



Validation of the proof reversal on the inexistence of untimely dismissal by using neutrosophic IADOV technique

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Abstract. This paper aims to validate the reversal of the burden of proof regarding the non-existence of untimely dismissal, given that in the workplace the worker is considered the weakest part of the labor relationship and untimely dismissal is a social problem in Ecuador, for which compensation has been determined in legal regulations, provided that it has been voluntarily recognized or proven in a legal process, with the plaintiff (ex-worker) being the party obliged to prove such assertion, which is complicated by the circumstances in which a dismissal is made. Theoretical and empirical methods were used to obtain results that revealed the most frequent causes of the problem under study. To support the validation, survey instruments were applied that evaluated by means of a methodology, which integrates the IADOV method and the neutrosophic logic, the transcendence of the reversal of the burden of proof on the non-existence of untimely dismissal in Ecuador.

Keywords: Labor Law, untimely dismissal, burden of proof, labor conflict, IADOV method, neutrosophic logic.

1 Introduction

The "International Labor Organization" (ILO) was created in 1919. It is a tripartite body made up of representatives of governments, employers and workers whose mission is to promote labor rights and improve social protection, among others [1].

Throughout the history of law, we find that, for example, in Roman law there existed the legal principle that the assertion in court by the plaintiff, without further ado, puts the aggrieved or defendant before the obligation to exculpate or demonstrate the contrary to what the plaintiff argued, characterizing those elementary principles that we know today as procedural burdens [2]. Further on, Justinian, in relation to the evidence, makes a deeper analysis and indicates that together with the direct evidence the contrary evidence is formed, which has the purpose of disputing the results of the first [3].

It should be noted that from the beginning of the Law there were already several points about who bears the burden of proof, which may raise the question, whether the burden of proof should be generalized in the Law or whether it should be adapted to the specialties of the Law and therefore to what each one regulates.

According to the issue of November 13, 2016 of the newspaper *El Comercio*, a publication entitled "Untimely dismissal is the most common complaint in the courts," it is determined that the rate of dismissals in Ecuador is very high [4]. However, that is not the problem, since what is really worrying is the difficulty that the worker has in proving such illegal termination of the labor relationship as Contreras Gallo points out [5].

According to Ecuador's current regulations [6], it is the worker who must prove the existence of untimely dismissal in a labor lawsuit, for which he finds a limitation in obtaining evidence to justify this, given the particularities in which it occurs, being generally in the company's facilities, in a reserved manner, and if there are witnesses, it is the same workers of the employer who refuse to give their testimony because their job stability is at stake.

Ecuador's Labor Code provides for an indemnity that the employer must pay to its worker in the event of untimely dismissal [7]. The purpose of this compensation is to pay off for the damage caused and allow the worker to have certain resources while a new source of income is sought for him or her and him or her family [8]. Moreover, in order to access this compensation, the employer must first recognize the existence of the untimely dismissal or the worker must prove it, which, as mentioned above, is very complex.

It is important to analyze that the way in which the burden of proof in cases of untimely dismissal is established in the current legislation not only violates labor rights, but also the rights of persons belonging to priority care groups (persons with disabilities - pregnant women, among others) recognized in the Constitution of the Republic

of Ecuador [9] to whom the State has the obligation to give special and preferential attention, especially if they are in conditions of double vulnerability. Thus, if any of them is the victim of an untimely dismissal, they must first prove this assertion in order to access the benefits of an ineffective dismissal action, the objective of which is to guarantee the reinforced job stability of a person associated with a specific condition (pregnant woman/union leader) is diminished by the difficulty they would have in proving it with the limited body of evidence available to them. Hence, this is the reason of the great relevance of providing a solution to this social problem through law as a legal norm [10].

The benefits determined in the Organic Law on Disabilities [11] in favor of persons with disabilities in order to guarantee greater job stability due to their specific condition, is previously subject to the possibility that the former worker may prove the unjustified/untimely dismissal to which he or she was subjected, a "sine qua non" requirement for the aforementioned rule to be effective, a situation that, as stated above, is very complex given the particularity in which the dismissal occurs. According to what is referred to in [12], it can be verified directly in one's own experience or in the direct observation of others. This is the reason why it is analyzed as a model.

At the international level, there are countries in Latin America that already have a reversal of the burden of proof in cases of untimely dismissal in their legislation, such is the case of Bolivia, where the Article 66 of the Labor Procedural Code establishes that, in all lawsuits initiated by the worker, the burden of proof rests with the employer, without prejudice to the employer being able to offer the evidence it deems appropriate [13], and even in the Article 48 of its Political Constitution, it is determined that one of the principles under which labor norms shall be interpreted and applied is the principle of inversion of evidence in favor of the worker.

Considering the above, the question arises as to whether the burden of proof should be generalized in law or whether it should be adapted to the specialties of law. In this regard, the author Percy Chocano Núñez points out that the burden of proof does not correspond to who affirms a fact, but to who is in the best position to prove [14].

For this reason, a validation of the reversal of the burden of proof on the non-existence of untimely dismissal is carried out, for which Iadov's neutrosophic technique is applied, see [15]. These techniques constitute an indirect way to measure the reversal of the burden of proof on the non-existence of untimely dismissal.

This technique consists, as the original method states, in related criteria of answers to interspersed questions whose relation the subject does not know, at the same time the unrelated or complementary questions serve as introduction and support of objectivity to the respondent who uses them to locate himself and contrast the answers.

The result of these questions interacts through what is called "Iadov's Logical Table", in this work the satisfaction of the respondents is combined with the introduction of the neutrosophic estimation to seek a solution to the problems of indetermination that appear universally in the evaluations of the surveys and other instruments, taking advantage not only of the found and opposite positions but also of the neutral or ambiguous ones. Starting from the fact that every idea $< A >$ tends to be neutralized, diminished, balanced by the ideas, in clear rupture with the doctrines binaries in the explanation and comprehension of the phenomena.

This is a Multicriteria Decision Making problem, a kind of problems that have been previously studied in the neutrosophic framework in papers like for example [16, 17, 18, 19].

This paper is divided in the following sections; Section 2 is dedicated to introduce theories and data that shall be used throughout this paper. Section 3 is devoted to calculate and analyze the results. In Section 4 we draw the conclusions of the paper.

2 Materials and methods

In relation to empirical data collection methods were used, for which the Judiciary Council of Santo Domingo was asked the number of processes of untimely dismissal that have entered from January 2017 to December 2017 and in how many of those processes the Judge has ruled in favor of the worker granting compensation for untimely dismissal, such information to assess its impact on the judicial environment and therefore in society, thus achieving an idea of the magnitude of the phenomenon studied; As well as direct observation when attending hearings and indirect observation when studying various processes in relation to the subject matter; and expert judgment through the interview technique, which were directed to two legal professionals, one is a lawyer in the free exercise of his profession and a professor at the Universidad Regional Autónoma de los Andes UNIANDES extension Santo Domingo, and the other one is a current Public Defender of Santo Domingo and former labor inspector, an interview guide is used.

Another of the techniques used was the survey, for which a sample of 21 subjects was considered, among the labor inspectors, defenders and lawyers in the free exercise of the profession of Santo Domingo. The survey was elaborated with five questions, three closed-ended questions interspersed in two open-ended questions; of which one fulfills the introductory function and three functioned as a reaffirmation and support of objectivity to the respondent.

The questionnaire used in the survey was useful to measure the reversal of the burden of proof on the non-existence of untimely dismissal; to anticipate, design and measure the impact of the problem, five questions were taken into account, three of them closed and two open. The three closed-ended questions correspond to the "Iadov Logical Table", which is presented adapted to the present research and shown in Table 1.

	1. Would it be appropriate to dispense with the reversal of the burden of proof on the non-existence of untimely dismissal?								
	No			I don't know			Yes		
3. Does the application of analysis to measure the reversal of the burden of proof over the non-existence of untimely dismissal meet your expectations?	2. If you could choose freely, an option to measure the inversion of the burden of proof over the non-existence of untimely unplanning would you choose one with similar characteristics to those of Ecuador?								
	Yes	I don't know	No	Yes	I don't know	No	Yes	I don't know	No
Very satisfied.	1	2	6	2	2	6	6	6	6
Partially satisfied.	2	2	3	2	3	3	6	3	6
I don't care.	3	3	3	3	3	3	3	3	3
More unsatisfied than satisfied.	6	3	6	3	4	4	3	4	4
Not at all satisfied.	6	6	6	6	4	4	6	4	5
I don't know what to say.	2	3	6	3	3	3	6	3	4

Table 1: Logical table by V.A. Iadov to measure the reversal of the burden of proof on the non-existence of untimely dismissal. Source Own preparation.

The number resulting from the interrelation of the three questions indicates the position of each respondent in the satisfaction scale, that is, their individual satisfaction.

As for the quantitative evaluation of results, neutrosophy theory is applied. Some basic concepts of this theory used in this paper are next summarized, see [20].

Definition 1 Let X be a universe of discourse, a space of points (objects) and x denotes a generic element of X . A *neutrosophic set* A in X is characterized by a truth-membership function $T_A(x)$, an indeterminacy-membership function $I_A(x)$, and a falsity-membership function $F_A(x)$. Where, $T_A(x), I_A(x), F_A(x) \subseteq]0, 1^+[$, i.e., they are real standard or nonstandard subsets of the interval $]0, 1^+[$. These functions do not satisfy any restriction, that is to say, the following inequalities hold:

$$0 \leq \inf T_A(x) + \inf I_A(x) + \inf F_A(x) \leq \sup T_A(x) + \sup I_A(x) + \sup F_A(x) \leq 3^+$$

Definition 2 Let X be a universe of discourse, a space of points (objects) and x denotes a generic element of X . A *Single Valued Neutrosophic Set (SVNS)* A in X is characterized by a truth-membership function $T_A(x)$, an indeterminacy-membership function $I_A(x)$, and a falsity-membership function $F_A(x)$. Where, $T_A(x), I_A(x), F_A(x): X \rightarrow [0, 1]$ such that: $0 \leq T_A(x) + I_A(x) + F_A(x) \leq 3$. A *single valued neutrosophic number (SVNN)* is symbolized by $\langle T, I, F \rangle$ for convenience, where $T, I, F \in [0, 1]$ and $0 \leq T + I + F \leq 3$.

Therefore, $A = \{ \langle x, T_A(x), I_A(x), F_A(x) \rangle : x \in X \}$ or more straightforwardly $A = \langle T_A(x), I_A(x), F_A(x) \rangle$, for every $x \in X$.

Given A and B two SVNSs, they satisfy the following relationships:

10. $A \subseteq B$ if and only if $T_A(x) \leq T_B(x), I_A(x) \geq I_B(x)$ and $F_A(x) \geq F_B(x)$. Particularly, $A = B$ if and only if $A \subseteq B$ and $B \subseteq A$.

11. $A \cup B = \langle \max(T_A(x), T_B(x)), \min(I_A(x), I_B(x)), \min(F_A(x), F_B(x)) \rangle$, for every $x \in X$.

12. $A \cap B = \langle \min(T_A(x), T_B(x)), \max(I_A(x), I_B(x)), \max(F_A(x), F_B(x)) \rangle$, for every $x \in X$.

In order to analyze the results, a scoring function is established. An adapted scoring function [21] is used to sort the alternatives, see Equation 1.

$$s(a_j) = 2 + T_j - F_j - I_j \tag{1}$$

Here a_j is an alternative evaluated with the SVNN (T_j, I_j, F_j) . Let us note that $s: [0, 1]^3 \rightarrow [0, 3]$.

The definition of precision function is given in Equation 2.

$$a(a_j) = T_j - F_j \tag{2}$$

$$a: [0, 1]^3 \rightarrow [-1, 1].$$

Here we prefer Equation 2 for scoring the options according to precision.

Based on the aforementioned concepts, the individual satisfaction scale shown in Table 2 was used to measure the individual satisfaction of each respondent associated to a linguistic term, see [22]. Observe that the scores are slightly different to them used in [15].

Number	Expression	SVNN	Score (Precision function)
1	Clear satisfaction	(1, 0, 0)	1
2	More satisfied than dissatisfied	(1, 0.25, 0.25)	0.75
3	Not defined	(0.5, 0.5, 0.5)	0
4	More dissatisfied than satisfied	(0.25, 0.25, 1)	-0.75
5	Clear dissatisfaction	(0,0,1)	-1
6	Contradictory	(1,0,1)	0

Table 2: Individual satisfaction scale.

This technique also includes the solution of a multicriteria decision making problem, see [23]. Multicriteria Decision Making is a decision making process where the number of criteria to evaluate is more than one, whereas, a Group Decision problem consists in a decision problem where the number of Decision Makers is more than one.

The usual fuzzy operators utilized to solve Group Decision problems are the aggregation operators. This notion can be extended to the neutrosophic framework. Neutrosophic Aggregation Operators are formally defined in Definition 3.

Definition 3 Let X be a universe of discourse, a space of points (objects) and x denotes a generic element of X . A is a *Single Valued Neutrosophic Aggregation Operator* (SVNAO) if it is a mapping $A: \cup_{n \in \mathbb{N}} ([0, 1]^3)^n \rightarrow [0, 1]^3$.

One example of SVNAO is the *Weighted Average operator* (WA), which is shown in Equation 3.

$$WA(a_1, a_2, \dots, a_n) = \sum_{i=1}^n w_i a_i \quad (3)$$

Where, $a_i = (T_i, I_i, F_i)$ are SVNNs and $w_i \in [0, 1]$ for every $i = 1, 2, \dots, n$; which satisfy the condition $\sum_{i=1}^n w_i = 1$. The a_i s are the values obtained for the i^{th} alternative assessment, and w_i denote the weight which represents the importance given to the alternative a_i .

The Weighted Average operator was used in [15] like an index of agreement, it was called Group Satisfaction Index (GSI).

Summarizing, the proposed neutrosophic IADOV technique consists in the following steps:

1. Each interviewed person emits his or her criterion for every of the three closed questions, according to Table 1. The only three possible answers for questions 1 and 2 are either, Yes, I don't know or No. The third question has six possible answers, namely, "Very satisfied", "Partially satisfied", "I don't care", "More unsatisfied than satisfied", "Not at all satisfied" and "I don't know what to say".
2. For each triplet of answers given by each interviewed, one answer per question, a number in Table 1 is taken from the intersection cell, with values ranged from 1 to 6.
3. The number obtained in the previous step is selected in the first column of the Table 2. It is associated to its corresponding SVNN, in the second column of the table.
4. Every person's opinion is associated to an importance weight, $w_i \in [0, 1]$ for every $i = 1, 2, \dots, n$; which satisfy the condition $\sum_{i=1}^n w_i = 1$. This step is necessary when the opinion is emitted by experts and the expertise level will be taking into account. Otherwise, it is recommendable to assume $w_i = \frac{1}{n}$ for every $i = 1, \dots, n$.
5. The person's opinions are aggregated using the Weighted Average operator defined in Equation 3, it is the GSI.
6. Calculate $a(\text{GSI})$.
7. Calculate the closest score to $a(\text{GSI})$ from those appeared in the last column of Table 2. When $a(\text{GSI})$ is equally closest to two different values, the selection is made by means of the score function given in Equation 1.
8. In case that the final score is 0, which means not defined or contradiction, the final criterion is obtained from the answers given to the open questions.

3 Results

As for the information requested from the Judiciary Council of Santo Domingo, it was obtained that during the period spanned from January 2017 to December 2017, eighty-five claims for compensation for untimely dismissal were filed, of which nine are with a sentence only one of them could prove untimely dismissal.

As for the analysis of labor lawsuits, in the case of ineffective dismissal processed in the Judicial Unit of Civil, Commercial and Labor of the canton of Santo Domingo, it is determined that the plaintiff (breastfeeding woman) did not obtain a ruling in her favor because the existence of the untimely dismissal cannot be proved.

In the interviews, several questions were asked to legal professionals; however, it is considered that the relevant questions for the subject matter of this research work are the following:

1. Do you think that there should be a reversal of the burden of proof towards the employer regarding the non-

existence of untimely dismissal?

- Dr. Liber Andrade: "Of course, it has to exist, because we do not forget that the worker is the weak part of the labor relationship, and in this case, as much as there have been workers who heard that the employer fired their co-worker, they are not going to want to go and declare in favor of the worker, because job stability is going to be at stake...".

- Lawyer Jonathan Vera: "This escapes from the common rule, in the field of law it is established that whoever affirms a fact must prove it, this is typical of the labor field because of the inequality within this legal relationship between the parties ... and it would be very important to give this situation of the reversal of the evidence in favor of the worker ...".

2. Do you believe that the employer's rights would be violated by proposing to reverse the burden of proof in the absence of untimely dismissal?

- Dr. Liber Andrade: "In no way, because in the country we must understand that worker-employer relations are covered by social law, and the principles that govern social law, is that, always when there is a weak relationship and a strong relationship, the strong relationship is the one that has to be tested...".

- Lawyer Jonathan Vera: "No. Rather what one would be doing is forcing the employer to do things the right way and to begin to do much more orderly with the acts and... to seek respect for the rights that workers have...".

The result of applying the IADOV technique to the criteria in the survey to measure the reversal of the burden of proof on the non-existence of untimely dismissal is shown in Table 3.

Expression	Total	%
Clear Satisfaction	14	66
More satisfied than dissatisfied	7	33
Not defined	0	0
More dissatisfied than satisfied	0	0
Clear dissatisfaction	0	0
Contradictory	0	0

Table 3: Results of the application of the IADOV technique to measure the reversal of the burden of proof on the non-existence of untimely dismissal.

The score is calculated and Iadov's calculation is determined, for our case study a value was assigned in the equal weights vector $w_1 = w_2 = \dots = w_{21} = 0,0476$. The result of the method is $GSI = (1,00, 0,083, 0,083)$, $\alpha(GSI) = 0,91667$, which is closest to 1, meaning "Clear Satisfaction", and showing a high level of group satisfaction.

The result obtained denotes clarity of what is expressed in the judicial processes, regarding that each former worker who claims compensation for untimely dismissal must present the reversal of the burden of proof. That is to say, who should prove that there was no unilateral and illegal form of termination of the labor relationship should be the employer, but not the worker. Consequently, if the employer is unable to prove this, the judge will consider the worker's statement and his respective indemnification payment to be true and proven.

Additionally, the result obtained demonstrates that the implementation of the inversion of the burden of proof does not violate the rights of the employer since it must be understood that worker-employer relations are covered by social law and its principles.

From the research carried out (surveys, interviews, among others), it was determined that there is a need to implement the reversal of the burden of proof on the non-existence of untimely dismissal, a novel situation taking into consideration that it would be applied in a general manner and not only when the employer alleges abandonment of the worker. All of which strengthens and contributes to workers' fair access to the compensations and benefits determined by legal regulations, when such illegal and unilateral termination of the labor relationship occurs.

4 Conclusions

Ecuadorian law indicates that the burden of proof for the existence of untimely dismissal generally falls on the plaintiff (ex-worker) who has the burden of proving the facts he has affirmatively proposed in the complaint and who has denied the plaintiff in his reply.

According to Ecuadorian jurisprudence, the reversal of the burden of proof in untimely dismissal only occurs when the former employer in answer to the complaint indicates that it was the worker who left his job.

Surveys and interviews conducted with legal professionals, as well as the analysis of judicial processes in labor matters, show that it is necessary to implement the reversal of the burden of proof on the non-existence of untimely dismissal in order to strengthen and allow workers fair access to the compensation and benefits determined by legal regulations when such illegal and unilateral termination of the labor relationship occurs, preventing the employer from taking advantage of the difficulty and lack of evidence that the former worker has, for which the

Article 169 of the General Organic Code of Processes should be reformed.

The validation process using Iadov's neutrosophic technique to measure the reversal of the burden of proof on the non-existence of untimely dismissal confirmed its feasibility of use. The results were expressed quantitatively in a high index of satisfaction of the group in the survey applied in our case study.

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