**Artículo de investigación científica y tecnológica**

# Socioeconomic determinants of economic reintegration in colombia: evidence from a probit model

**Determinantes socioeconómicos de la reinserción económica en colombia: evidencia a partir de un modelo probit**

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**ABSTRACT**

This paper seeks to determine what socioeconomic aspects influence the economic reintegration process of former combatants from illegal armed groups in Bolívar, Colombia. For this purpose, an analysis of some variables such as age, gender, educational level, marital status, former group, household income, and type of demobilization is carried out. Methodologically, a two-stage econometric binary choice model (Probit) was applied. This research found that educational level, household income, and gender are the key socioeconomic determinants of economic reintegration in the population under study. Finally, the scholar community is invited to carry out studies of this type to understand the factors that can affect the economic reintegration of ex-combatants across the country. These analyses provide critical information for designing more successful reintegration programs for insurgent groups, considering that Colombia is currently undergoing a massive demobilization process requiring a successful reintegration program that prevents former combatants from recidivism.

**RESUMEN**

Esta investigación busca determinar cuáles son los principales factores que tienen incidencia en la reintegración económica de los excombatientes pertenecientes a grupos armados al margen de la ley en Bolívar, Colombia. Para alcanzar lo anteriormente planteado, se llevó a cabo un análisis de un grupo de variables socioeconómicas como: edad, género, nivel educativo, estado marital, número de hijos, ingresos familiares, tipo de desmovilización y grupo insurgente del excombatiente. El marco metodológico está representado por un modelo de selección binaria (Probit). Esta investigación encontró que el nivel educativo, el género y el ingreso familiar son los determinantes socioeconómicos clave de la reinserción económica en la población objeto de estudio. Finalmente, se invita a la comunidad académica a realizar estudios de este tipo con el fin de comprender los factores que pueden afectar la reintegración económica de los excombatientes en todo el país. Estos análisis brindan información crítica para diseñar programas de reintegración más exitosos para los grupos insurgentes, considerando que Colombia actualmente atraviesa un proceso de desmovilización masiva que requerirá un programa de reintegración exitoso que evite la reincidencia.

# INTRODUCTION

One of the main challenges of the Colombian Government has been the socioeconomic reconstruction of all its territories through the democratic transition of illegal armed groups to legality (Department of National Planning - DNP, 2015). The Agency for Reincorporation and Normalization (ARN) stores relevant and periodically updated information about former combatants who completed the reintegration route in Colombia.

This research seeks to establish the determinants of economic reintegration in former combatants who completed the reintegration route in the department of Bolívar, Colombia, analyzing the degree of influence of socioeconomic variables on the employability of this population.

Thus, this paper starts with a theoretical contextualization of the term "reintegration," considering the word itself comes from a complex historical process in which some words, such as reinsertion, reincorporation, and reconciliation, converge. These terms have similar meanings, yet they are different.

This research can be addressed as a descriptive study with a quantitative-qualitative approach. On the one hand, an econometric binary choice model (probit) was applied to quantitatively determine the socioeconomic variables that affect the economic reintegration process. On the other hand, some in-depth interviews with former combatants provided qualitative information supporting the results obtained from the econometric model and relevant data for the research beyond its quantitative outcomes.

The results show a descriptive analysis of the selected explanatory variables was carried out to determine their impact on economic reintegration (response variable). This analysis determined whether the explanatory variables behaved as expected according to the literature review. Then, two binary choice models (probit) were estimated: in the first model, all the explanatory variables were included in determining which of these had the required significance levels and which did not. Only the variables that reached the significance levels needed for the first model were included in the second model.

Lastly, some final considerations are presented, comparing the econometric model results with former combatants' perspectives about analyzed variables. Furthermore, some recommendations were made to improve the indicators of economic reintegration in Bolívar, Colombia.

## Theoretical Framework

Economic reintegration is one of the different types of reintegration. As mentioned, this concept differs from similar and confusing terms such as reconciliation, reincorporation, and reinsertion. Before understanding its economic dimension, it is essential to define the word reintegration, which is usually described as the final stage of a complex process that begins with disarmament, continues with demobilization, and ends with reintegration (Giraldo, 2010).

## Disarmament, Demobilization, and Reintegration (DDR) Process

DDR is a complex process that seeks to contribute to the security and stability of countries immersed in post-conflict contexts where political, military, security, humanitarian, and socioeconomic variables intervene (United Nations - UN, 2019). De Coning & Romita (2009) indicate that the DDR process is an intermediate stage between the peace agreement and the reconstruction of a country; therefore, it must be ensured that whatever peace is achieved, it becomes irreversible. For this, it is necessary to work the conflict from its origin to avoid the appearance of new hostilities between the parties involved. In this process, governmental and non-governmental entities must understand that DDR is not an instrument to achieve peace by itself, but it is a facilitator (Munive & Stepputat, 2015).

Disarmament is the initial stage of the DDR process. It is defined as the act of surrendering weapons, including ammunition, explosives, and any nuclear, chemical, biological, radiological, or conventional systems. The disarmament stage must be effective, efficient, and safe; it must be specifically designed to adapt to the security environment and planned in coherence with efforts to consolidate peace (UN, 2019; Giustozzi, 2016).

Demobilization is the second stage of the DDR process and is defined as the final, official, and controlled discharge of active combatants from illegal armed groups. Demobilization is a physical and mental process. In its physical dimension, a person separates from their firearm, reducing the number of individuals in an insurgent group. In its mental dimension, the former combatant is psychologically prepared to forget the kind of life they had during wartime and find a place in civil society (Muggah & O'Donnell, 2015). The demobilization can be individual or collective, which means that a person can demobilize at their own decision or within a massive demobilization program (UN, 2019).

Finally, reintegration is considered the final stage of the DDR process, in which the former combatant achieves civil status and gains access to sustainable employment and income (UN, 2019). It is a stage subject to continuous improvement. In fact, the Third Report of the Secretary-General on DDR of the UN (2011) delves into a new concept of "Sustainable Reintegration," which recognizes its political and social dimension with the same level of importance as its economic dimension.

## Reintegration

Reintegration is a long-term process in which former combatants from illegal armed groups acquire civilian status and obtain sustainable employment and income. Reintegration has an economic, social, and political dimension. According to the Integrated DDR Standards (IDDRS), it has an open duration period and requires long-term external assistance (UN, 2019).

First, it is crucial to recognize the differences between reinsertion and reintegration beyond the conceptual debate since both concepts influenced the construction of public policies for former combatants in Colombia (Escobar et al., 2019). In this sense, reinsertion is a short-term process of an assistance nature, where the former combatant receives humanitarian aid and support to return to civil life safely. On the other hand, reintegration is a long-term process where the former combatant returns to civility, most

of the time with access to employment and sustainable income generation (Gleichmann et al., 2004, as cited in DNP, 2018). For some authors, such as Humphreys & Weinstein (2007), reinsertion is an initial phase that is part of reintegration. For other authors, it is a transitional stage between demobilization and reintegration (Thorsell, 2013).

The term reincorporation, for its part, contains elements that differentiate it from reintegration, particularly concerning its political dimension. In this sense, reincorporation differs from reintegration as reincorporated former combatants can immediately participate in political environments, while reintegrated ex-combatants do not enjoy this benefit (ARN, 2017; (Rhyn, 2019). This differentiation is essential in the Colombian context of their Peace Agreements.

### Economic Reintegration

Among the social, political, and economic dimensions of reintegration, the latter is considered the most important because former combatants' permanence on legality usually depends on their access to the labor market and sustainable income generation (Thorsell, 2013). Additionally, unemployment is one of the leading causes of recidivism in crime (Kapplan & Nussio, 2018).

Economic reintegration is based on creating opportunities to help ex-combatants find employment or generate sustainable income for remaining productive individuals within the law. Creating economic opportunities is essential to help former combatants rebuild their civilian lives. This vulnerable population has consistently identified the capability of generating income as a critical factor for their successful reintegration. Many of them have also indicated that being able to provide for their families is vital for establishing their sense of identity and increasing their self-esteem (Kapplan & Nussio, 2018).

## METHODOLOGY

This research seeks to determine what socioeconomic variables affect the economic reintegration of former combatants in Bolívar, Colombia, by applying a probit model with a discrete dependent variable that can only take two possible values: 1= reintegrated, and 0= not reintegrated. It should be noted that reintegrated or not reintegrated for this study is circumscribed to the economic dimension of reintegration.

According to the definition of economic reintegration (detailed in the theoretical framework), it is determined that the number 1 value is for former combatants who have formal employment. On the other hand, the number 0 value is for former combatants who have informal employment or are unemployed. It is essential to mention that informal work is included in the number 0 value (not reintegrated) due to its lack of sustainability (Ruzek, 2015), an important attribute for considering a former combatant's situation

as reintegrated. The probit model allows determining the probability of a former combatant who has completed the reintegration route to be formally linked to the labor market, considering specific characteristics.

For Ariza et al. (2016), this type of model has advantages over other binary choice models, such as the Linear Probability Model (LPM), since the impact that variables to be measured have on the dependent variable does not simply correspond to the coefficients of the estimated models, but depends on the explanatory variables (Muthén, 1979). Additionally, LPM models have other problems, such as heteroscedasticity and limitations inherent to the determination of coefficient R2 (Ariza et al., 2016). This has led authors to search for alternatives to achieve more reliable estimations of dichotomous variables. At this point, binary choice models with discrete variables become relevant. The probit model proposed in this research is expressed as follows:

$$Y_i = B_0 + B_1 X_{i1} + B_2 X_{i2} + ... + B_K X_{ik} + e_i \quad (1)$$

Where $Y_i$ = status of former combatant regarding the reintegration route (reintegrated or not reintegrated); $X_{ik}$ = vector of explanatory variables (age, gender, educational level, marital status, former group, household income, and type of demobilization). Finally, $e_i$ = error term.

The independent or explanatory variables used for this research are available on ARN's website in the *"Reintegración en Cifras" section.* These variables were selected based on previous studies developed by theoretical referents such as Becker (1993) with the theory of human capital and McQuaid & Lindsay (2005), who analyzed a group of variables that can add or subtract from individuals to acquire formal employment. Furthermore, some explanatory variables (former armed group or type of demobilization) were included in the model at the authors' discretion since it is considered that these variables may have an impact on the response variable. This is because, in Colombia, there are government reports that have indicated that, as a result of the disorganization in the treatment of individual and collective demobilizations, former combatants who demobilized collectively from the United Self-Defense Forces of Colombia (AUC) came to enjoy more significant benefits during their reintegration route (Thorsell, 2013). Therefore, dummy or dichotomous variables will be established concerning the former armed group and type of demobilization of former combatants to determine whether being a former member of the AUC - collectively demobilized - has any positive effect on the individual's economic reintegration. However, a positive effect (+) is not expected for any of these two variables (Table 1) since no scientific evidence supports it. Therefore, it is established that these variables do not have a specific expected effect (+/-). Table 1 shows the operationalization of variables used in this study and their expected impacts.

**Table 1.** Operationalization of variables

| Dependent Variable | | | |
|---|---|---|---|
| Variable | **Description** | **Expected effect** | **Source** |
| Economic Reintegration (ECRE) | Dummy variable (1= has formal employment; 0= does not have formal employment) | Not applicable | Becker (1993) y Thorsell (2013) |
| Variable | **Description** | **Expected effect** | **Source** |
| Age (AGE1) | Numeric variable. It will be distributed by age groups according to Erikson's stages of development (cited by Bordignon, 2005).<br><br>1. Between 12 y 20 years old.<br>2. Between 20 y 30 years old.<br>3. Between 31 y 50 years old.<br>4. More than 50 years old. | (+) | Bordignon (2005), Kriger (1995) & Allgood (2020) & Bordignon (2005) |
| Age2 (AGE2) | Age squared. It measures the diminishing marginal returns on years of age over the economic reintegration of former combatants. | (-) | (Kriger, 1999) |
| Educational Level (EDLE) | Coded by years of study according to education levels of the Colombian Ministry of Education:<br><br>Literacy: 0 years of study.<br>Basic primary: 5 years of study.<br>Basic secondary: 9 years of study.<br>Bachelor: 11 years of study. | (+) | Braña & Anton (2007), Kerr et al. (2020) and Oswald-Egg & Renold (2021). |
| Gender (GEND) | Dummy variable (1= masculine; 0= feminine). | (+) | Song (1995), Braña & Antón (2007) and Kokot (2015) |
| Marital Status (MAST) | Dummy variable (1= has a spouse; 0=does not have a spouse). | (+) | Braña & Anton (2007) Choi et al. (2020) and Braun et al. (2020) |
| Children (CHIL) | Dummy variable (1= has children; 0=does not have children). | (+) | López (2001). |
| Family income (FAIN) | Numeric variable. Recorded taking into account income in terms of Minimum Monthly Wage (MMW):<br><br>1. Less than 1 MMW<br>2. Between 1 and less than 2 MMW<br>3. Between 2 and less than 3 MMW<br>4. Between 3 and less than 4 MMW.<br>5. 4 MMW or more. | (-) | López (2001) |
| Former armed group (FARG) | Dummy variable (1= was a former AUC member; 0=was not a former AUC member). | (+/-) | Thorsell (2013) |
| Type of demobilization (TYDE) | Dummy variable (1= individual demobilization; 0= collective demobilization). | (+/-) | Thorsell (2013) |

**Source:** Own elaboration based on data from the Agency for Reincorporation and Normalization (ARN).

## RESULTS

### Descriptive analysis of variables

This analysis used a microdata database composed of all former combatants who completed the reintegration route in Bolívar from the program's beginning until September 2019. The information in the database was cleaned and organized according to the variables included in this research as hypothetical determinants of economic reintegration.

Table 2 shows that 23.86 % of former combatants from Bolívar are economically reintegrated, i.e., they have access to formal and sustainable employment. The other 76.14 % are located in the informal sector of the labor market or unemployed, which means they are not economically reintegrated.

The variable corresponding to the age of former combatants was organized by age groups according to Erikson's stages of psychosocial development (Bordignon, 2005), which establish three types of ages distributed into four groups: adolescence (12-20 years), the young adult (21-30 years), the adult (31-50) and the elderly (over 51 years).

Concerning the age variable, there was an increase in the percentage share of former combatants between 21 and 30 who reached economic reintegration (6.38 %) and those between 31 and 50 who reached economic reintegration (87.23 %). Then, when analyzing the participation rate of reintegrated former combatants over 51 years old, the figure shows the percentage share decreases to 6.38 %. According to the economic literature reviewed, these results demonstrate the expected effects: the more senior the individual, the greater the chances of getting a job. However, after reaching work maturity (between 31 and 50), diminishing returns happen in the labor market's participation (Kriger, 1999). The results obtained concerning this variable concur with the results of Allgood (2020), Carlsson & Eriksson (2019), and Geyer et al. (2020), where it was found that age is one of the most common forms of employment discrimination.

For calculating the educational level of the population under study, the variables were recorded according to the years of education at each academic level. In this sense, a person who finished the basic primary level has five years of education; the basic secondary level, nine years of education, and when an individual gets a bachelor's degree, it means they completed eleven years of education (Ministry of National Education of Colombia- MEN, 2010). For those former combatants who never went to school and only learned to write and read (basic literacy), the years of education were taken as zero.

The education variable shows that as the former combatant's level of education increases, their economic reintegration rate also increases. Former combatants with a literacy level participate with 1.06 %, followed by those who

reached basic primary, basic secondary, and bachelor's with percentages of 8.51 %, 25.53 %, and 64.89 %, respectively. These results concur with other studies carried out by Groot et al. (1994), Braña & Anton (2007), Kerr et al. (2020), and Oswald-Egg & Renold (2021). These studies showed that more educated and qualified people are needed

The gender variable shows that 96.81 % of reintegrated former combatants are men, and 3.19 % are women. It is necessary to acknowledge that the analyzed sample of 394 individuals comprises 356 men and only 38 women. Nevertheless, the results of the economic reintegration rate by gender in this research are congruent with those obtained by other authors such as Song (1995), Braña & Antón (2007), Kokot (2015), Peng & She (2020) and Baquero et al. (2000) who stated that there is gender discrimination against women in the labor market.

In addition to the above, it is observed that 65.96 % of reintegrated former combatants have a spouse, while 34.04 % do not. These results concur with studies by Choi et al. (2020) and Braun et al. (2020). It is presumed that the individual, in this case, the former combatant, is financially responsible for their spouse, therefore, has a greater need to access the labor market.

On the other hand, descriptive analysis shows that 60.64 % of reintegrated former combatants have children, while 39.36 % do not. This is a likely outcome considering that former combatants with children have a more significant need for a job due to the economic responsibility they acquire with their offspring (López, 2001; Braña & Anton, 2007).

The household income variable shows an inversely proportional relationship between household income and economic reintegration in former combatants from Bolívar (the higher their household income, the lesser number of former combatants reintegrated), excluding those ex-combatants whose family groups earn less than 1 MMW. These individuals have a percentage share of 34 %, ranking below ex-combatants whose family groups make between 1 and 2 MMW (50 %). From there on, the higher the income of the family group, the lower the percentage of economic reintegration. These results concur with those obtained by López (2001), who indicates that the income of the other family members converts the individual into a surplus worker that increases their period of inactivity because high-income levels at home support their decision not to work.

Finally, the descriptive analysis shows that former combatants who were part of the AUC (79.79 %) and demobilized collectively (78.72 %) have a greater tendency to be reintegrated. This can be explained by Colombia's disorganized processes of individual and collective demobilizations. In this sense, those who demobilized collectively received better economic and assistance benefits than those who did so individually (Ministry of Interior of Colombia, 2008, as cited in Thorsell, 2013).

**Table 2.** Descriptive Analysis Variables

| Variables | Percentage | |
|---|---|---|
| **Former combatants who finished the reintegration route in Bolívar, Colombia.** | | |
| Reintegrated | 23.86 % | |
| No reintegrated | 76.14 % | |
| **Economic reintegration rate by age groups** | | |
| Between 21 and 30 years old | 6.38 % | |
| Between 31 and 50 years old | 87.23 % | |
| More than 50 years old | 6.38 % | |
| **Economic reintegration rate by educational level** | | |
| Literacy | 1.06 % | |
| Basic Primary | 8.51 % | |
| Basic Secundary | 25.53 % | |
| Bachelor | 64.89 % | |
| **Economic reintegration rate by gender** | | |
| Male | 96.81 % | |
| Female | 3.19 % | |
| **Economic reintegration rate when having spouse and children.** | **Spouse** | **Children** |
| Yes | 65.96 % | 60.64 % |
| No | 34.04 % | 39.36 % |
| **Economic reintegration rate by family income** | | |
| Less than 1 MMW | 34 % | |
| Between 1 and 2 MMW | 50 % | |
| Between 2 and 3 MMW | 12 % | |
| Between 3 and 4 MMW | 4 % | |
| 4 or more MMW | 0 % | |
| **Economic reintegration rate by armed group.** | | |
| AUC | 79.79 % | |
| Other groups | 20.21 % | |
| **Economic reintegration rate by type of demobilization** | | |
| Individual | 21.28 % | |
| Collective | 78.72 % | |

**Source:** own elaboration

**Application of binary response model (PROBIT)**

At first, the model was estimated using all the explanatory variables selected for this research (Table 3). However, some variables such as age, number of children, marital status, type of demobilization, and former armed group did not reach the accepted level of significance (probability of chi-square less than 5 %). Therefore, a second model was estimated, excluding variables that did not obtain ac-ceptable coefficients. This is to determine if the individually significant variables in the first model maintained an acceptable significance level in the second. It should be noted that some variables such as age and marital status, even though they did not reach an acceptable level of significance, were still used for the final model due to the importance that, according to the literature review, they have for studies about labor market's access (Braña & Antón, 2007). Additionally, the expected effects of these variables

are another factor that supported their inclusion in the final Probit model. As can be seen in Table 3, when estimating the second model, the significant variables of the first model (education, gender, and household income) maintained their level of significance.

The first and second models showed a Pseudo R2 of 7 %, which qualifies as a low model fit. However, the model met the expected effects, which allowed quantifying the

preponderance of the selected regressors. Additionally, as Gujarati & Porter (2009) state, the goodness of fit in binary regression models is of secondary matter since the expected effects are the most critical outcomes in the model. Moreover, the two models are statistically significant because the Chi-square probability is less than 5 %, ruling out the possibility of global non-significance of the models (Table 4).

**Table 3.** Application of first and second Probit Model

| Probit 1 | | | Probit 2 | | | |
|---|---|---|---|---|---|---|
| Var. | Coef. | P> z | Var. | Coef. | P> z | Marginal Effect (dy/dx) |
| AGE1 | 0.032 (+) | 0.79 | AGE1 | 0.042 (+) | 0.72 | 0.0118 |
| AGE2 | -0.001 (-) | 0.67 | AGE2 | -0.001 (-) | 0.61 | -0.001 |
| EDLE | 0.103 (+) | 0.01 | EDLE | 0.101 (+) | 0.01 | 0.029 |
| GEND | 0.915 (+) | 0.01 | GEND | 0.931 (+) | 0.01 | 0.265 |
| MAST | 0.176 (+) | 0.33 | MAST | 0.151 (+) | 0.33 | 0.043 |
| CHIL | -0.056 (-) | 0.75 | FAIN | 0.323 (+) | 0.00 | 0.092 |
| FAIN | 0.316 (+) | 0.01 | | | | |
| FARG | -0.540 (-) | 0.35 | | | | |
| TYDE | 0.061 (+) | 0.28 | | | | |

**Source:** own elaboration

**Table 4.** Global indicators of first and second Probit Model

| | Probit 1 | Probit 2 |
|---|---|---|
| Number of obs | 394 | 394 |
| L R chi 2 | 35.1 | 32.9 |
| Prob > chi 2 | 0.0001 | 0.0000 |
| Pseudo R 2 | 0.0789 | 0.0754 |

**Source:** own elaboration

## DISCUSSION

As observed in the results section, the education variable obtained the expected positive effect. In this sense, the higher the education level of the former combatant, their probability of reaching economic reintegration will increase by 2.9 percentage points. This happens because when people are educated, they gain knowledge that improves their skills in the labor market (Braña & Antón, 2009).

Regarding the gender variable, the results also showed the expected effects. In this sense, if the former combatant is a man, his probability of reaching economic reintegration increases by 26.5 %. The preceding concurs with the literature reviewed during this research, indicating employment discrimination against women in the labor market.

If a former combatant has a spouse, the probability of reaching economic reintegration status increases by 4.3 percentage points. This makes sense considering that 90.3 % of the population under study are men who are usually responsible for their spouses (López, 2001).

Household income did not obtain the expected negative effect according to the studies that support the conception of the surplus worker. On the contrary, the marginal effects of the probit model indicated that the higher the family income, the probability of reaching economic reintegration increases by 9.2 percentage points. The results concerning this variable showed that a former combatant who completed the reintegration route does not become a surplus worker, regardless of their family income.

Although the age variable is insignificant in the estimated model, it showed the expected positive effect according

to the literature review. In other words, as the age of the former combatant increases, the probability of economic reintegration increases as well. The inclusion of an age-square variable (AGE2) in the model seeks to demonstrate whether there are diminishing marginal returns for the dependent variable. In this case, the variables AGE1 and AGE2 showed the expected effects: as a former combatant grows older, their probability of reintegration increases by 1.1 percentage points. Then, a decreasing effect of 0.01 % was perceived for the age-square variable.

## CONCLUSION

In general terms, it can be said that variables that significantly determine the economic reintegration of former combatants in Bolívar are education level, gender, and family income. However, not all of these variables showed the expected effects when applying the probit binary response model. Additionally, age and marital status were included in the final model based on these two variables' theoretical relevance and expected behavior.

Regarding the education level, gender, marital status, and age of former combatants, the expected positive effects were successfully obtained. On the other hand, household income, the variable with the highest significance level, did not produce the expected negative impact. Below, the main conclusions for each explanatory variable selected for the final model will be presented:

1. Regarding education, it is clear that the higher the former combatant's educational level, the greater the probability of economic reintegration in the labor market. These results align with other studies that establish that education is a source of knowledge and skills for the workforce. These results show the importance of the reinsertion stage, where the former combatants get the chance to gain some knowledge and skills to succeed in the labor market. In this sense, the ARN must ensure that former combatants get interested in educating themselves to acquire the necessary knowledge and skills for improving their competitiveness and probability of economic reintegration.

2. Regarding the gender variable, the low rate of economic reintegration in women is worrying. According to the perception of some former combatants, this occurs because available jobs for the population under study are usually physically demanding; thus, men have more access than women. In response to the previous, the ARN should work on a specialized plan for the economic reintegration of women, considering that many of them are household heads.

3. The family income variable did not show the expected negative effect on economic reintegration. This discards the condition of surplus workers for populations under study. The unavailability of underage former combatants in the sample could have affected the results of this variable concerning the expected effect, considering that surplus workers are primarily young adults.

4. The age variable is of great importance in studies about determinants of employment. Most of these studies have indicated that the older a person, the greater their attraction to the labor market due to the experienced gained in working life. Nevertheless, the population under study lacks the particularity of having accumulated work experience; most of them were performing insurgent activities for the armed groups to which they belonged. Furthermore, there are limitations in the analysis of the age variable because underage former combatants are not attended by the ARN, i.e., they are not included in the database. This variable's low significance level can be explained based on the disparity in the relationship between age and work experience, and the limitation of information on underage former combatants.

5. Although the marital status variable did not obtain the accepted significance level, it showed the expected effects according to the literature review. In this sense, having a spouse increases the probability of economic reintegration in the population under study, taking into account that the majority of former combatants are men who are usually financially responsible for their spouses.

The findings and conclusions of this paper are highly relevant, considering the post-conflict process Colombia is going through after the collective demobilization of the FARC-EP. The results and recommendations of this study are expected to serve as input for structuring local policies in favor of the current economic reintegration process and the upcoming economic reincorporation process. Likewise, it is hoped that this research will serve as a basis for similar studies in other regions of the country to improve the understanding of the reintegration process in Colombia.

**Declaration on Conflict of Interest**
The authors of this paper report that they are independent of financial institutions. Furthermore, it is stated that there are no interests other than those usually fulfilled by a research study based on a scientific methodology.

## BIBLIOGRAPHIC REFERENCES

Allgood, S. (2020). Age Discrimination and Academic Labor Markets. *Journal of Economic Behavior & Organization 169*, 70-78. https://doi.org/10.1016/j.jebo.2019.10.024

Ariza, M., Acosta, K. & Altamar, L. (2016). Aplicación de los Modelos de Respuesta Binaria a los Determinantes de la Demanda de Postgrado en Colombia. *Escenarios, 14*(1), 7-18. http://dx.doi.org/10.15665/esc.v14i1.874

Baquero, J., Guataqui, J. & Sarmiento, L. (2000). Un Marco Analítico de la Discriminación Laboral. *Borradores de investigación, 8*(1), 2-31. https://repository.urosario.edu.co/handle/10336/10807

Becker, G. (1993). *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education.* The National Bureau of Economic Research. https://www.nber.org/

books-and-chapters/human-capital-theoretical-and-empirical-analysis-special-reference-education-third-edition

Bordignon, N. (2005). El Desarrollo Psicosocial de Eric Erikson. El diagrama epigenético del adulto. *Revista Lasallista de Investigación, 2*(2), 50-63. https://www.redalyc.org/pdf/695/69520210.pdf

Borjas, G. (2000). Economics of Migration. International Encyclopedia of the Social and Behavioral Sciences, *3*(38), 1-21. https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.453.6650&rep=rep1&type=pdf

Braña, F. & Antón, J. (2007). Determinantes de la Inserción Laboral de los Jóvenes en España. Revisión y Nueva Evidencia Empírica. *Anuales de economía aplicada, 10*(1), 44-67. https://dialnet.unirioja.es/servlet/articulo?codigo=5181268

Braun, C., Nusbaum, C. & Rupert, P. (2020). Labor Market Dynamics and the Migration Behavior of Married Couples. *Review of economics dynamics*, Elsevier for the Society for Economics. http://dx.doi.org/10.1016/j.red.2020.11.001

Carlsson, M. & Eriksson, S. (2019). Age Discrimination in Hiring Decisions: Evidence from a Field Experiment in the Labor Market. *Labour Economics, 59,* 173-183. http://dx.doi.org/10.1016/j.labeco.2019.03.002

Choi, J., Choi, J. & Son, H. (2020). The Long-term Effects of Labor Market Entry in a Recession: Evidence from the Asian Financial Crisis. *Labour Economics, 67,* 101926. http://dx.doi.org/10.1016/j.labeco.2020.101926

De Coning, C. & Romita P. (2009). *Monitoring and Evaluations of Peace Operations.* International Peace Institute. https://www.ipinst.org/wpcontent/uploads/publications/ipi_rpt_m_and_e_of_peace_ops_epub.pdf

Department of National Planning - DNP. (2015). *CONPES 3850: Fondo Colombia en Paz.* Department of National Planning. https://colaboracion.dnp.gov.co/CDT/Conpes/Econ%C3%B3micos/3850.pdf

Department of National Planning - DNP. (2018). *CONPES 3931: Política Nacional para la Reincorporación Social y Económica de Exintegrantes de las FARC-EP.* Department of National Planning. https://www.reincorporacion.gov.co/es/Documents/conpes_final_web.pdf

Escobar, Á., Luna, J. & López, N. (2019). Reintegración Económica: Conceptualización y Estrategias Implementadas en Colombia y Otros Países. *Saber, Ciencia y Libertad, 14*(1): 118-139.https://doi.org/10.18041/2382-3240/saber.2019v14n1.5211

Geyers, J., Haan, P., Hammerschmid, A. & Peters, M. (2020). Labor Market and Distributional Effects of an Increase in the Retirement Age. *Labour Economics, 65,* 101817. http://dx.doi.org/10.1016/j.labeco.2020.101817

Giraldo, S. (2010). Contextualización teórica e histórica de la reintegración social y económica de desmovilizados en Colombia. *Poliantea, 6*(11), 35-52. https://journal.poligran.edu.co/index.php/poliantea/article/view/198

Giustozzi, A. (2016). *Post-conflict Disarmament, Demobilization and Reintegration: Bringing State-building Back in.* Taylor and Francis. http://dx.doi.org/10.4324/9781315601656

Groot, W., Hartog, J. & Oosterbeek, H. (1994). Cost and revenues of investment in Enterprise-Related schooling. *Oxford Economics papers, 46*(4), 658-75. https://www.jstor.org/stable/2663515#metadata_info_tab_contents

Gujarati, D. y Porter, D. (2009). *Econometría. Quinta Edición.* Mc Graw Hill. https://www.academia.edu/33064534/Gujarati_Econometr%C3%ADa_5ta_Edici%C3%B3n_pdf

Humphreys, M. & Weinstein, J. (2007). "Demobilization and Reintegration. *Journal of Conflict Resolution, 51*(4), 531-567. http://dx.doi.org/10.1177/0022002707302790

Kapplan, O. & Nussio, E. (2018). Explaining Recidivism of Ex-Combatants in Colombia. *Journal of Conflict Resolution, 62*(1): 64-93. http://dx.doi.org/10.1177/0022002716644326

Kerr, S., Pekkarinen, T., Sarvimäki, M. & Uusitalo. (2020). Post-Secondary Education and Information on Labor Market Prospects: A Randomized Field Experiment". *Labour Economics, 66,* 101888. http://dx.doi.org/10.1016/j.labeco.2020.101888

Kokot, P. (2015). Let's Talk About Sex(ism): Cross-national Perspectives on Women Partners' Narratives on Equality and Sexism at

Work in Germany and the UK. *Critical Perspectives on Accounting, 27*, 73-85. http://dx.doi.org/10.1016/j.cpa.2014.02.002

Kriger, J. (1999). *British Politics in the Global Age: Can Social Democracy Survive?* Oxford University. https://books.google.com.co/books/about/British_Politics_in_the_Global_Age.html?id=BNbksZgI5a4C&redir_esc=y

López, H. (2001). *Características y Determinantes de la Oferta Laboral Colombiana y su Relación con la Dinámica del Desempleo*. Chapter in Urrutia, Miguel (Ed.), Empleo y Economía (pp. 156-192). Banco de la República. http://dx.doi.org/10.32468/Ebook.664-099-X

McQuaid, R. & Lindsay, C. (2005). The Concept of Employability. *Urban Studies, 42*(2), 197-219. https://doi.org/10.1080/0042098042000316100

Ministry of Education of Colombia (2010). *Niveles de Educación Básica y Media.*. https://www.mineducacion.gov.co/1759/w3-article-233834.html

Muggah, R. & O'Donnell, C. (2015). Next Generation Disarmament, Demobilization, and Reintegration. *Stability, 4*(1). http://dx.doi.org/10.5334/sta.fs

Munive, J. & Stepputat, F. (2015). Rethinking Disarmament, Demobilization, and Reintegration Programs. *Stability, 4*(1). http://dx.doi.org/10.5334/sta.fs

Muthén, B. (1979). A Structural Probit Model with Latent Variables. *Journal of the American Statistical Association 74*(368), 807-811. http://dx.doi.org/10.1080/01621459.1979.10481034

Oswald-Egg, M. & Renold, U. (2021). No Experience, No Employment: The Effect of Vocational Education and Training Work Experience on Labour Market Outcomes After Higher Education. *Economics of Education Review, 80*, 102065. http://dx.doi.org/10.1016/j.econedurev.2020.102065

Peng, C. & She, P. (2020). Are Women Less Likely to be Managers in the UK Labour Market? *Economic Modeling, 85*, 317-324. http://dx.doi.org/10.1016/j.econmod.2019.10.021

Rhyn, L. (2019). Overcoming Stigma and Fostering Participation: Mechanisms for Community Reintegration in Colombia. *Conflict, Security and development, 19*(2), 195-222. http://dx.doi.org/10.1080/14678802.2019.1586157

Ruzek, W. (2015). "The informal Economy as a Catalyst for Sustainability*." Sustainability, 7*(1), 23-34. http://dx.doi.org/10.3390/su7010023

Song, M. (1995). Between "The Front" and "The Back": Chinese Women's Work in Family Businesses. *Women's Studies International Forum, 18*(3), 285-298. http://dx.doi.org/10.1016/0277-5395(95)80073-X

Thorsell, S. (2013). Towards People-centred Economic Reintegration? An Analysis of the Economic Reintegration Strategy of Demobilized Combatants in Colombia. *Colombia Internacional, 77,* 177-215. http://dx.doi.org/10.7440/colombiaint77.2013.07

United Nations - UN. (2011). *Third Report of the Secretary–General on DDR.* http://unddr.org/uploads/documents/IDDRS_4.30%20Reintegration%20WEB.pdf

United Nations - UN. (2019). *Integrated Disarmament, Demobilization and Reintegration Standards (IDDRS).* https://www.unddr.org/the-iddrs/level-1/