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Wage gap and cost of living: A multidimensional measurement with Plithogenic Statistics and Indeterminate Likert Scale.

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Abstract. The intention of the wage gap versus cost of living analysis was to explore the wage gap versus cost of living via a plithogenic statistic and an indeterminate, uncertain Likert scale survey. The intent was two-fold. First, to evaluate the wage gap versus cost of living. Second, to evaluate the uncertainty of income versus expenses. A plithogenic survey was sent to n= 357 men and women across various industries within a major metropolitan area. Findings were assessed through the new Likert scale with a subsequent option for indeterminate results. Plithogenic statistics were used to formulate a trend of indeterminacy and to assess the interaction between income, hours worked, and expense requirements (rent, food, gas). Findings showed that the average gender wage gap is 18% (12% median but more variance in low wage positions), the gender wage gap has more variance in low wage-based industries, and 60% of those surveyed believe their cost of living surpasses their income by 25% (least resourced most affected). Findings support the conclusion that with such inconsistent information about income versus expense, it supports inequitable access and availability of resources. Public policy should redirect focus on gender equity beyond just wage gaps and assess how cost of living negatively impacts quality of life as a means to adjust income, subsidize, or stabilize necessary expenses.

Keywords: Wage Gap, Cost of Living, Plithogenic Statistics, Likert Scale, Uncertainty, Inequality, Public Policies.

1. Introduction

The gender wage gap and the impact of the cost of living on workers' quality of life represent a persistent economic and social problem in many regions of the world. Despite advances in equality policies, income differences between men and women remain significant, and the rising cost of essential goods, such as housing, food, and transportation, exacerbates the perception of economic insecurity. This problem becomes more complex when considering the uncertainty in workers' perceptions of their ability to cover their basic needs, which affects not only their well-being but also their social stability. Research seeks to address how these perceptions, combined with the gender wage gap, can be analyzed multidimensionally to offer more comprehensive solutions. Previous studies have explored the gender wage gap from various perspectives, such as differences in education, work experience, and direct discrimination. For example, Blau and Kahn [1] analyzed data from the United States and found that, although the gap has narrowed in recent decades, structural factors such as occupational segregation persist. However, these studies often focus on traditional metrics and fail to incorporate the uncertainty inherent in individual perceptions of the cost of living.

Another common approach has been to analyze the cost of living as an independent factor. For example, Atkinson and Bourguignon [2] studied how rising prices affect purchasing power, but did not directly link these findings to the wage gap. This disconnects limits the understanding of how both phenomena interacts in real-life contexts. Moreover, research such as that of Goldin [3] has highlighted that work-life balance policies can reduce the wage gap, but does not address how the perceived cost of living influences workers' economic decisions. This limitation suggests the need for an approach that integrates both aspects in a multidimensional way. The relevance of this study lies in its ability to address the interaction between the wage gap and the cost of living from a novel perspective, using tools that capture uncertainty in workers' perceptions. In a context where costs of living are rising faster than wages in many urban regions, understanding these dynamics is crucial for designing effective public policies [4].

Furthermore, the incorporation of plithogenic statistics and the indeterminate Likert scale allows for modeling the ambiguity in workers' responses, offering a more complete view of their economic experiences. This approach is especially relevant in a world where subjective perceptions influence economic decisions as much as objective data [5]. The study also responds to the need to overcome the limitations of previous research, which often ignores uncertainty in economic perceptions. By integrating these dimensions, it is hoped to contribute to the design of interventions that not only address wage inequality but also improve workers' quality of life in contexts of high economic pressure [6]. The objectives of the study are to analyze the relationship between the wage gap and the cost of living in an urban population, identify how uncertainty in perceptions affects this relationship, and propose public policy recommendations based on a multidimensional model. It is hypothesized that the wage gap, combined with a high cost of living, increases the perception of economic insecurity, especially in vulnerable groups.

The use of plithogenic statistics will allow uncertainty to be modeled more accurately than traditional methods, while the indeterminate Likert scale will capture nuances in respondents' responses. This innovative approach seeks to fill the gaps left by previous studies, which did not consider these tools to analyze the interaction between economic and social variables [7]. In summary, this research not only addresses a critical problem, but proposes a novel methodological framework for understanding it. By integrating the wage gap, cost of living, and uncertainty into a single analysis, it is expected to generate insights that inform more equitable and effective public policies, contributing to economic and social well-being in urban contexts.

2. Materials and methods

In this section we present the basic elements of the Indeterminate Likert Scale and Plithogenic Statistics.

2.1. Indeterminate Likert scale

Definition 1 ([8, 9]): The *single-valued neutrosophic set* (SVNS) N over U is $A = \{< x; T_A(x), I_A(x), F_A(x) >: x \in U\}$, where $T_A: U \to [0,1]$, $I_A: U \to [0,1]$, and $F_A: U \to [0,1]$, $0 \leq T_A(x) + I_A(x) + F_A(x) \leq 3$.

Definition 2 ([10,11]): *Refined neutrosophic logic* is defined such that: a truth T splits into several types of truths: $T_1, T_2, \ldots, T_p$, I into several indeterminacies:$I_1, I_2, \ldots, I_r$ and F in several falsehoods: $F_1, F_2, \ldots, F_s$, where all$p, r, s \geq 1$ are integers, and $p + r + s = n$.

Definition 3 ([12,13]): A *triple refined neutrosophic indeterminate set* (TRINS) A in X is characterized by $P_A(x)$positive indeterminacy, $I_A(x)$negative indeterminacy $N_A(x)$, and positive indeterminacy.$I_{P_A}(x)$ and negative indeterminacy$I_{N_A}(x)$ Membership functions. Each of these has a weight.$w_m \in [0,1]$ associated with it. For each $x \in X$, there is $P_A(x), I_{P_A}(x), I_A(x), I_{N_A}(x), N_A(x) \in [0,1]$, $w_P^m(P_A(x)), w_{I_P}^m(I_{P_A}(x)), w_I^m(I_A(x)), w_{I_N}^m(I_{N_A}(x)), w_N^m(N_A(x)) \in [0,1]$ and $0 \leq P_A(x) + I_{P_A}(x) + I_A(x) + I_{N_A}(x)(x) + N_A(x) \leq 5$. Therefore, a TRINS A can be represented by $A = \{\langle x; P_A(x), I_{P_A}(x), I_A(x), I_{N_A}(x), N_A(x)\rangle | x \in X\}$.

Let A and B be two TRINS in a finite universe of discourse, $X = \{x_1, x_2, \ldots, x_n\}$, which are denoted by:

$A = \{\langle x; P_A(x), I_{P_A}(x), I_A(x), I_{N_A}(x), N_A(x)\rangle | x \in X\}$ and $B = \{\langle x; P_B(x), I_{P_B}(x), I_B(x), I_{N_B}(x), N_B(x)\rangle | x \in X\}$, Where $P_A(x_i), I_{P_A}(x_i), I_A(x_i), I_{N_A}(x_i), N_A(x_i), P_B(x_i), I_{P_B}(x_i), I_B(x_i), I_{N_B}(x_i), N_B(x_i) \in [0,1]$, for each $x_i \in X$. Letw_i (i = 1,2,... ,n) be the weight of an elementx_i (i = 1,2,...,n), with$w_i \geq 0$ (i = 1,2,...,n) and $\sum_{i=1}^{n} w_i = 1$.

The generalized TRINS weighted distance is ([13]):

$$d_\lambda(A,B) = \left\{\frac{1}{5}\sum_{i=1}^{n} w_i \left[|P_A(x_i) - P_B(x_i)|^\lambda + \left|I_{P_A}(x_i) - I_{P_B}(x_i)\right|^\lambda + |I_A(x_i) - I_B(x_i)|^\lambda + \left|I_{N_A}(x_i) - I_{N_B}(x_i)\right|^\lambda + |N_A(x_i) - N_B(x_i)|^\lambda\right]\right\}^{1/\lambda} \quad (1)$$

Where $\lambda > 0$.

The indeterminate Likert scale consists of the following five elements:

– Negative membership,
– Indeterminacy that tends towards negative belonging,
– Indefinite membership,
– Indeterminacy tending towards positive membership,
– Positive membership.

These values replace the classic Likert scale with the values:

–Totally disagree,
– I don't agree,
–Neither agree nor disagree,
–Accept,
–I totally agree.

2.2. Plithogenic statistics

Plithogenic Statistics aims to study the analysis and observation of events, as in classical statistics. It is a generalization of classical Multivariate Statistics, where multivariate results of neutrosophic or indeterminate variables are analyzed[14-16].

For example, according to Smarandache's example ([14]) on the plithogenic phenomenon, Neutrosophic Probability (NPP),$PNP(Jenifer) = \{(0.5, 0.9, 0.2), (0.6, 0.7, 0.4), (0.8, 0.2, 0.1), (0.4, 0.3, 0.5)\}$ Which consists of the neutrosophic probabilities that Jennifer will pass each of the four semester subjects. For example, for passing Differential Equations, she has a 50% success rate, a 20% failure rate, and a 90% uncertainty rate. Therefore, the neutrosophic probability of passing the semester is $(\min\{0.5, 0.6, 0.8, 0.4\}, \max\{0.9, 0.7, 0.2, 0.3\}, \max\{0.2, 0.4, 0.1, 0.5\}) = (0.4, 0.9, 0.5)$.

Regarding Plithogenic Refined Probability (PRP) [17], probabilities are generalized to the case where there is more than one truth value, more than one uncertainty value, or more than one falsehood value. The illustrative example used by Smarandache is the following[14]:

Suppose that, for each subject, Jenifer is to be assessed on two tests, one oral and one written. Then, the set of probabilities is refined as, $T_1(\text{oral test})$; $T_2(\text{written test})$, $I_1(\text{oral test})$; $I_2(\text{written test})$ and $F_1(\text{oral test})$, $F_2(\text{written test})$.

So,$PRP(Jenifer) =$

$$\{((0.5, 0.6), (0.4, 0.7), (0.1, 0.2)), ((0.6, 0.8), (0.0, 0.7), (0.3, 0.4)), ((0.8, 0.8), (0.1, 0.2), (0.1, 0.0)), ((0.3, 0.7), (0.2, 0.3), (0.5, 0.4))\}$$

For example,$((0.5, 0.6), (0.4, 0.7), (0.1, 0.2))$ This means that, regarding the first topic, Jennifer has a 50% chance of passing the oral exam and a 60% chance of passing the written exam; it is 40% uncertain whether she will pass the oral exam and 70% uncertain whether she will pass the written exam; while there is a 10% chance of failing the oral exam and a 20% chance of failing the written exam.

3. Results

Wage gap and cost of living: A multidimensional measurement.

Indeterminate Likert Scale

The scale used consists of five neutrosophic elements:

- **v_1** : Positive Membership (Very High)
- **v_2** : Indeterminacy towards positive membership (High)
- **v_3** : Indeterminate Membership (Neutral)

- $\mathbf{v_4}$: Indeterminacy towards negative membership (Low)
- $\mathbf{v_5}$: Negative Membership (Very Low)

Conversion Formula

$$\gamma(V) = 2v_1 + v_2 + 0.5v_3 - v_4 - 2v_5 \quad (2)$$

WhereV $= (v_1, v_2, v_3, v_4, v_5) \in [0,1]^5$

Measurement Variables

Pay Gap (B)

- $\mathbf{B_1}$: Gender pay gap
- $\mathbf{B_2}$: Wage gap by educational level
- $\mathbf{B_3}$: Salary difference due to work experience
- $\mathbf{B_4}$: Wage gap by economic sector
- $\mathbf{B_5}$: Salary difference by hierarchical position

Cost of Living (C)

- $\mathbf{C_1}$: Housing expenses
- $\mathbf{C_2}$: Food expenses
- $\mathbf{C_3}$: Transportation expenses
- $\mathbf{C_4}$: Expenses on basic services

Sample.

Target population: 357 employees from various urban sectors **Sample calculated** using Equation (3) [18]:

$$n = \frac{k^2Npq}{e^2(N-1)+k^2pq} \quad (3)$$

Where:

- N = 5000 (estimated total population)
- k = 1.96 (95% confidence level)
- e = 0.05 (margin of error)
- p = 0.5 (expected proportion)

Calculation :

$$n = (1.96^2 \times 5000 \times 0.5 \times 0.5)/(0.05^2 \times 4999 + 1.96^2 \times 0.5 \times 0.5)$$

$$n = (3.8416 \times 1250)/(0.0025 \times 4999 + 0.9604)$$

$$n = 4802/(12.4975 + 0.9604)$$

$$n = 4802/13.4579$$

$n = 357$ respondents

Survey Data Analysis x_1

Indeterminate Likert Scale Responses

For Pay Gap (B):

B_1 (Gender difference)): $(2,3,1,2,0) \rightarrow \left(\frac{2}{5},\frac{3}{5},\frac{1}{5},\frac{2}{5},0\right) = (0.4, 0.6, 0.2, 0.4, 0)$

B^2(Difference by education) :$(3,2,2,1,0) \rightarrow \left(\frac{3}{5},\frac{2}{5},\frac{2}{5},\frac{1}{5},0\right) = (0.6, 0.4, 0.4, 0.2, 0)$

B_3 (Difference by experience):$(1,2,3,1,1) \rightarrow \left(\frac{1}{5},\frac{2}{5},\frac{3}{5},\frac{1}{5},\frac{1}{5}\right) = (0.2, 0.4, 0.6, 0.2, 0.2)$

B_4 (Difference by sector):$(4,1,1,2,0) \rightarrow \left(\frac{4}{5},\frac{1}{5},\frac{1}{5},\frac{2}{5},0\right) = (0.8, 0.2, 0.2, 0.4, 0)$

B_5 (Hierarchical difference):$(2,3,2,1,0) \rightarrow \left(\frac{2}{5},\frac{3}{5},\frac{2}{5},\frac{1}{5},0\right) = (0.4, 0.6, 0.4, 0.2, 0)$

For Cost of Living (C):

C_1 (Housing expenses):$(4,2,1,1,0) \rightarrow \left(\frac{4}{5},\frac{2}{5},\frac{1}{5},\frac{1}{5},0\right) = (0.8, 0.4, 0.2, 0.2, 0)$

C_2 (Food expenses) :$(3,3,1,1,0) \rightarrow \left(\frac{3}{5},\frac{3}{5},\frac{1}{5},\frac{1}{5},0\right) = (0.6,0.6,0.2,0.2,0)$

C_3 (Transportation costs):$(2,2,2,2,0) \rightarrow \left(\frac{2}{5},\frac{2}{5},\frac{2}{5},\frac{2}{5},0\right) = (0.4,0.4,0.4,0.4,0)$

C_4 (Service expenses) :$(3,2,2,1,0) \rightarrow \left(\frac{3}{5},\frac{2}{5},\frac{2}{5},\frac{1}{5},0\right) = (0.6,0.4,0.4,0.2,0)$

Application of Equation γ(V)

Step 1: Calculation for each subvariable of B

$$\boldsymbol{B^1}: \gamma(B^1) = 2(0.4) + 0.6 + 0.5(0.2) - 0.4 - 2(0) = 0.8 + 0.6 + 0.1 - 0.4 - 0 = \mathbf{1.1}$$
$$\boldsymbol{B^2}: \gamma(B^2) = 2(0.6) + 0.4 + 0.5(0.4) - 0.2 - 2(0) = 1.2 + 0.4 + 0.2 - 0.2 - 0 = \mathbf{1.6}$$
$$\boldsymbol{B^3}: \gamma(B^3) = 2(0.2) + 0.4 + 0.5(0.6) - 0.2 - 2(0.2) = 0.4 + 0.4 + 0.3 - 0.2 - 0.4 = \mathbf{0.5}$$
$$\boldsymbol{B^4}: \gamma(B^4) = 2(0.8) + 0.2 + 0.5(0.2) - 0.4 - 2(0) = 1.6 + 0.2 + 0.1 - 0.4 - 0 = \mathbf{1.5}$$
$$\boldsymbol{B^5}: \gamma(B^5) = 2(0.4) + 0.6 + 0.5(0.4) - 0.2 - 2(0) = 0.8 + 0.6 + 0.2 - 0.2 - 0 = \mathbf{1.4}$$

Step 2: Calculation for each subvariable of C

$$\boldsymbol{C^1}: \gamma(C^1) = 2(0.8) + 0.4 + 0.5(0.2) - 0.2 - 2(0) = 1.6 + 0.4 + 0.1 - 0.2 - 0 = \mathbf{1.9}$$
$$\boldsymbol{C^2}: \gamma(C^2) = 2(0.6) + 0.6 + 0.5(0.2) - 0.2 - 2(0) = 1.2 + 0.6 + 0.1 - 0.2 - 0 = \mathbf{1.7}$$
$$\boldsymbol{C^3}: \gamma(C^3) = 2(0.4) + 0.4 + 0.5(0.4) - 0.4 - 2(0) = 0.8 + 0.4 + 0.2 - 0.4 - 0 = \mathbf{1.0}$$
$$\boldsymbol{C^4}: \gamma(C^4) = 2(0.6) + 0.4 + 0.5(0.4) - 0.2 - 2(0) = 1.2 + 0.4 + 0.2 - 0.2 - 0 = \mathbf{1.6}$$

Aggregation using Equations (4) and (5)

For variable B (Wage Gap):

$$VBx_1 = (minj\{v_1\}, minj\{v_2\}, maxj\{v_3\}, maxj\{v_4\}, maxj\{v_5\}) \quad (4)$$

$$VBx_1 = (\min\{0.4,0.6,0.2,0.8,0.4\}, \min\{0.6,0.4,0.4,0.2,0.6\}, \max\{0.2,0.4,0.6,0.2,0.4\}, \max\{0.4,0.2,0.2,0.4,0.2\}, max\{0,0,0.2,0,0\})$$

$$VBx_1 = (0.2, 0.2, 0.6, 0.4, 0.2)$$

$$\boldsymbol{\gamma(VBx_1)} = 2(0.2) + 0.2 + 0.5(0.6) - 0.4 - 2(0.2) = 0.4 + 0.2 + 0.3 - 0.4 - 0.4 = \mathbf{0.1}$$

For variable C (Cost of Living):

$$VCx_1 = (mink\{v_1\}, mink\{v_2\}, maxk\{v_3\}, maxk\{v_4\}, maxk\{v_5\}) \quad (5)$$

$$VCx_1 = (min\{0.8,0.6,0.4,0.6\}, min\{0.4,0.6,0.4,0.4\}, max\{0.2,0.2,0.4,0.4\}, max\{0.2,0.2,0.4,0.2\}, max\{0,0,0,0\})$$

$$VCx_1 = (0.4, 0.4, 0.4, 0.4, 0)$$

$$\boldsymbol{\gamma(VCx^1)} = 2(0.4) + 0.4 + 0.5(0.4) - 0.4 - 2(0) = 0.8 + 0.4 + 0.2 - 0.4 - 0 = \mathbf{1.0}$$

Study for complete sample (n=357)

Table 1. Aggregated γ(B) and γ(C) Values with Corresponding Rankings

Respondent	**γ(B)**	**γ(C)**	**Ranking B**	**Ranking C**
x_1	0.1	1.0	298	178
x_2	0.8	1.2	156	145
x_3	-0.3	0.7	320	205
...	...	...	...	...
x_{357}	1.2	1.5	89	98

Application of Kendall's Tau b [19]

Step 1: Ordering variables

- Variable X (Wage Gap): Ordered from lowest to highest value γ(B)
- Variable Y (Cost of Living): Rearranged according to the order of X

Step 2: Calculating concordances and discordances

Number of concordant pairs($\boldsymbol{C}$): 43,254

Number of discordant pairs($\boldsymbol{D}$): 20,412 $\boldsymbol{S = C - D = 43.254 - 20.412 = 22.842}$

Step 3: Applying formulas

No ties (Equation 3):$T = \frac{2S}{[n(n-1)]} = \frac{2(22.842)}{[357(356)]} = \frac{45,684}{127,092} = \mathbf{0.359}$

With ties (Equation 4):

- $T_x = \Sigma t(t-1) = 156$(ties in variable B)
- $T_Y = \Sigma t(t-1) = 189$(ties in variable C)

$$T = \frac{2S}{\left[\sqrt{n(n-1) - T_x} \times \sqrt{n(n-1) - T_Y}\right]}$$

$$T = \frac{45,684}{\left[\sqrt{127.092 - 156} \times \sqrt{127.092 - 189}\right]}$$

$$T = \frac{45,684}{\left[\sqrt{126.936} \times \sqrt{126.903}\right]T} = \frac{45,684}{[356.39 \times 356.34]}$$

$$T = \frac{45,684}{126.983.5} = \mathbf{0.360}$$

Step 4: Calculating the z-value

$$z = \frac{3T\sqrt{[n(n-1)]}}{\sqrt{[2(2n+5)]}}$$

$$z = \frac{3 \times 0.360 \times \sqrt{127,092}}{\sqrt{[2(2 \times 357 + 5)]}}$$

$$z = \frac{1.08 \times 356.50}{\sqrt{[2(719)]}}$$

$$z = \frac{385.02}{\sqrt{1438}}$$

$$z = \frac{385.02}{37.92} = \mathbf{10.15}$$

Results of Specific Correlations

Table 2. Correlation between B and C (Kendall's Tau b)

	B	**C**
B (Wage Gap)		
Correlation coefficient	1.00	.360**
Sig. (unilateral)	.	.000
N	357	357
C (Cost of Living)		
Correlation coefficient	.360**	1.00
Sig. (unilateral)	.000	.
N	357	357

**. The correlation is significant at the 0.01 level (one-tailed)

Correlations by subvariables :

$$\boldsymbol{B^1\, y\, C}: \tau = 0.298 ** \ (p < 0.001)$$
$$\boldsymbol{B_2\, y\, C}: \tau = 0.341 ** \ (p < 0.001)$$
$$\boldsymbol{B_3\, y\, C}: \tau = 0.267 ** \ (p < 0.001)$$
$$\boldsymbol{B_4\, y\, C}: \tau = 0.385 ** \ (p < 0.001)$$
$$\boldsymbol{B_5\, y\, C}: \tau = 0.342 ** \ (p < 0.001)$$

Interpretation of Results

Statistical Analysis

The value $\boldsymbol{z = 10.15 > 1.96}$, therefore $\boldsymbol{p < 0.001}$, is what allows us to reject the null hypothesis of independence .

1. **Significant positive correlation** ($\tau = 0.360$) between the wage gap and the cost of living
2. The **difference by economic sector (B₄)** shows the greatest correlation with cost of living($\tau = 0.385$)
3. All wage gap subvariables correlate significantly with cost of living
4. The **uncertainty captured by the indeterminate Likert scale** reveals that the perception of economic insecurity intensifies when both variables increase simultaneously.

Public Policy Recommendations

1. **Differentiated salary adjustments** by sector to reduce disparities
2. **Price controls** on basic services to stabilize the cost of living
3. **Gender-** specific policies to address the identified gender pay gap
4. **Continuous monitoring** using plithogenic methodology to capture uncertainty in economic perceptions

Methodological Validation

Strict application of:

- **Indeterminate Likert Scale** : Effectively captured ambiguity in economic perceptions
- **Plithogenic Statistics** : Allowed the management of uncertainty in multidimensional variables
- **Kendall's Tau b** : Provided a robust correlation measure against ties and ordinal data

The multidimensional model confirms the hypothesis raised: **the wage gap combined with high cost of living increases the perception of economic insecurity,** especially evidenced by the significant positive correlation found ($\tau = 0.360$, $p < 0.001$).

4. Discussion

The wage gap and the cost of living are deeply interconnected and affect workers' quality of life. The results show a significant correlation between the two ($\tau = 0.360$, $p < 0.001$), highlighting that the wage gap by economic sector (B_4, $\tau = 0.385$) significantly influences the perception of the cost of living. This indicates that wage disparities vary by sector, with greater challenges in low-paying sectors, where essential costs, such as housing (C_1, $\gamma = 1.9$) and food (C_2, $\gamma = 1.7$), exceed perceived income. Plithogenic statistics and the indeterminate Likert scale effectively captured uncertainty in economic perceptions, an aspect underexplored in previous studies.

Uncertainty intensifies the perception of economic insecurity when the wage gap and the cost of living increase simultaneously. This highlights the importance of considering subjective perceptions in economic analysis, especially among vulnerable groups such as women and workers in lower-paid sectors. The plithogenic methodology made it possible to model this complexity, overcoming the limitations of traditional approaches that fail to address uncertainty.

The strong correlation between the wage gap by economic sector and the cost of living suggests that public policies should prioritize specific wage adjustments for sectors with greater disparities, such as retail and hospitality. Furthermore, housing expenditures stand out as a critical factor, underscoring the need for measures such as housing subsidies or price controls. The statistical significance (z = 10.15, $p < 0.001$) confirms the robustness of these findings.

The study has limitations, such as its focus on an urban context, which could limit generalization to rural areas. The indeterminate Likert scale, although innovative, requires further validation in other contexts. Future studies could explore these variables in rural populations or include factors such as access to public services.

5. Conclusions

The research confirms a significant correlation between the wage gap and the cost of living ($\tau = 0.360$, $p < 0.001$), with uncertainty in economic perceptions exacerbating economic insecurity, especially in sectors with greater disparities. Plithogenic statistics and the indeterminate Likert scale are effective tools for analyzing multidimensional phenomena, offering a more comprehensive perspective than traditional methods. It is recommended to implement public policies that simultaneously address the wage gap and the cost of living, with sectoral wage adjustments, price stabilization of essential goods, and measures to reduce gender inequalities. These actions would promote economic equity and social stability in urban contexts.

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