0.85)]	[(0,0.95,1);(0.1,0.9,0.95)]	[(0.3,0.75,0.8);(0.7,0.3,0.4)]
20	[(0.2,0.8,0.85);(0.3,0.75,0.8)]	[(0.2,0.8,0.85);(0.2,0.8,0.85)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.2,0.8,0.85);(0.6,0.35,0.5)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]
21	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.3,0.75,0.8);(0.9,0.12,0.15)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(1,0.05,0)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]
22	[(0.3,0.75,0.8);(0.7,0.3,0.4)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.1,0.9,0.95);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.6,0.35,0.5)]
23	[(0.4,0.5,0.55);(1,0.05,0)]	[(0.1,0.9,0.95);(0.3,0.75,0.8)]	[(0,0.95,1);(0,0.95,1)]	[(0.1,0.9,0.95);(0.2,0.8,0.85)]	[(0,0.95,1);(0.3,0.75,0.8)]
24	[(0.4,0.5,0.55);(0.9,0.12,0.15)]	[(0,0.95,1);(0.4,0.5,0.55)]	[(0.2,0.8,0.85);(0.7,0.3,0.4)]	[(0.3,0.75,0.8);(0.7,0.3,0.4)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]
25	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0,0.95,1);(0,0.95,1)]	[(0.1,0.9,0.95);(0.2,0.8,0.85)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]
26	[(0.1,0.9,0.95);(0.3,0.75,0.8)]	[(0,0.95,1);(0.2,0.8,0.85)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(1,0.05,0)]
27	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.2,0.8,0.85);(0.3,0.75,0.8)]	[(0.1,0.9,0.95);(0.1,0.9,0.95)]	[(0.3,0.75,0.8);(0.7,0.3,0.4)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]
28	[(0.4,0.5,0.55);(0.8,0.15,0.25)]	[(0.1,0.9,0.95);(0.2,0.8,0.85)]	[(0.4,0.5,0.55);(0.8,0.15,0.25)]	[(0.3,0.75,0.8);(0.8,0.15,0.25)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]
29	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.1,0.9,0.95);(0.6,0.35,0.5)]	[(0.1,0.9,0.95);(0.6,0.35,0.5)]	[(0.3,0.75,0.8);(0.8,0.15,0.25)]	[(0.4,0.5,0.55);(0.9,0.12,0.15)]
30	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.9,0.12,0.15)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.4,0.5,0.55);(1,0.05,0)]	[(0.1,0.9,0.95);(0.3,0.75,0.8)]
31	[(0.1,0.9,0.95);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(0.6,0.35,0.5)]	[(0.1,0.9,0.95);(0.2,0.8,0.85)]	[(0.2,0.8,0.85);(0.2,0.8,0.85)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]
32	[(0,0.95,1);(0,0.95,1)]	[(0.1,0.9,0.95);(0.1,0.9,0.95)]	[(0.2,0.8,0.85);(0.4,0.5,0.55)]	[(0.2,0.8,0.85);(0.4,0.5,0.55)]	[(0.1,0.9,0.95);(0.2,0.8,0.85)]
33	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0,0.95,1);(0,0.95,1)]	[(0,0.95,1);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.7,0.3,0.4)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]
34	[(0,0.95,1);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0,0.95,1);(0.2,0.8,0.85)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]
35	[(0,0.95,1);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.1,0.9,0.95);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.7,0.3,0.4)]
36	[(0.2,0.8,0.85);(0.3,0.75,0.8)]	[(0.2,0.8,0.85);(0.7,0.3,0.4)]	[(0.1,0.9,0.95);(0.3,0.75,0.8)]	[(0,0.95,1);(0,0.95,1)]	[(0.4,0.5,0.55);(1,0.05,0)]
37	[(0.3,0.75,0.8);(0.7,0.3,0.4)]	[(0,0.95,1);(0.3,0.75,0.8)]	[(0.2,0.8,0.85);(0.6,0.35,0.5)]	[(0.3,0.75,0.8);(0.9,0.12,0.15)]	[(0.3,0.75,0.8);(0.8,0.15,0.25)]
38	[(0.2,0.8,0.85);(0.7,0.3,0.4)]	[(0,0.95,1);(0,0.95,1)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]

39	[(0.3,0.75,0.8);(0.7,0.3,0.4)]	[(0,0.95,1);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.1,0.9,0.95);(0.3,0.75,0.8)]	[(0.1,0.9,0.95);(0.6,0.35,0.5)]
40	[(0,0.95,1);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(1,0.05,0)]	[(0.4,0.5,0.55);(0.7,0.3,0.4)]	[(0.3,0.75,0.8);(0.7,0.3,0.4)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]
41	[(0.3,0.75,0.8);(0.7,0.3,0.4)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.1,0.9,0.95);(0.3,0.75,0.8)]	[(0,0.95,1);(0,0.95,1)]	[(0,0.95,1);(0.2,0.8,0.85)]
42	[(0.4,0.5,0.55);(0.8,0.15,0.25)]	[(0.1,0.9,0.95);(0.4,0.5,0.55)]	[(0.2,0.8,0.85);(0.7,0.3,0.4)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0,0.95,1);(0.4,0.5,0.55)]
43	[(0.1,0.9,0.95);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.1,0.9,0.95);(0.1,0.9,0.95)]	[(0.3,0.75,0.8);(0.8,0.15,0.25)]	[(0.3,0.75,0.8);(0.9,0.12,0.15)]
44	[(0.4,0.5,0.55);(0.6,0.35,0.5)]	[(0.3,0.75,0.8);(0.8,0.15,0.25)]	[(0.4,0.5,0.55);(0.9,0.12,0.15)]	[(0.2,0.8,0.85);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.9,0.12,0.15)]
45	[(0.4,0.5,0.55);(0.8,0.15,0.25)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0,0.95,1);(0,0.95,1)]	[(0.4,0.5,0.55);(0.7,0.3,0.4)]	[(0,0.95,1);(0.1,0.9,0.95)]
46	[(0.4,0.5,0.55);(1,0.05,0)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.1,0.9,0.95);(0.6,0.35,0.5)]	[(0.2,0.8,0.85);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(0.6,0.35,0.5)]
47	[(0.2,0.8,0.85);(0.3,0.75,0.8)]	[(0.1,0.9,0.95);(0.4,0.5,0.55)]	[(0.2,0.8,0.85);(0.6,0.35,0.5)]	[(0.1,0.9,0.95);(0.1,0.9,0.95)]	[(0.1,0.9,0.95);(0.6,0.35,0.5)]
48	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.2,0.8,0.85);(0.6,0.35,0.5)]	[(0.2,0.8,0.85);(0.2,0.8,0.85)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.2,0.8,0.85);(0.2,0.8,0.85)]
49	[(0.1,0.9,0.95);(0.2,0.8,0.85)]	[(0.1,0.9,0.95);(0.2,0.8,0.85)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.9,0.12,0.15)]	[(0.1,0.9,0.95);(0.3,0.75,0.8)]
50	[(0.1,0.9,0.95);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.1,0.9,0.95);(0.3,0.75,0.8)]	[(0,0.95,1);(0.2,0.8,0.85)]	[(0.2,0.8,0.85);(0.4,0.5,0.55)]
51	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.1,0.9,0.95);(0.1,0.9,0.95)]	[(0.2,0.8,0.85);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.4,0.5,0.55);(1,0.05,0)]
52	[(0,0.95,1);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.9,0.12,0.15)]	[(0.4,0.5,0.55);(1,0.05,0)]	[(0.4,0.5,0.55);(0.8,0.15,0.25)]	[(0.4,0.5,0.55);(1,0.05,0)]
53	[(0.4,0.5,0.55);(0.6,0.35,0.5)]	[(0.3,0.75,0.8);(0.9,0.12,0.15)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.1,0.9,0.95);(0.6,0.35,0.5)]	[(0.4,0.5,0.55);(0.6,0.35,0.5)]
54	[(0.3,0.75,0.8);(0.9,0.12,0.15)]	[(0.3,0.75,0.8);(0.8,0.15,0.25)]	[(0.4,0.5,0.55);(0.8,0.15,0.25)]	[(0.1,0.9,0.95);(0.3,0.75,0.8)]	[(0.2,0.8,0.85);(0.6,0.35,0.5)]
55	[(0.3,0.75,0.8);(0.8,0.15,0.25)]	[(0,0.95,1);(0.3,0.75,0.8)]	[(0,0.95,1);(0.2,0.8,0.85)]	[(0,0.95,1);(0.1,0.9,0.95)]	[(0.1,0.9,0.95);(0.1,0.9,0.95)]
56	[(0.1,0.9,0.95);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.9,0.12,0.15)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]
57	[(0.3,0.75,0.8);(0.7,0.3,0.4)]	[(0.2,0.8,0.85);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0,0.95,1);(0,0.95,1)]
58	[(0.1,0.9,0.95);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.2,0.8,0.85);(0.7,0.3,0.4)]	[(0.4,0.5,0.55);(0.9,0.12,0.15)]	[(0.4,0.5,0.55);(0.9,0.12,0.15)]
59	[(0.1,0.9,0.95);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.9,0.12,0.15)]	[(0.2,0.8,0.85);(0.6,0.35,0.5)]	[(0,0.95,1);(0.1,0.9,0.95)]	[(0.2,0.8,0.85);(0.3,0.75,0.8)]
60	[(0.3,0.75,0.8);(0.7,0.3,0.4)]	[(0.2,0.8,0.85);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.8,0.15,0.25)]	[(0.2,0.8,0.85);(0.3,0.75,0.8)]	[(0,0.95,1);(0,0.95,1)]
61	[(0,0.95,1);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.9,0.12,0.15)]	[(0.1,0.9,0.95);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(0.8,0.15,0.25)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]
62	[(0.4,0.5,0.55);(0.7,0.3,0.4)]	[(0.3,0.75,0.8);(0.8,0.15,0.25)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0,0.95,1);(0,0.95,1)]	[(0.1,0.9,0.95);(0.2,0.8,0.85)]
63	[(0.4,0.5,0.55);(0.9,0.12,0.15)]	[(0.4,0.5,0.55);(0.7,0.3,0.4)]	[(0,0.95,1);(0.3,0.75,0.8)]	[(0,0.95,1);(0,0.95,1)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]
64	[(0,0.95,1);(0.2,0.8,0.85)]	[(0.2,0.8,0.85);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.8,0.15,0.25)]	[(0,0.95,1);(0.2,0.8,0.85)]	[(0.1,0.9,0.95);(0.1,0.9,0.95)]
65	[(0.1,0.9,0.95);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(0.8,0.15,0.25)]	[(0.2,0.8,0.85);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]
66	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0,0.95,1);(0.4,0.5,0.55)]	[(0.1,0.9,0.95);(0.6,0.35,0.5)]	[(0.3,0.75,0.8);(0.8,0.15,0.25)]	[(0,0.95,1);(0.3,0.75,0.8)]
67	[(0.2,0.8,0.85);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(0.6,0.35,0.5)]	[(0,0.95,1);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.6,0.35,0.5)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]
68	[(0.3,0.75,0.8);(0.8,0.15,0.25)]	[(0.4,0.5,0.55);(0.8,0.15,0.25)]	[(0.1,0.9,0.95);(0.2,0.8,0.85)]	[(0,0.95,1);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]

69	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.2,0.8,0.85);(0.7,0.3,0.4)]	[(0,0.95,1);(0.2,0.8,0.85)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.2,0.8,0.85);(0.4,0.5,0.55)]
70	[(0.1,0.9,0.95);(0.1,0.9,0.95)]	[(0.3,0.75,0.8);(0.8,0.15,0.25)]	[(0.2,0.8,0.85);(0.4,0.5,0.55)]	[(0,0.95,1);(0.1,0.9,0.95)]	[(0.1,0.9,0.95);(0.2,0.8,0.85)]
71	[(0.2,0.8,0.85);(0.6,0.35,0.5)]	[(0.3,0.75,0.8);(0.9,0.12,0.15)]	[(0.2,0.8,0.85);(0.3,0.75,0.8)]	[(0,0.95,1);(0.3,0.75,0.8)]	[(0.4,0.5,0.55);(0.9,0.12,0.15)]
72	[(0.3,0.75,0.8);(0.7,0.3,0.4)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.2,0.8,0.85);(0.2,0.8,0.85)]	[(0.4,0.5,0.55);(0.8,0.15,0.25)]	[(0.3,0.75,0.8);(0.9,0.12,0.15)]
73	[(0.3,0.75,0.8);(0.8,0.15,0.25)]	[(0.4,0.5,0.55);(0.4,0.5,0.55)]	[(0,0.95,1);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.9,0.12,0.15)]	[(0.2,0.8,0.85);(0.3,0.75,0.8)]
74	[(0.2,0.8,0.85);(0.6,0.35,0.5)]	[(0,0.95,1);(0.4,0.5,0.55)]	[(0.3,0.75,0.8);(0.7,0.3,0.4)]	[(0.3,0.75,0.8);(0.8,0.15,0.25)]	[(0.3,0.75,0.8);(0.7,0.3,0.4)]
75	[(0.1,0.9,0.95);(0.1,0.9,0.95)]	[(0.2,0.8,0.85);(0.4,0.5,0.55)]	[(0.4,0.5,0.55);(0.7,0.3,0.4)]	[(0.2,0.8,0.85);(0.4,0.5,0.55)]	[(0,0.95,1);(0.1,0.9,0.95)]
76	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.3,0.75,0.8);(0.4,0.5,0.55)]	[(0.1,0.9,0.95);(0.3,0.75,0.8)]
77	[(0.1,0.9,0.95);(0.4,0.5,0.55)]	[(0,0.95,1);(0.2,0.8,0.85)]	[(0.4,0.5,0.55);(0.8,0.15,0.25)]	[(0.1,0.9,0.95);(0.3,0.75,0.8)]	[(0.2,0.8,0.85);(0.3,0.75,0.8)]
78	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.3,0.75,0.8);(0.6,0.35,0.5)]	[(0.2,0.8,0.85);(0.3,0.75,0.8)]	[(0,0.95,1);(0.3,0.75,0.8)]	[(0.2,0.8,0.85);(0.4,0.5,0.55)]
79	[(0.2,0.8,0.85);(0.3,0.75,0.8)]	[(0.2,0.8,0.85);(0.6,0.35,0.5)]	[(0.2,0.8,0.85);(0.6,0.35,0.5)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0.1,0.9,0.95);(0.6,0.35,0.5)]
80	[(0.3,0.75,0.8);(0.9,0.12,0.15)]	[(0.3,0.75,0.8);(0.7,0.3,0.4)]	[(0.3,0.75,0.8);(0.3,0.75,0.8)]	[(0,0.95,1);(0.2,0.8,0.85)]	[(0.2,0.8,0.85);(0.6,0.35,0.5)]
1-80	**[(0.3,0.75,0.8);(0.5,0.45,0.53)]**	**[(0.3,0.75,0.8);(0.5,0.45,0.53)]**	**[(0.2,0.8,0.85);(0.4,0.5,0.55)]**	**[(0.3,0.75,0.8);(0.5,0.45,0.53)]**	**[(0.3,0.75,0.8);(0.4,0.5,0.55)]**

Table 4: IDLE neutrosophic frequency. Source: own elaboration.

The results obtained from the analysis of the neutrosophic frequency present an indeterminacy level close to 0.5. The result defines in what proportion the factor influences the stability of democracy in Ecuadorian society according to the sample analyzed. From the results, it is observed that:

- The right to a healthy environment, the deterioration of civil rights, and the worsening of the economic crisis affect the stability of democracy in society. These factors are severely impaired and impaired for the analyzed subset.
- Political disaffection affects the stability of democracy in society, as it is in a highly deteriorated to moderately deteriorated state.
- The infraction of the regulations affects the stability of democracy in society, with a severely deteriorated to moderately deteriorated state.

Given the existing levels of indeterminacy, it is required to visualize the neutrosophic points and the areas where each factor is found (see figure 1). Each subset is determined by the neutrosophic state of each factor within the democracy set in society.

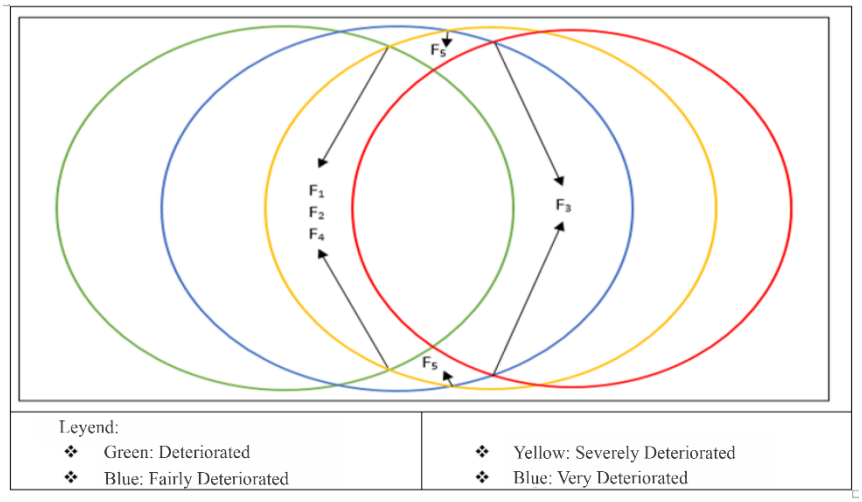

Figure 1: Neutrosophic interception of the analyzed sample subsets. Source: own elaboration.

From the analysis, it can be observed that of the eleven neutrosophic states in which the variable stability of democracy in society is represented, it is only manifested in four. Of the five factors that the study variable represents, three (F1, F2, and F4) are found in the same dimension among the study subsets. For factors, F3 and F5 are unique in the same dimension among subsets with unique state properties.

To measure the uncertainty value of each factor, the associated referent uncertainty measure is calculated for and in the form of neutrosophic numbers (Table 6). In the results obtained, it is observed that the values range from 0.056 to 0.71 with the measure of indeterminacy of [0.625; 0.0.713]. The resulting information is generated by a sample of [0;80] questionnaires and statistical information, obtained from 80 experts (table 4).

Factors	$\bar{x}_N$	Y_N	CV_N
F1	0.263 + 0.519 I;I ∈ [0,0.493,0]	0.016 + 0.325I;I ∈ [0,0.951,0]	0.061 + 0.626 I;I ∈ [0,0.903,0]
F2	0.275 + 0.549 I;I ∈ [0,0.499,0]	0.017 + 0.343 I;I ∈ [0,0.950,0]	0.062 + 0.625I;I ∈ [0,0.901,0]
F3	0.224 + 0.468 I;I ∈ [0,0.521,0]	0.016 + 0.307 I;I ∈ [0,0.948,0]	0.071 + 0.656 I;I ∈ [0,0.892,0]
F4	0.259 + 0.513 I;I ∈ [0,0.495,0]	0.016 + 0.355I;I ∈ [0,0.955,0]	0.062 + 0.692 I;I ∈ [0,0.910,0]
F5	0.268 + 0.498 I;I ∈ [0,0.462,0]	0.015 + 0.355I;I ∈ [0,0.958,0]	0.056 + 0.713 I;I ∈ [0,0.921,0]

Table 5: Neutrosophic forms with a measure of indeterminacy. Source: own elaboration.

As a result of the analysis of the neutrosophic frequencies, the deterioration of civil rights in the stability of democracy in society in Ecuador is determined with greater incidence. For each factor, a sample of the elements associated with the subset visualized by the group of experts is analyzed. The analysis of the sample that makes up the groups analyzed in the study regarding the relationship between the deterioration of civil rights, democracy, and society.

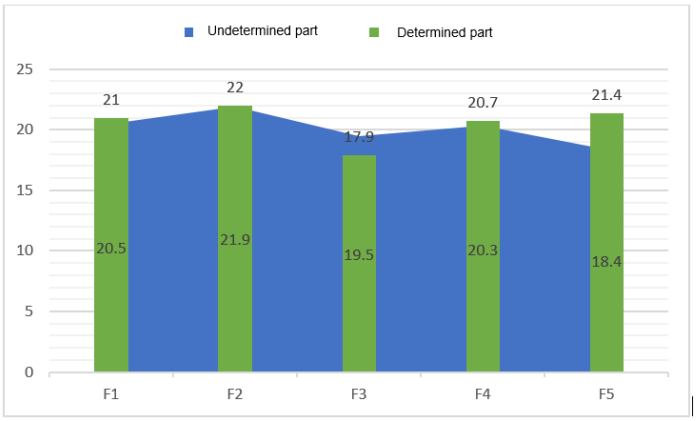

Figure 2: SDS neutrosophic bar graph. Source: own elaboration.

Figure 2 shows that for the study variable, the determined part is found between [18.4; 21.9], while the indeterminate part varies between [17.9; 22]. The existing levels of indeterminacy for both sub-sets are up to 52.14% in the EDS variable. The analysis implies that each specialist defines a criterion of stability of democracy in the society exposed to factors that vary according to the terms of office.

Partial solutions

From these neutrosophic interceptions, the solutions to be visualized are defined, of which the deterioration of civil rights is a key factor.

In order to achieve a solid democracy, it is proposed:

- Carry out structural changes that are essential in the protection of civil rights,
- Support and encourage economic and political progress, where institutions act in favor of the development of the country and the welfare of society.
- Develop a critical mentality in politicians and citizens, with a projection to prepare the new generation that contributes effectively to the transformation of the country
- Carry out policies aimed at protecting environmental rights and collective rights.

Conclusion

Neutrosophic statistics respond to the level of indeterminacy of the factors analyzed. Of the subsets, three intercepts are defined, the first in which the factors F1, F2, and F4 are found, in the second F3 and F5 are displayed in the last two intercepts. The result defines in what proportion the factor of deterioration of civil rights influences the stability of democracy in Ecuadorian society according to the sample analyzed.

The analysis shows that of the eleven neutrosophic states, the variable is present in four. Of the five factors represented by the study variable, only the right to a healthy environment, the deterioration of civil rights, and the worsening of the economic crisis are found in the same dimension. Of these factors, the one that has a lower value of CV corresponds to the deterioration of civil rights with 90.10% of neutrosophic representativeness. Therefore, we must work and dedicate actions to achieve a participatory democracy in society.

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