

# Annex A. Gender gaps at the regional level and relationship between gender equality and departmental GDP growth in Colombia

## Introduction

As shown in Chapter 2, wide imbalances persist between women and men in Colombia, with significant regional variation. This Annex presents an analysis of existing gender gaps at the regional level in the country. After investigating departmental differences in gender gaps with respect to economic participation, educational achievement, health and survival, and political empowerment, the Annex proposes an econometric model to estimate the relationships between gender equality and economic growth in Colombia. This empirical study was developed by experts of the Colombian Observatory for Women in the framework of the six-year co-operative project between the government of Colombia and the OECD and included in the Report at the request of the Presidential Council for Women's Equality.

## Gender gaps at the regional level

Colombia has wide territorial gaps in development, which are reflected in its departments' varying levels of competitive performance (CPC & U. Rosario, 2021<sup>[1]</sup>). Recent efforts have been made to measure gender gaps at the regional level, including creating the Colombian Women's Observatory, which answers to the Presidential Council for Women's Equality (CPEM), and the Departmental Gender Equality Index, managed by the Cydeem Foundation and Kynapsys Research and Consultancy (CPEM, 2021<sup>[2]</sup>) (Cydeem & Kynapsys, 2020<sup>[3]</sup>)<sup>1</sup>.

To offer a regional overview of the disparities between men and women, an index of gender gaps at the departmental level is presented below, drawing on the methodology of the World Economic Forum's Global Gender Gap Index (WEF, 2021<sup>[4]</sup>). A synthetic index is calculated for Colombia's 23 departments and the capital district of Bogotá.<sup>2</sup> This indicator has 16 variables divided into four pillars: 1) economic participation and opportunities, 2) educational achievement, 3) health and survival, and 4) political empowerment.

**Table A A.1. Structure of the Gender Gap Index for Colombia, 2021**

By department

Sub pillar	Variable (ratio between men and women)	Description	Source
<b>Economic participation and opportunity</b>	Labour force participation rate	Proportion of the economically active population over the working-age population (% 2020)	DANE
	Income equality	Monthly earned income (COP 2020)	DANE
	Hours worked	Average hours worked per week (hours 2020)	FILCO – Ministry of Labour
	Formality work rate	Proportion of employed who contribute to health and pension (% 2020)	FILCO – Ministry of Labour
	Professional and technical workers	Proportion of employed who are professionals and technicians (% 2020)	DANE
<b>Educational attainment</b>	Literacy rate	Proportion of the population that can read and write (%)	DANE
	Enrolment in primary education	Enrolment of students between 5 and 10 years of age in primary education (% 2020)	Ministry of Education
	Enrolment in secondary education	Enrolment of students between 11 and 16 years of age in secondary education (% 2020)	Ministry of Education
	Enrolment in tertiary education	Enrolment of students between 17 and 21 years of age in tertiary education (% 2020)	Ministry of Education
	Enrolment in STEM careers	Proportion of students in science, technology, engineering, and mathematics careers (% 2020)	Ministry of Education
<b>Health and survival</b>	Sex ratio at birth	Proportion of male and female births (ratio 2020)	DANE
	Healthy life expectancy	Average years of life expected at birth (years 2020)	DANE
	Mortality to preventable causes rate	Number of deaths for cancer, diabetes, cardiovascular and respiratory diseases (per 100 000 habitants 2020)	DANE
<b>Political empowerment</b>	Governor	Proportion by gender of people who held the position of governor in the last four electoral periods (2007, 2011, 2015, 2019) (%)	National Civil Registry
	Mayors	Proportion by gender of people who held the positions of mayor in the municipalities of the department (% 2019)	National Civil Registry
	Gubernatorial candidates	Proportion by gender of people who were candidates for the post of governor (% 2019)	National Civil Registry

Source: Author's own calculations based on data from (DANE, n.d.<sup>[5]</sup>; FILCO, n.d.<sup>[6]</sup>; Ministerio de Educacion Nacional, n.d.<sup>[7]</sup>) (2002)

This index aims to present a general diagnosis of Colombia's departments for dimensions with persistent disparities between men and women that hinder the development of local economies.

At the methodological level, to obtain the scores associated with each indicator, the ratio between the observed value of the indicator for men and women is calculated, distributed between 0 and 1.<sup>3</sup> The values obtained are adjusted on a scale of 0 to 10, to facilitate the interpretation of the scores, where 10 indicates full gender parity and 0 represents the worst performance.<sup>4</sup>

The general score of the index corresponds to a simple average of the four pillars, which are in turn obtained from the simple average of its composing indicators.

The results for 2020 show that the department of Valle del Cauca ranked the highest, with a score of 8.02 out of 10, continuing its lead since 2019. Atlántico came in second, with a score of 7.75 out of 10. In third place was the capital district of Bogotá, with a score of 7.74 out of 10. At the other end of the scale, the La Guajira, Norte de Santander and Chocó fared the lowest (Table A A.1).

It is worth noting that Cauca has seen a jump of 4 p.p. since 2019, ranking ninth of the 24 departments evaluated. Boyacá and Cesar have also improved their rank substantially since 2019, increasing 3 p.p.

As for departments whose position fell in the gender gap indicators, Bolívar lost five positions in the general ranking, and Magdalena and Sucre fell four positions from 2019 (Table A A.2).

**Table A A.2. Gender Gap Index score and ranking: Colombian departments, 2021**

2020 Region	GGI			ECO		EDU		SAL		POL	
	Score	Rank	Vs. 2019	Score	Rank	Score	Rank	Score	Rank	Score	Rank
Valle del Cauca	8.02	1	⇒ 0	8.37	14	9.02	7	9.02	17	5.67	1
Atlántico	7.75	2	⇒ 0	8.40	12	9.23	2	9.32	8	4.04	2
Bogotá D.C.	7.74	3	⇒ 0	9.07	1	8.94	12	9.59	2	3.33	3
Meta	7.31	4	⇒ 0	8.29	16	9.03	6	9.12	14	2.81	4
Córdoba	7.10	5	⇒ 0	7.76	22	9.35	1	8.99	19	2.31	5
Quindío	7.04	6	↑ 2	8.53	7	8.97	10	8.89	23	1.78	6
Santander	7.02	7	⇒ 0	8.59	6	8.95	11	9.36	6	1.20	11
Huila	6.99	8	↑ 1	8.40	13	8.62	20	9.32	9	1.63	7
Cauca	6.92	9	↑ 4	8.64	5	8.90	14	9.36	5	0.78	16
Magdalena	6.92	10	↓ -4	7.96	20	9.02	8	9.08	15	1.62	8
Risaralda	6.92	11	↓ -1	8.41	11	9.20	3	8.95	21	1.11	12
Cundinamarca	6.88	12	↑ 2	8.89	2	8.85	17	9.04	16	0.74	17
Tolima	6.88	13	↓ -1	8.50	8	8.57	21	8.94	22	1.51	9
Nariño	6.83	14	↓ -3	8.23	17	9.10	5	9.60	1	0.41	18
Boyacá	6.78	15	↑ 3	8.50	9	8.86	16	9.42	4	0.33	21
Antioquia	6.77	16	⇒ 0	8.76	3	8.81	18	9.16	11	0.35	20
Cesar	6.76	17	↑ 3	8.35	15	8.88	15	8.99	20	0.83	15
Caldas	6.74	18	↑ 1	8.75	4	9.10	4	9.00	18	0.13	24
Caquetá	6.74	19	↑ 2	8.45	10	8.73	19	8.67	24	1.11	12
Bolívar	6.69	20	↓ -5	8.09	18	8.94	13	9.32	7	0.41	19
Sucre	6.67	21	↓ -4	7.63	23	8.39	23	9.21	10	1.46	10
La Guajira	6.63	22	↑ 1	8.04	19	8.23	24	9.13	13	1.11	12
Norte de Santander	6.52	23	↓ -1	7.80	21	8.97	9	9.15	12	0.18	23
Chocó	6.38	24	⇒ 0	7.37	24	8.47	22	9.43	3	0.24	22

Source: Author's own calculations based on data from (DANE, n.d.<sup>[5]</sup>; FILCO, n.d.<sup>[6]</sup>; Ministerio de Educacion Nacional, n.d.<sup>[7]</sup>) (2022)

### ***Pillar I: Economic participation and opportunities***

This pillar is composed of five indicators measuring gender gaps in the labour market: labour force participation rate, gender wage gap, number of hours worked and share of informal employment.

The capital district of Bogotá ranks first under this pillar, with a score of 9.07 out of 10. In particular, the city reflects the best performance evaluated among the 24 regions for the indicators on labour force participation rate (global) and number of hours worked.

Cundinamarca ranks second, with outstanding performance in the indicators on the labour force participation rate and the proportion of employed persons with technical and professional training. The department of Antioquia ranks in third place, with the smallest gender gap in share of informal employment and faring well in the average number of hours worked.

### ***Pillar II: Educational achievement***

This pillar assesses gender disparities in enrolment rates across all levels of educational training (primary, secondary and tertiary). Additionally, it places special emphasis on gaps in professional careers with a lower participation of women (e.g., science, technology, engineering and mathematics, or STEM).

Under this pillar, the department of Córdoba ranks the highest (9.35 score), thanks to its strong performance in enrolment in secondary education and participation in STEM careers. Atlántico takes the

second place, with the smallest gender gap at the national level in enrolment rates in higher education. Risaralda comes next, with good results in enrolment rates in primary, secondary and higher education.

### ***Pillar III: Health and survival***

This pillar considers three indicators: sex ratio at birth, life expectancy at birth and mortality rate from preventable causes usually associated with poor lifestyle habits and poor health management (cardiovascular and respiratory diseases, cancer and diabetes).

The department of Nariño ranks the highest, with a rating of 9.6 out of 10, and the best performance in terms of sex ratio at birth. In second place is the capital district of Bogotá, which demonstrates the smallest gap in mortality due to preventable causes. Chocó, a department showing outstanding results on mortality rates due to preventable causes ranks in the third position.

### ***Pillar IV: Political empowerment***

This pillar assesses the political participation of men and women in regional governments, specifically at the level of governorates and municipalities. Additionally, it includes an indicator on the proportion of candidates disaggregated by gender of gubernatorial candidates.

Overall, departmental scores for this indicator are relatively low. Valle del Cauca ranks first (with a score of 5.67), showing the highest gender parity in share of elected governors and the second highest parity in gubernatorial candidates. Atlántico comes next, with outstanding results in the number of gubernatorial candidates. The capital district of Bogotá ranks third, with the best performance in share of mayors.

## **Gender equality and GDP growth in Colombia's departments are positively correlated**

A panel model is developed below to estimate the contribution of gender equality to the economic growth of Colombian departments. The following equation takes into account the capital district of Bogotá as well as other 23 departments, for the period between 2016 and 2020:

$$Y_{it} = \beta_0 + \beta_1 g\_TGP_{it} + \beta_2 g\_STEM_{it} + \beta_3 g\_ExpectLife_{it} + \beta_4 g\_MortPrev_{it} + \beta_5 g\_Mayors_{it} + \varepsilon_{it} + u_{it}$$

where  $Y_{it}$  includes various specifications:

- departmental GDP growth (LnPIB);
- departmental GDP growth per capita (LnPIBper);
- GDP growth excluding the mining-energy sector<sup>5</sup> (LnPIBnme);
- growth in non-mining-energy GDP per capita (LnPIBpernme).

The equation includes the following explanatory variables:

- ( $g\_TGP_{it}$ ): female-male labour force participation rate;
- ( $g\_STEM_{it}$ ): proportion of female to male students enrolled in STEM fields;
- ( $g\_ExpectLife_{it}$ ): male-female ratio of life expectancy at birth;
- ( $g\_MortPrev_{it}$ ): female-male ratio of mortality from preventable causes;
- ( $g\_Mayors_{it}$ ): share of women mayors.

Table A A.3 reports estimates of the four models as specified above. In general terms, the findings suggest that greater equality in the labour force participation between women and men is positively associated with the economic growth of the Colombian departments. For the four estimated models, women's participation in the labour market appears to have a statistically significant effect on departmental GDP growth. This

result is in line with those illustrated in various studies at the international level, which highlight the increasingly active role of women in the labour market and their contribution to promoting sustained economic growth. Reduced gender gaps are also associated with improvements in women's living conditions, determined by lower economic dependency ratios and greater income-generation opportunities (Bloom et al., 2009<sup>[8]</sup>) (Klasen, 2019<sup>[9]</sup>) (Elson, 2017<sup>[10]</sup>).

**Table A A.3. Impact of gender equality on departmental economic growth**

VARIABLES	(1) LnPIB	(2) LnPIBper	(3) LnPIBnme	(4) LnPIBperme
$(g\_TGP_{it})$	0.00957*** (0.00219)	0.00636** (0.00319)	0.00369*** (0.000985)	0.00811*** (0.00155)
$(g\_STEM_{it})$	0.00379*** (0.000914)	0.00809*** (0.00139)	0.00233*** (0.000584)	0.000889 (0.000840)
$(g\_ExpectLife_{it})$	0.0561** (0.0238)	0.114*** (0.0348)	0.0657*** (0.0132)	0.0196 (0.0203)
$(g\_MortPrev_{it})$	0.00357*** (0.00138)	0.00800*** (0.00231)	0.00335*** (0.000762)	0.00362*** (0.00100)
$(g\_Mayors_{it})$	0.000231* (0.000139)	0.000521* (0.000285)	0.000191*** (6.24e-05)	0.000219** (0.000107)
Constant	3.477 (2.215)	4.328 (3.193)	3.028** (1.264)	13.54*** (1.790)
Observations	120	120	120	120
Number of ID	24	24	24	24
R-squared	0,3158	0,5159	0,459	0,204

Note: Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: Author's own elaboration (2022).

In education, a more gender equal participation in STEM training programmes also appears to be positively associated with regional economic growth. In three of the four models, the estimated coefficient is statistically significant. Skills development is expected to lead to an increase in the human capital stock, which is fundamental to the dynamics of innovation, as well as to increase productivity and facilitate the proper functioning of the productive sectors that demand this type of skill (Psacharopoulos and Patrinos, n.d.<sup>[11]</sup>).

As for health, although women usually have a longer life expectancy at birth than men and, in turn, a lower incidence of mortality from preventable causes, the model reveals that greater equality in these indicators also tends to be positively associated with economic growth. As for the variable measuring life expectancy at birth, the estimated coefficients are significant, at the 1% level in two of the four models, and at the 5% level in a third. Observing the variable for mortality due to preventable causes, the estimated effects are significant, at the 1% level in all the four models, highlighting a potential positive impact that health prevention policies can have on the economy. In general, better performance on these indicators is associated with better management of the health systems in the departments, greater access to and quality of the service provision, healthier lifestyle habits of the population and favourable environmental and health conditions. All these elements are indicators of social well-being and economic progress (Bloom, Kuhn and Prettnner, 2020<sup>[12]</sup>).

Finally, increased political participation of women, particularly in leadership positions in local government, is positively associated with economic growth. In two of the four models, the estimated coefficients are statistically significant, at the 10% level, and significant in the other two, at 5% and 1%. Several studies indicate that the presence of women in elected positions increases the likelihood that women's interests are adequately represented and their perspectives taken into account, particularly in the design of public policies and allocation of resources. Additionally, women's participation in decision-making spaces reduces prejudice and negative stereotypes of their ability to occupy leadership positions, and directly affects the

aspirations of girls and adolescents who see the leaders and decision makers in their communities as examples to follow (ONU Mujeres, DANE and Consejería Presidencial para la Equidad de la Mujer, 2020<sup>[13]</sup>) (Pachón, Peña and Wills, 2012<sup>[14]</sup>).

Overall, the empirical findings presented above provide evidence of some significant correlations between greater gender equality and GDP growth in Colombian departments. However, further studies could be conducted in the future to address and go beyond the limitations of this analysis. For example, the panel specification herein illustrated would benefit from the use of a greater number of observations and more extensive time-series data, since the process through which improvements in gender equality have an impact on economic outcomes is generally slow. This would also allow to develop more sophisticated econometric models using additional control and explanatory variables that could shed light on other potential effects on GDP growth. In addition, the model does not address issues of reverse causation that could arise from the use of the ratio of labour force participation rate as explanatory variable. In fact, while higher women's participation in the labour market can be a driver of economic growth, that may also rise as a result of better economic performances. Further studies could explore ways to tackle reverse causality, such as the use of lagged control variables. Moreover, the model does not yet provide any indications of how strong the variation in the explanatory variables is year-on-year, and whether this could be driven by departmental GDP growth as in the case of the ratio of female to male labour force participation. Finally, the regression analysis could be further improved by adding time or department fixed effects, to control for specific underlying differences that do not change over time and across departments. Additional control variables could also be included to take into account factors which are likely to affect cross-regional differences in economic growth.

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## Notes

<sup>1</sup> This evaluates the gender gaps in 31 departments of Colombia and the city of Bogotá, based on five dimensions of analysis: physical autonomy, political autonomy, socioeconomic autonomy, quality of life and empowerment.

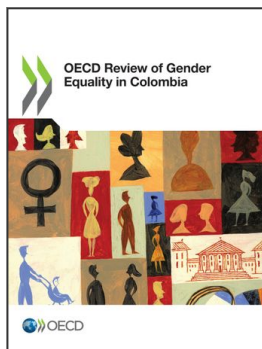
<sup>2</sup> Due to limitations in the information available, it was not possible to include the Archipelago of San Andrés and the departments of Amazonía and Orinoquía in the 2020 Departmental Gender Equality Index.

<sup>3</sup> To guarantee that the indicator scores are distributed between 0 and 1 in the calculated quotient, the data assigned to the numerator, in all cases, is the lowest value observed, regardless of the gender to which it corresponds.  $\left\{0 < Indicator_i : \frac{hard\ data_{inferior}}{hard\ data_{superior}} < 1\right\}$

<sup>4</sup> The rescaling of the scores basically consisted of multiplying by 10 the values obtained in the quotients of each indicator.

<sup>5</sup> The mining and energy sector represents a significant share of the economies of Arauca, Casanare, Chocó, César, La Guajira, Meta, Putumayo and Santander. As an activity that generates high value, but with low labour intensity, its greater relative weight may underestimate the impact of gender variables on the economic growth of these regions. Hence, for certain simulations, this effect is isolated.





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