

## Returns to education of Colombian care workers before and after the COVID 19 pandemic

 Dustin Tahisin Gómez Rodríguez<sup>1\*</sup>,  Ehyder Mario Barbosa Perez<sup>2</sup>

<sup>1</sup>University Corporation of Asturias, Colombia; dustin.gomez@uniasturias.edu.co (D.T.G.R.).

<sup>2</sup>Minute of God University Corporation, Colombia; ehyder.barbosa@uniminuto.edu (E.M.B.P.)

**Abstract:** This article aims to examine how human capital is reflected in the field of care work in Colombia, emphasizing its relevance for the sustainable progress of the country, both before and after the COVID-19 pandemic. A quantitative methodology was employed, conducting a microeconomic model through Mincerian equations with data from the Integrated Household Survey (GEIH) provided by the National Administrative Department of Statistics (DANE) for the periods 2018, 2019, 2021, and 2022. The main conclusion highlights the intrinsic relationship between human capital, care jobs, and the Colombian reality, underscoring the complexity and multidimensionality of these aspects. While investment in skill and knowledge development is crucial for the country's advancement, the lack of visibility and recognition of care jobs, despite their critical impact on society, poses a significant challenge.

**Keywords:** *Employment, Market Economy, Transitioning Economies, Workforce.*

### 1. Introduction

At present, the correspondence between Human Capital and Care Work plays a crucial role in the social and economic development of countries [1]. In the specific case of Colombia, this relationship takes on special relevance as it intertwines with socio-cultural, economic and gender dynamics [2]. This paper explores how Human Capital is reflected in Care Work in Colombia, highlighting the importance of this relationship for the country's sustainable progress before and after the COVID-19 pandemic.

Human Capital is defined as the body of knowledge, skills and experience possessed by a population [3-5]. In the Colombian context, investment in education and skills development has become a fundamental pillar for economic growth and improved quality of life. Human capital formation refers not only to formal education, but also to skills acquired through work experience and continuous learning [6].

Likewise, Care Work, historically female-centred, plays a crucial role in the development of Human Capital. These jobs, which range from caring for children and the elderly to domestic work, have been instrumental in Colombia in enabling other members of society to participate fully in the labour and educational spheres [7, 8].

However, despite the importance of care work, Colombia faces significant challenges in this sector. Lack of formal recognition, lack of adequate labour protection and wage disparities are obstacles that affect caregivers. Care workers often face precarious working conditions and lack of social benefits, highlighting the need for policies to address these issues [9]. The relationship between gender and care work is undeniable in the Colombian context, with women mostly assuming care responsibilities both at home and at work [10, 11]. This phenomenon contributes to the perpetuation of gender stereotypes and inequality, as women often face difficulties in balancing the demands of care work with the pursuit of educational and employment opportunities [12].

To respond to these challenges, it is essential to implement policies that recognise and value care work. This includes measures to ensure fair wages, decent working conditions and access to social benefits. In addition, it is crucial to foster the equal redistribution of care responsibilities between genders, promoting men's active participation in care work [13]. Therefore, this article hypothesises that there is a significant bidirectional relationship between human capital development and the quality of care work in the country. It is argued that strengthening human capital, through investments in education and training, could have a positive impact on the improvement of care work and thus on the overall well-being of Colombian society.

Accordingly, the article is structured in several moments: first, a continuous introduction is presented with the methodology and methods used, followed by the results, the discussion, a brief conclusion and, finally, the references used to support the research judgement.

## 2. Methodology

In this study, the main source of data used is the Microdata from the Gran Encuesta Integrada de Hogares (GEIH) corresponding to the periods 2018-2019 and 2021-2022, provided by the Departamento Administrativo Nacional de Estadística (DANE). From a scientific perspective, the validity of surveys as tools to understand social phenomena is highlighted, being widely used in labour economics research [14-16].

The research approach focuses on the professions, according to the classification established by DANE, and specifically on Care Jobs [17, 18]. The theoretical framework of Mincerian Functions is adopted to estimate the returns of Human Capital variables on the wage income of these professionals during the mentioned period [19].

The estimation is based on the income function proposed by Mincer in 1974, which seeks to calculate the reciprocity between the Human Capital variables and the logarithm of labour income. The model applied to the GEIH data is configured following the principles established by Rodríguez [14] and Gómez and Barbosa [20] and the seminal work of Mincer (1974; 1970). The methodology employed seeks to shed light on the relationship between Human Capital and the earnings of Colombian Care Work, offering a valuable perspective from labour economics [21].

$$\ln(y) = \beta_0 + \beta_1 + \beta_2 \exp + \beta_3 \exp^2 + \varepsilon \quad (1)$$

Where:

Y: income of the individual.

S: number of years of formal education.

Exp: number of years of work experience.  
work experience.

$\varepsilon$ : random term that cannot explain the model.

Micro econometric model

$$\ln Y_i = \beta_0 + \beta_1 \exp_i + \beta_2 \exp_i^2 + \beta_3 \text{Edu}_i + \beta_4 \text{Edu}_i^2 + \beta_5 \text{Disciplina}_i + \beta_6 \text{Disciplina}_i^2 + \beta_7 + \varepsilon_i \quad (2)$$

Where:

$\ln y_i$  = income of wage earners in logarithmic form.

exp = experience of the worker.  $\exp^2$  = experience of the worker squared.

pri = primary school level.

sec = secondary school level.

uni = university level.

Discipline = represents the professions.

k = number of occupations [14].

This methodological approach, supported by the rigorousness of the earnings function proposed by Mincer, offers a robust approach to analyse the influence of Human Capital variables on the labour income of Colombian teachers. This approach not only stands out as an effective analytical tool, but also meets the scientific standards established for research in the field of labour economics, according to references such as [22, 23].

The key variables used in this analysis include Ln, which represents the natural logarithm of hourly earnings, functionally derived from two main variables: education measured in years (edu) and work experience (exp). A quadratic expression (exp2) is incorporated to indicate diminishing returns as a function of experience measured in years. In addition, differential effects across cities and occupations are considered using dummy variables. The coefficients associated with these variables are expected to have a positive sign for edu and exp, and a negative sign for exp2, reflecting the differential effects in each city and occupation, as reported by Gómez Rodríguez and Rojas [24].

The econometric model is subjected to the methodology proposed by Heckman [25] to correct for selection bias, especially when the individuals analysed do not constitute a random sample of the target population. This correction addresses the omission of unobservable variables, such as motivation and skills, associated with wages, which may bias the coefficients of the earnings equations, as indicated by [26].

The Heckman procedure introduces a selection term derived from the pseudoradicals of a probit model of labour participation. These pseudoradicals contain information on the unobservable variables associated with wages, allowing to correct the estimated coefficients of other variables present in the model [27]. The method also incorporates the variable  $\lambda$ , known as the correction term or inverse of the Mills ratio, to adjust for selection. In addition, estimations of gender-differentiated wage equations will be performed in order to identify the gender wage gap, following the approach of Gomez, et al. [28] and Mérlo [29].

$$\ln(f) = X_f * \beta_f + \sigma \lambda_f + U_f \tau_2 \quad (3)$$

$$\ln(W_m) = X_m * \sigma_m \lambda_m + U_m \quad (4)$$

Where  $W_i$  = Column vector of the logarithm of the hourly wage of the individual of sex  $i$ .

$X_i$  = Matrix containing the observed characteristics of the individuals.

$B_i$  = Vector of coefficients to be estimated.

$\lambda$  = Correction term.

$\sigma$  = Covariance between the unobservable factors affecting labour participation and those affecting wages.

$U_i$  = Random disturbance term, where  $E(u) = 0$  [14, 30, 31].

### 3. Results

In this study, we detail the estimations of the labour income equation model, described in equation (2), using annual microdata from the Gran Encuesta Integrada de Hogares (GEIH) in the periods 2018-2019-2021 and 2022 of the Departamento Nacional Administrativo de Estadística-DANE. The total sample comprises 911 thousand observations, including both the economically active population surveyed and the inactive population [32]. Data for the year 2020 were not included due to robust errors identified in the data that could distort the results [33, 34].

The Tables 1 and 2 present the results of the selection effects incorporated in the earnings equations using the Heckman [25] procedure for the male sub-sample, and the same results are given for the female sub-sample. The coefficients presented in the tables of the earnings equations for the different professional categories are statistically significant [35].

The results obtained suggest, firstly, the absence of selection bias, according to the lambda coefficients. In addition, a statistically significant negative correlation at 1% is observed for the selected

variables, which implies that unobserved characteristics have a significant weight in an individual's share of earnings, highlighting greater motivation, ability and other characteristics associated with productivity, in line with the findings of Galvis [36].

In the same way, the International Standard Industrial Classification (ISIC) of all economic activities was concatenated with the composition of all economic activities with the composition of the Care Work divisions from the Gran Encuesta Integrada de Hogares (GEIH) [37, 38].

**Table 1.**

Income equations for the male sub-sample.

Professions	Year				CIU code
	2018	2019	2021	2022	
Domestic work and cleaning	-0,2013	-0,2248	-0,2281	-0,2311	9700
Beauty treatment specialists and associated workers	0.1132	0,1168	0,2001	0,1197	9602
Workers in services not classified under other headings	0.1352***	0,1333	0,1268	0,1237	8720-8730
Cooks, waiters, bartenders, and similar workers	0.1329***	0,1472	0,1327	0,1392	5611-5612-5313-5619
Nursing	0.4373***	0.4299***	0.4266***	0.4213***	8610-8621-8691-8692-8710
Teachers	0.6615***	0.6534***	0.6619***	0.6586***	8511 ,8512-8513

**Table 2.**

Income equations for the female sub-sample.

Professions	Years				CIU Code
	2018	2019	2021	2022	
Domestic work and cleaning	0.0150	0.0131**	0.0167***	0.0124***	9700
Beauty treatment specialists and associated workers	0.0026	0.0044**	0.0126***	0.00258**	9602
Workers in services not classified under other headings	0.3437***	0.3336***	0.4412***	0.2894***	8720-8730
Cooks, waiters, bartenders, and similar workers	0.3502***	0.35725***	0.3608***	0.3498***	5611-5612-5313-5619
Nursing	0.4809***	0.4714***	0.4779***	0.4801***	8610-8621-8691-8692-8710
Teachers	0.5648***	0.5615***	0.5582***	0.5568***	8511 ,8512-8513

**Note:** Robust standard errors in brackets. \*\*\* denotes significance at 1%, \*\* denotes significance at 5%, \* denotes significance at 10%. denotes significance at 10%. Base category is Salesperson, Shop Assistant.

The names of the trades, occupations and professions are taken from the page

[http://www.ilo.org/public/libdoc/ilo/1969/69B09\\_35\\_span.pdf](http://www.ilo.org/public/libdoc/ilo/1969/69B09_35_span.pdf). Last accessed 30/11/2023.

The results reveal significant patterns in the educational outcomes for Care Workers in Colombia. It is observed how education has had a differential impact on the incomes of this group, both in the pre-COVID period and in the post-pandemic stage. The paid care sector, which includes activities in education, human health care, social assistance, and domestic services, employed over two million people in 2019, of which 76% were women [39]. However, women in the care sector exhibit higher rates of informality, lower levels of education, and lower income compared to men. Due to the COVID-19 pandemic, the paid care sector was the most affected in terms of job loss, especially for women with lower education and income levels and higher informality [40].

#### 4. Discussion

This article supports the assertions of Álvarez-Correa, et al. [41]; Barraza [31] and Aguirre and Arriagada [42] who argue that investment in the training and education of the Colombian population has a positive impact on the development of human capital. Properly educated human capital possesses skills, knowledge and capacities applicable in a variety of fields, including care work. Specifically, the provision of care services by better trained professionals would not only improve the quality of care services, but also raise the status and social recognition of care workers [43].

It is imperative to emphasise that promoting equal participation of men and women in education and work can play a crucial role. Such action could reduce the disproportionate burden of care responsibilities that currently falls on women, thus contributing to a more equitable distribution of these tasks [44, 45].

Consistently, Gómez and Rojas [46]; Yamada [47] and Navarro [48] agree with the results of the research exercise in indicating that both human capital and care work exert a significant influence on Colombia's social and economic development. Both concepts play a crucial role in the sustainable advancement of the country. Human capital formation, which encompasses both formal education and skills acquired through work experience, is an essential element in building a more competent and advanced society. At the same time, care work, mostly undertaken by women throughout history, is fundamental to the functioning of society and the well-being of its members [49, 50].

Indeed, the article supports the claims of Rodríguez [51]; Gómez Rodríguez and Rojas Velásquez [52]; Freire and Teijeiro [53] and Salas-Velasco [54] who argue that both human capital and care work are intrinsically linked to gender equity. Equal participation of men and women in education and work proves to be a key element in mitigating the disproportionate burden of care responsibilities on women, thus promoting a fairer distribution of tasks [55, 56].

#### 5. Conclusions

The concept of human capital primarily refers to educational training and skill development, aspects that are more easily quantifiable and assessable in terms of academic and professional achievements. In contrast, caregiving jobs, encompassing domestic responsibilities and the care of individuals, often lack the same visibility and recognition, despite their critical impact on society. Specifically, challenges associated with caregiving, such as the lack of adequate labor protection and absence of social benefits, possess distinctive features that require differentiated approaches and policies to address these issues.

The relationship among human capital, caregiving jobs, and the Colombian reality is complex and multidimensional. Investment in skills and knowledge development is crucial for the country's progress, but the importance of caregiving jobs in this process cannot be overlooked. Resolving existing challenges, especially in terms of gender, is essential for building a more equitable and sustainable society. Colombia has the opportunity to strengthen its human capital by fully recognizing and valuing caregiving jobs, thereby laying the foundations for a more prosperous and inclusive future.

The convergence between human capital and caregiving work is evident in their contribution to the country's development and progress. However, divergences reflect disparities in the recognition and valuation of these areas, as well as specific challenges associated with caregiving work. To achieve a more equitable and sustainable society, it is essential to address these divergences and promote policies that fully recognize the importance of both concepts in the construction of a prosperous and just future.

#### Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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