

**SOCIOECONOMIC DETERMINANTS
AND SPATIAL CONVERGENCE OF
BIOLOGICAL WELL-BEING:
THE CASE OF PHYSICAL STATURE IN
COLOMBIA, 1920-1990**

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Colombia



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I. Introduction

- The **standard of living** of in Colombia **improved significantly** during the 20th century. Progress occurred in income per capita, education, and health (Jaramillo, Meisel and Ramírez, 2017). Important advances were achieved made in the biological welfare of the population.
- The analysis of the **long-term evolution of human stature** has been widely used in the economic history literature in order to **measure changes in biological welfare** in different countries (e.g. Komlos and Baten, 2003; Steckel, 2008; Komlos, 2003; Bassino, 2015, Heyberger, 2014; Beltran and Tapias, 2015; María Dolores and Martinez-Carrion, 2011; Meisel and Vega, 2007 and Peracchi, 2008).
- Anthropometric history has improved knowledge about human welfare and living conditions due to the fact that **human height** is one of the **main biological manifestations** of **nutrition**, and **exposure to diseases**. Therefore, height is an indicator of biological human living conditions (María-Dolores and Martínez-Carrión, 2011; Steckel 1995, Chanda 2008).

I. Introduction

- Recently, the anthropometric literature has taken interest in establishing a **relationship between long-term height evolution and socio-economic factors** (Ayuda and Puche Gil, 2014; Huang, van Poppel and Lumey (2015); Gyenis and Joubert 2004; among others). However, this relationship **has not been analyzed yet** for an **emerging** country.
- **Colombia is an interesting case of study**, due to the fact that the first half of the twentieth century was a period of rapid economic growth, which led to substantial gains in the standard of living, especially in education and life expectancy.
- We make a **contribution** to the literature by **estimating econometrically the socioeconomic determinants of height** in an **emerging country**. Our research examines the effects of gender, education, urbanization, year of birth, occupation, disease environment, and access to public services on the height of Colombians during the 20th century.
- We also explore **inequalities and spatial convergence** of height between Colombian departments by estimating **sigma** and **beta convergence**.

I. Introduction

- Our database is rich in the **socio-economic information** of **more than 225,000 individuals** for **through the 20th century**. The data source are the **judicial background records**, emitted by the **former Administrative Security Department of Colombia (DAS)** during the 20th century. Due to the fact that the DAS was dissolved, it's records are now in the General National Archive.
- Because of the high degree of its **demographic representativeness**, the **lack of self-reported** height measures, and its **non-truncated** character, **our is database an important contribution** to anthropometric literature.
- We find **important differences in stature according to** gender, level of education, occupation, disease environment, access to public services, and place and date of birth.
- The results indicate that the inequality of stature between departments has decreased considerably through the century, suggesting that the departmental disparities in biological well-being and net nutrition have been reduced.

II. Related literature: Europe

- The economic literature has been interested in analyzing the effects of socioeconomic variables on indicators of biological wellbeing of the population, as is the case of height. Research for different countries has found causal effects of different measures of socio-economic variables on adult height.
- **Spain:**
 - ❖ Ayuda and Puche-Gil (2014) study the determinants of the stature of Spain's male populations between 1859 and 1960 and find a close relationship between education, occupation, income, and height.
 - ❖ Martinez-Carrion and Moreno-Lazaro (2007) examine whether there was an urban height penalty in Spain's Southeastern coast and Castile–Leon's region during early industrialization in Spain. Their results show that there was no urban height penalty.
 - ❖ Martinez-Carrion and Camara (2015) analyze the differences in height among young males during the period of industrialization and its decline in Andalusia. They find that the strong inequalities in net nutritional status affected the inequalities in stature in the region.

II. Related literature: Europe

- **Netherlands:** Huang, van Poppel and Lumey (2015) explore the differences in height by socio economic status among 371,105 military conscripts born between 1944 and 1947. The results indicate large differences in individuals' statures by their attained education and by their father's occupation.
- **Switzerland:** Schoch, Staub and Pfister (2012) analyze individual measurements of the height of conscripts for the years 1875–1950 and their relationship with social inequality. The authors find that social-class affiliation was the most important determinant of differences in the biological standard of living.
- **Hungary:** Gyenis and Joubert (2004) investigate the relationship between social-economic factors and height, weight, and body mass index of university students and conscripts for the period 1933-1998. They find important differences in height according to parental occupation, educational level, composition of the family, place of birth, and residence.

II. Related literature: Asia

- **Japan:** Bassino (2006) studies the effects of per capita income, health, and regional inequality on the physical stature of the Japanese at the prefecture-level for the period 1892–1941. The results suggest that there is a relationship between income, health, and height of the population across the 47 Japanese prefectures.
- **Philippine:** Bassino, Dosis and Kolmos (2018) examine the relationship between socioeconomic variables, such as year and province of birth, occupation, education, and stature using a data base of 23,000 Filipino soldiers enlisted by the US military between 1901 and 1913. Contrary to previous studies, this paper finds that few socioeconomic characteristics of the region of birth had a significant influence on individual stature.

II. Related literature: Latin America

- **Mexico:**
 - ❖ López-Alonso (2007) analyses the trend in adult heights of different sectors of Mexican society during the Diaz regime (1876-1910). The results show that the stature of the upper classes increased, indicating that they were the ones who benefitted from industrialization while the standard of living of laboring classes did not benefit from the industrialization that took place.
 - ❖ Lopez-Alonso and Velez-Grajales (2015) examine the evolution of Mexican adult heights and their relation to the economic cycles, inequality, wars, and institutions for the period 1850-1986. The authors find that these variables affect the socioeconomic groups and regions differently, causing unequal living standard patterns on the Mexican population.
- **Argentina:** Salvatore, R. (2004) examines height trends in the Argentine Northwest during the first half of the twenty century. They find that there were significant improvements in health and nutrition, as the evolution of stature suggests. However, within the region, education, skills and socio-economic status causes important differences in individuals' heights, and these differences increase over time.

II. Related literature: Colombia

- Anthropometric research in **Colombia** benefited from the development of a well-organized **system of citizen identification since the early twentieth century** which contains information on adult height. The system has not had significant interruptions due to the fact that the national identity card was required in order to **vote in elections** (Meisel and Vega, 2007).
- The country also has very good information on **passports and judicial certificates**, which were required of citizens for various procedures. These sources of information recorded peoples' height.
- The first study on the evolution of the stature of Colombians dates from 1992. Ordoñez and Polania (1992), used data from the national identification card, and constructed a random sample individuals in order to find that between 1920 and 1970 the average height of women increased 8.7 centimeters (cms) and that of men increased 7.0 cms.

II. Related literature: Colombia

- **Meisel and Vega (2007)**, analyze the stature of Colombians using as a source both the national identification card and the passport records. The number of national identification cards included 9,321,776 observations between 1905 and 1985. The authors find that **women's and men's average height increased 8.9 centimeters in the 1905-2003 period**.
- **No trend was found using the passports** records in the period 1870-1919. However, because those who obtained a passport at that time belonged to the **Colombian elite**, that group was relatively tall for the time, even compared to **European countries**.
- In a more recent study, **Acosta and Meisel (2013)** analyze the evolution of average height of **Colombian ethnic groups** for those **born between 1965 and 2010** using information from a sample of the National Nutrition and Health Survey that was conducted in 2010. Their results show that **Afro-Colombians** had a height that was **6 centimeters above the indigenous** and **2 centimeters higher** than the rest of the population.

III. Data and descriptive statistics: the evolution of height in Colombia during the 20th century

Data source

- The main data source is the former Administrative Security Department (**DAS**) of Colombia. This entity emitted the **certificates of judicial background**.
 - ❖ Certificates of judicial background were a requirement in order to leave the country, take public office, acquire a gun, enter into State contracts, and optionally, but regularly required for jobs in the private sector.
- The certificates are stored in **25,223 boxes**, and all of the certificates in a box are from the same department. Each box contains **six packages**. The digitalized packages were chosen by **stratified random sampling** where the **strata were the departments**. For each randomly selected box within each department either the odd or even packages (also randomly selected) were digitalized.
- Stratified random sampling leads to a very high degree of **representativeness**. Height measures in the certificates are **not self-reported**, and **non-truncated**.
- The final sample consists of **225,805 women (42.5%) and men (57.5%)** with a national identification card **born between 1921 and 1990**.

III. Data and descriptive statistics: the evolution of height in Colombia during the 20th century

Certificate of judicial background issued in 1947

Arango Londoño

(a) NUMERO DE
orden 29153
clase
biogr.
exped. 16082

Conceptuación policial

Nacido en *Carolina* Departamento de *Antioq*
 el día de *1913* de *Luis Arango*
 y de *Rosa Londoño* Estado *Solt* Talla *1-68* col. Iris *e. med.*



Profesión *obrero*

Domicilio *Ibagué*

Observaciones *6872870264 - Palumbo (H.)*

Fórmula **S 1 1 3 3 - D 1 1 2' 2**

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PULGAR E	INDICE DERECHOS
	

Reseñado en el DEPARTAMENTO DEL TOLIMA
 Por D. *Ramiro*
 Fotografiado por D. *Ibagué, Julio 23/47*
 Firma del reseñado,
Rosendo Arango

III. Data and descriptive statistics: the evolution of height in Colombia during the 20th century

Certificate of judicial background issued in 1968

AGUIRRE I. D. 162296

Concep. Policial: _____ Prt. _____

Nacido en Fresno Depto. Tol.

Fecha nacimiento 3-Abril 1,944 Estado Civil. Soltero

Hijo de _____ y de Alicia

Profesión u oficio: jornalero Estatura 1.67 Mts.

Color del iris: cast. claro Color del cutis: trigueño

Domicilio: Fresno, Alto de La Cruz Instrucción: 4º Primaria

Presentó lo C. C. N° 5.849.625 Expedido en: Armero

Señales particulares: _____



ARMERO T. D. PARENTES O RELACIONADOS

Nombre	Vínculo	Lugar	Dirección
GLORIA AGUIRRE	Hna.	Fresno	Alto de La Cruz
VICTOR AGUIRRE	Tio.	Fresno	" " " "

Fórmula Dactiloscópica.

S 3 3 3 3 — D 1 2 2 2

16 2 8 6 5 19 9 14 18 8

PULGAR DERECHO	INDICE DERECHO	Reseñada por: B.C.U.
		D. Biográfico R.R.S.
		Armero El 16 MAR 1968
		Autógrafo <i>Osorio Aguirre</i>

III. Data and descriptive statistics: the evolution of height in Colombia during the 20th century

Certificate of judicial background issued in 1993

311285

T.D. _____

Concep - Policial: _____

Nacido en COYAIMA Depto. TOLIMA Prt. _____

Fecha nacimiento 2 OCTUBRE DE 1963 Estado Civil CASADA

Hijo de CONSTANTINO y de DIGNA MARIA

Profesión u oficio EDUCADORA Estatura | 66 mts.

Color del iris CASTAÑO OSCURO Color del cutis TRIGUEÑO

Domicilio: COYAIMA Instrucción: BTO. PEDAGOGICO

Presentó la C.C. No. 28.647.384 Expedida en: COYAIMA (T)



Señales particulares NINGUNA.

PARIENTES O RELACIONADOS

Nombre	Vínculo	Lugar	Dirección
OLIVERTO PENAGOS	ESPOSO	COYAIMA	LA MISMA.

Fórmula Dactiloscópica:

5 3 3 3 3 — D 2 2 2 2
20. 7 9 8 7. 7 4 10. 8 5.

PULGAR DERECHO	INDICE DERECHO.	Resenado por: <u>BR</u>
		D. Biografico: <u>LMC.</u>
		En <u>IBAGUE</u> El <u>III-30-93</u>
		Autografo <u>Leyla Moreno Vique</u>

III. Data and descriptive statistics: the evolution of height in Colombia during the 20th century

Certificate of judicial background issued in 2000

 **REPUBLICA DE COLOMBIA**
DEPARTAMENTO ADMINISTRATIVO DE SEGURIDAD
TARJETA ALFABETICA MUJER

MORENO **CAICEDO** T.D. _____

Concep-Policial _____ Pnt. _____

Nacido en: **CHAPARRAL** Dpto: **TOLIMA**

Fecha de nacimiento: **7 SEPT 1971** Estado Civil **SOLTERA**

Hijo de: **JOSE LEVER** y de **IRENE**

Profesión u oficio: **DOCENTE** Estatura **1.69** mts

Color del iris: **CASTAÑO MEDIO** Color del cutis: **TRIGUENO**

Domicilio: **Cra 8Nro. 3-14 CHAPARRAL** Instrucción: **11bto**

Presentó la **c.c. No. 28.688.513** Expedida en: **CHAPARRAL**

Señales particulares: **CIC/ CARA LADO DER/**

PARIENTES O RELACIONADOS

Nombre	Vinculo	Lugar	Dirección
OSCAR DANIEL PADILLA	ESP/	MISMA	

F. Dactiloscópica _____

Reseñado por: _____

Pulgar Derecho **Indice Derecho**

Biográfico: **IBAGUE** En **7** El **7** **ABR 2000**

Autógrafo: *X Dilia Esperanza H. C. 28688513 Chaparral*

DIGINV/DL.001

III. Data and descriptive statistics: the evolution of height in Colombia during the 20th century

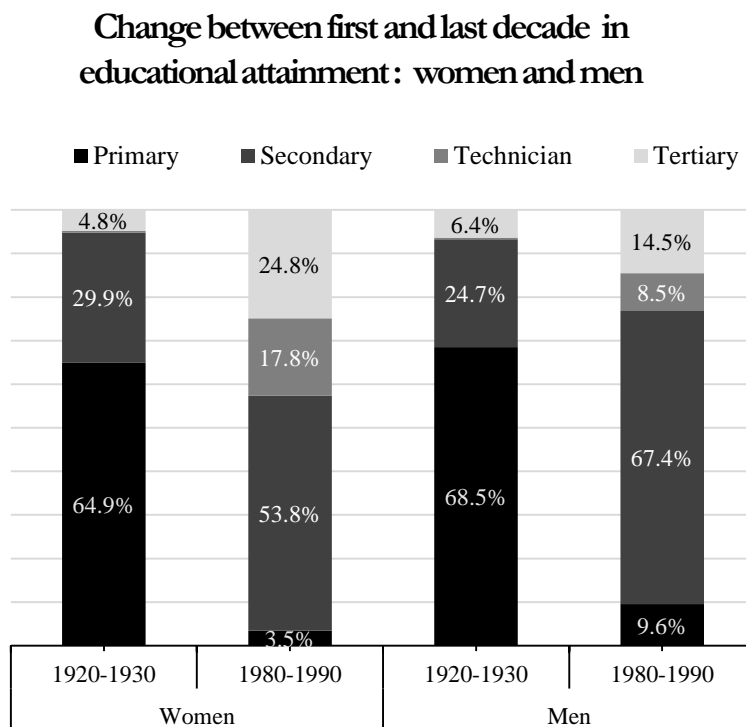
Sample description

Variable	Observations	%	Variable	Observations	%
Sex			Education		
Women	95,884	42.5%	Primary	43,913	21.7%
Men	129,921	57.5%	Secondary	106,189	52.4%
Total	225,805		Technical/Technician	13,731	6.8%
			Tertiary	38,934	19.2%
			Total	202,767	
Region			Work force		
Amazon	3,567	1.6%	Unskilled	63,729	46.2%
Andean	147,672	65.4%	Skilled	42,637	30.9%
Caribbean	31,007	13.7%	Students	29,566	21.4%
Pacific	37,535	16.6%	Armed forces	1,929	1.4%
Orinoquia	6,024	2.7%	Total	137,861	
Total	225,805				

Source: Author's calculations based on digitalized certificates of judicial background issued by the former DAS.

III. Data and descriptive statistics: the evolution of height in Colombia during the 20th century

There was a structural change in educational attainment in the population:



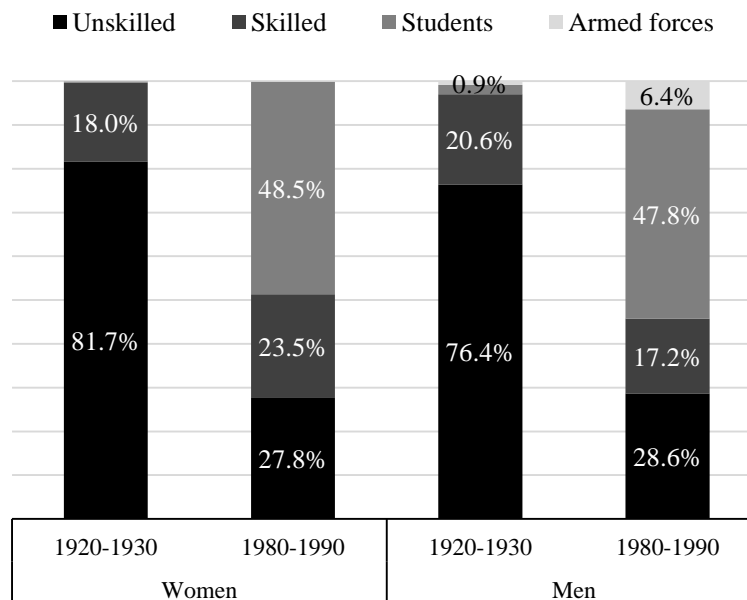
Source: Author's calculations based on digitalized certificates of judicial background issued by the former DAS.

- There was a **significant increase** in the percentage of individuals with **secondary and tertiary education** from the first to the last decade accompanied by a **decrease** of the percentage of individual with **primary education**.
- In the **beginning of the century**, the distribution in educational attainment distribution was **similar for women and men**. In the last decade of the century, the percentage of **women and men** with tertiary education was **24.8%** and **14.5%**, respectively. The difference is statistically significant **in favor of women**.

III. Data and descriptive statistics: the evolution of height in Colombia during the 20th century

There was a structural change in the workforce composition:

Change between first and last decade in workforce: women and men



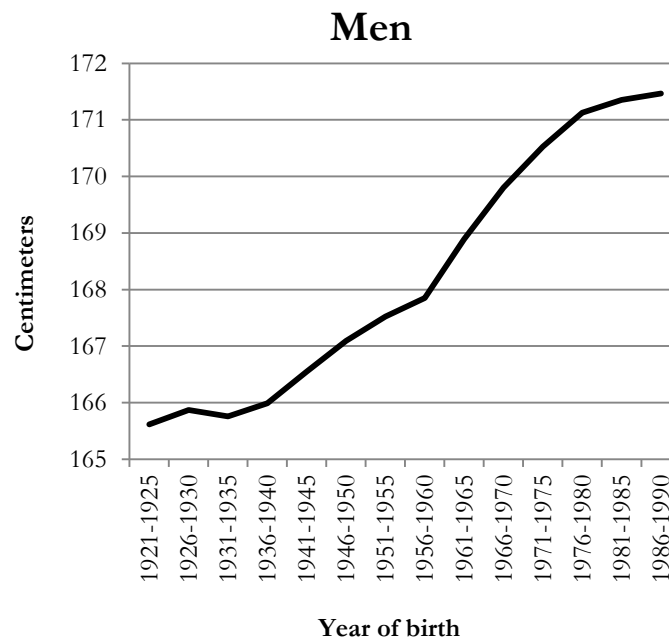
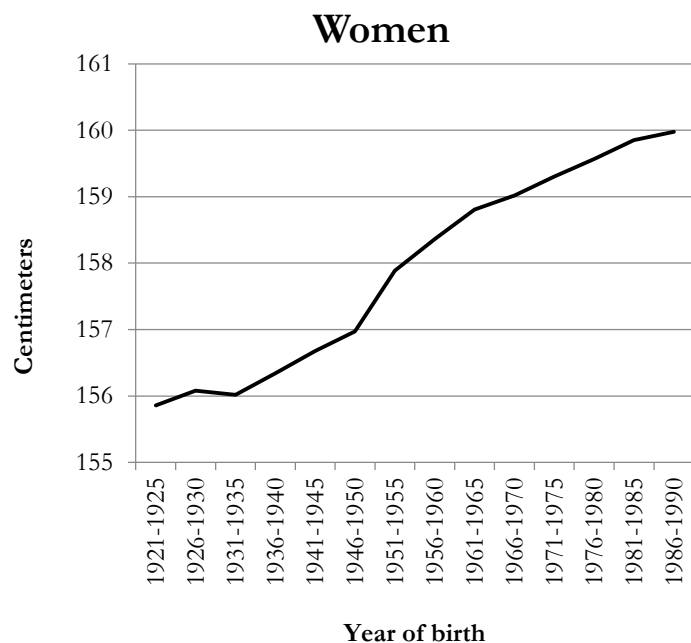
- There was an **important increase** in the percentage of **skilled workers and students**.
- In the **beginning of the century**, the percentage of **unskilled women** was considerably **higher** and the percentage of **students and skilled woman workers** was **lower** than the percentage of men.
- In the last decade, the **percentage of female skilled workers** was **significantly higher** than the percentage of **male skilled workers**.

Source: Author's calculations based on digitalized certificates of judicial background issued by the former DAS.

III. Data and descriptive statistics: the evolution of height in Colombia during the 20th century

Evolution of height in Colombia

Men's average height grew **0,06%** annually and women's average height grew **0,05%** annually.
This growth rate is **statistically significant** for both women and men.

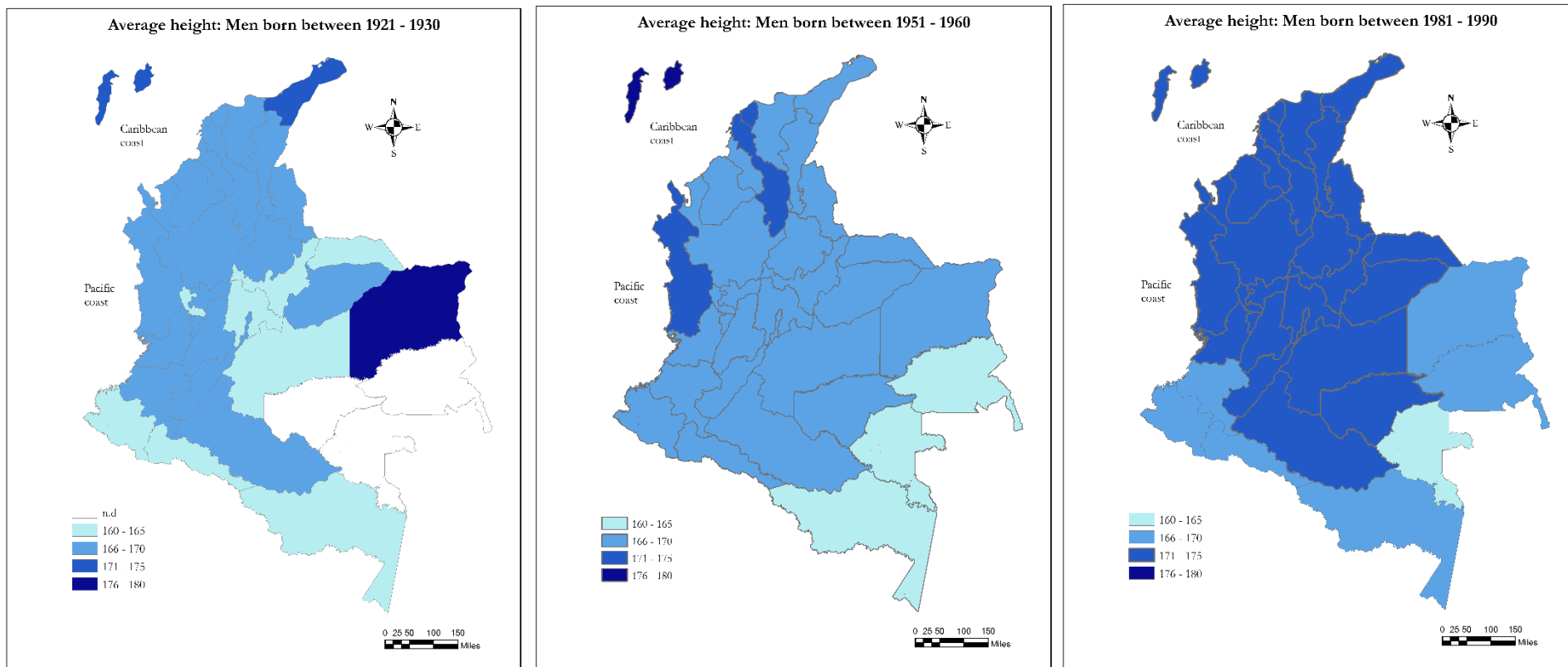


Source: Author's calculations based on digitalized certificates of judicial background issued by the former DAS.

III. Data and descriptive statistics: the evolution of height in Colombia during the 20th century

Evolution of height in Colombia

Men's average height increased 5.8 centimeters between the first and the last decade of the century.

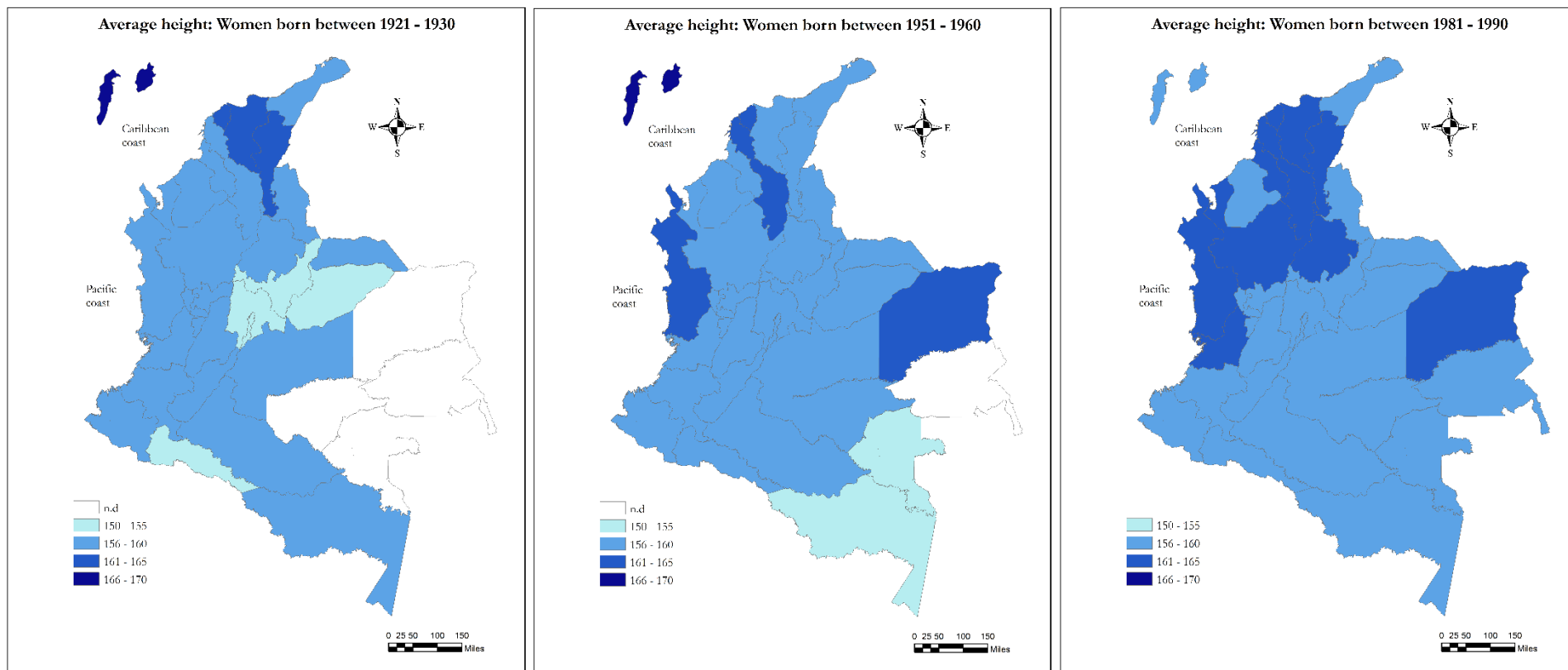


Source: Author's calculations based on digitalized certificates of judicial background issued by the former DAS.

III. Data and descriptive statistics: the evolution of height in Colombia during the 20th century

Evolution of height in Colombia

Women's average height **increased 4.1 centimeters** between the first and the last decade of the century.



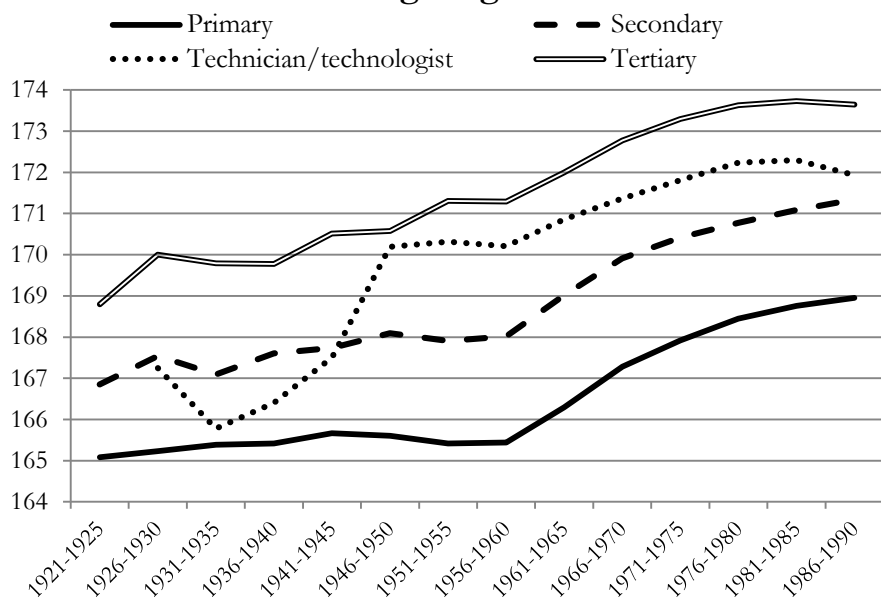
Source: Author's calculations based on digitalized certificates of judicial background issued by the former DAS.

III. Data and descriptive statistics: the evolution of height in Colombia during the 20th century

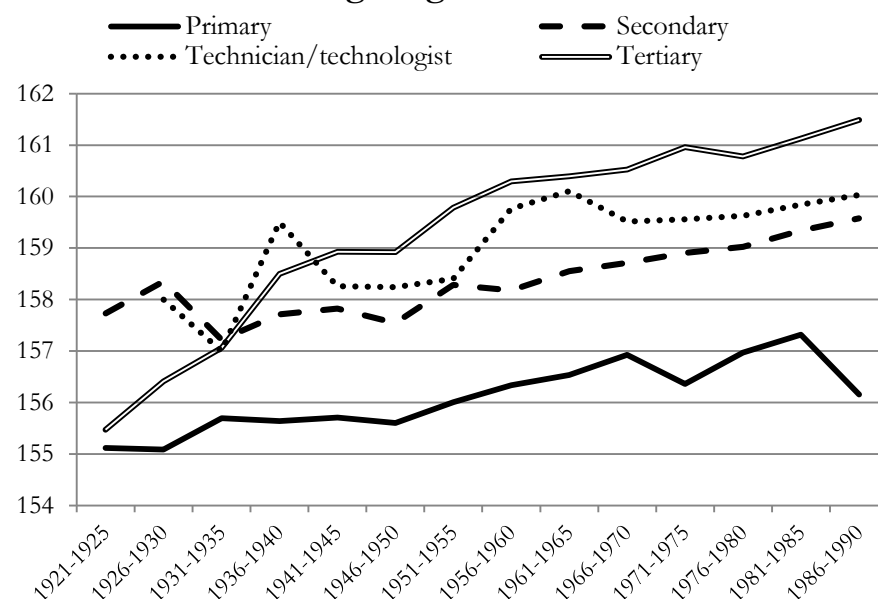
Evolution of height in Colombia

Education

Average height: men



Average height: women



Average annual growth rate: men

Primary	0.04%
Secondary	0.04%
Technical/Technologist	0.05%
Tertiary	0.05%

Average annual growth rate: women

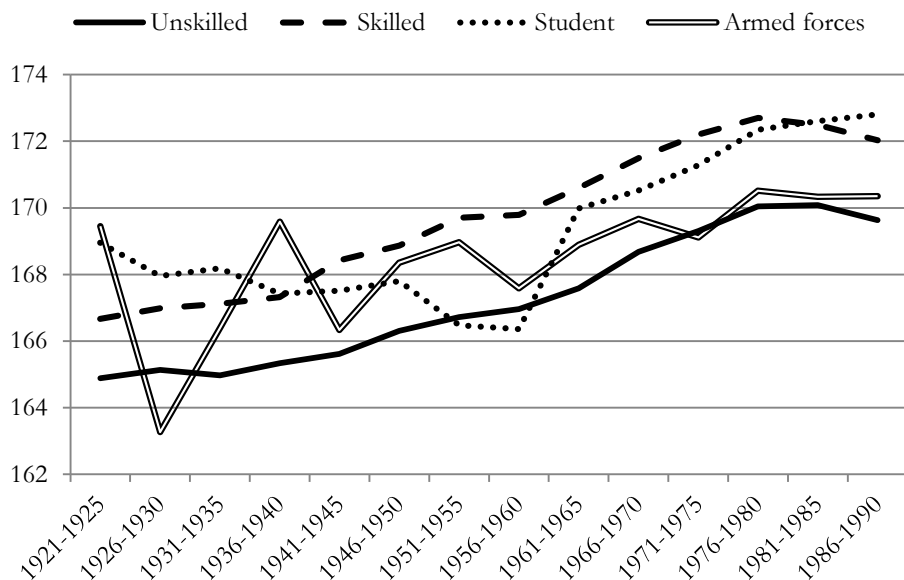
Primary	0.02%
Secondary	0.02%
Technical/Technologist	0.01%
Tertiary	0.06%

III. Data and descriptive statistics: the evolution of height in Colombia during the 20th century

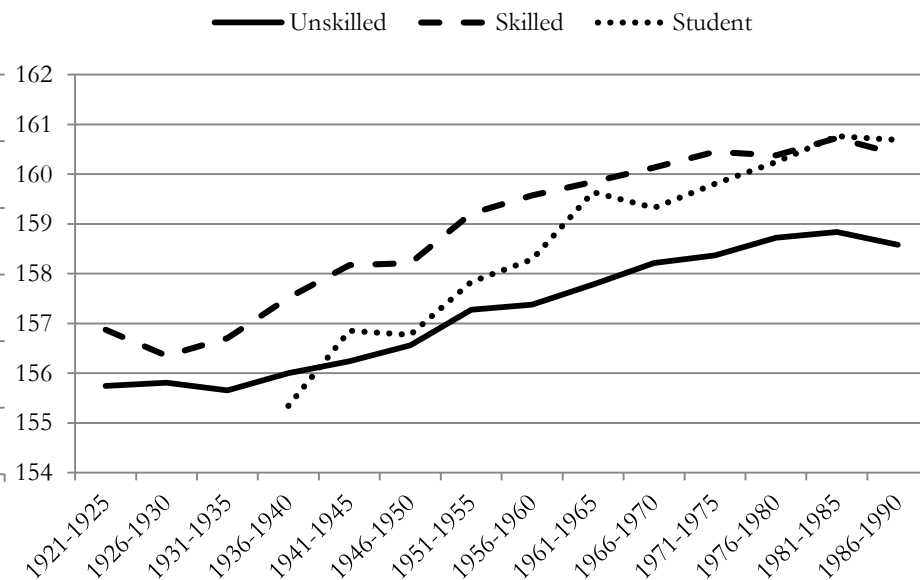
Evolution of height in Colombia

Workforce

Average height: men



Average height: women



Average annual growth rate: men

Unskilled	0.055%
Skilled	0.061%
Student	0.047%
Armed forces	0.042%

Average annual growth rate: women

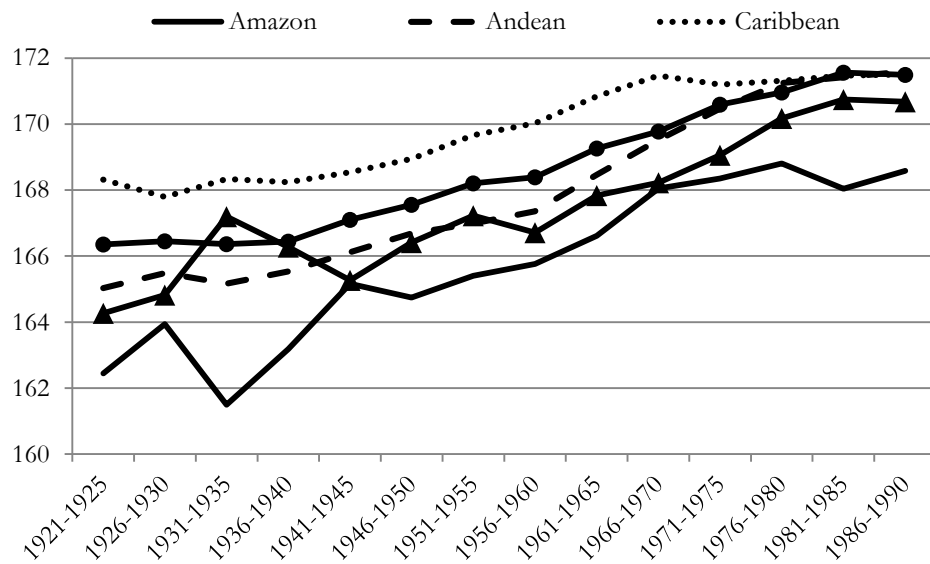
Unskilled	0.037%
Skilled	0.043%
Student	0.042%

III. Data and descriptive statistics: the evolution of height in Colombia during the 20th century

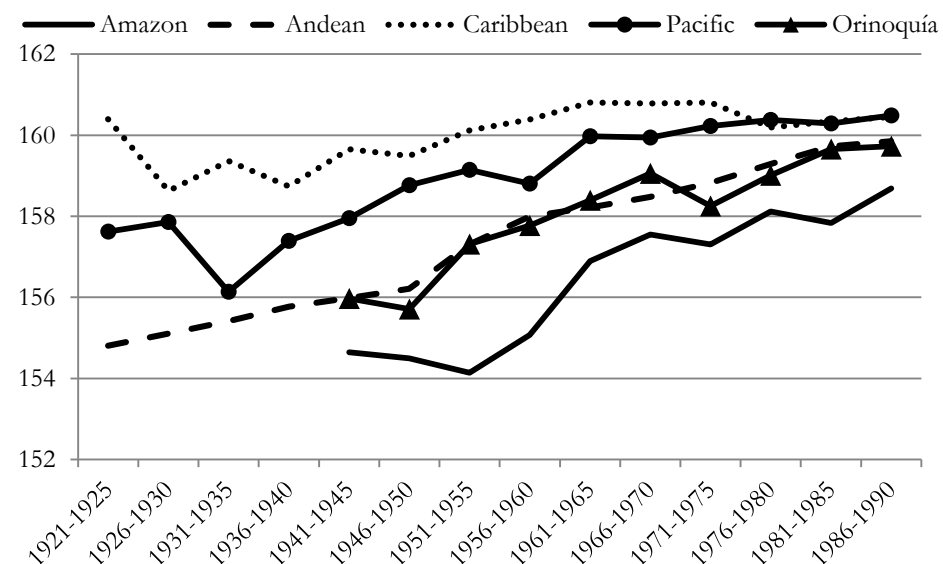
Evolution of height in Colombia

Workforce

Average height: men



Average height: women



Average annual growth rate: men

Amazon	0.07%
Andean	0.07%
Caribbean	0.04%
Pacific	0.06%
Orinoquía	0.06%

Average annual growth rate: women

Amazon	0.03%
Andean	0.05%
Caribbean	0.01%
Pacific	0.04%
Orinoquía	0.05%

III. The effects of socioeconomic characteristics and regional convergence: econometric estimations

Variables of interest

We investigate the **relationship between the stature** of Colombians born during the 20th century and several **socioeconomic variables**:

- ❖ **Year of birth**: the date of birth is an important variable because, as mentioned by Ayuda and Puche-Gil (2014), it includes economic, social, and political conditions, which could influence the quality of life.
- ❖ **Gender**
- ❖ **Education**: reflects the individual's socio-economic level and that of her/his parents.
- ❖ **Workforce type**: proxy for the level of income and the living conditions of the family .
- ❖ **Municipality size of the individual's birthplace**: social, environmental, economic, and health conditions of the individual during the first years, which could be a determinant of their physical development.
- ❖ **Mortality rates from gastrointestinal, respiratory and puerperal diseases**. As Deaton (2006) points out, net nutrition is the result of food consumption and the losses to activities and to diseases. Height is affected by the disease environment, especially during childhood. Consequently, gastrointestinal diseases (especially diarrhea), fevers, and respiratory infections negatively affect nutrition and consequently stature.
- ❖ Coverage of **aqueducts**: proxy for sanitary conditions.

III. The effects of socioeconomic characteristics and regional convergence: econometric estimations

Model

We want to know the effect of education, labor force type, gender, and city size, on human height.

$$\ln(\text{height})_{i,j} = \alpha + \beta_1 \text{Year}_{i,j} + \beta_2 \text{Sex}_{i,j} + \beta_3 \text{Edu}_{i,j} + \beta_4 \text{Ocup}_{i,j} + \beta_5 \text{MunSize}_{i,j} + \beta_6 \text{Gastro}_{i,j} + \beta_7 \text{Resp}_{i,j} + \beta_8 \text{Matern}_{i,j} + \beta_9 \text{Aqued}_{i,j} + \delta FE_j + \varepsilon_{i,j}$$

i indexes the individual and j indexes the department.

$\log(\text{height})$: logarithm of height, measured in centimeters (cms).

Year : year of birth of the individual.

Sex : dummy variable, that takes the value of 1 if the person is male and 0 if the person is female.

Edu : education reached by the person (primary, secondary, technical/technological, and university education)

Ocup : occupation of the individual (unskilled, skilled labor, student, or armed forces).

MunSize : dummy variable that takes the value of 1 if the municipality of birth is ranked in the top 20 according to its population

Gastro : mortality rate (per 1,000 inhabitants) from gastrointestinal infections

Resp : mortality rate (per 1,000 inhabitants) from respiratory diseases

Matern : mortality rate (per 1,000 inhabitants) from puerperal diseases

Aqued : annual percentage of households in departments covered by aqueducts.

FE : department-fixed effect

ε : error term.

III. The effects of socioeconomic characteristics and regional convergence: econometric estimations

Model

We want to know the effect of education, labor force type, gender, and city size, on human height.

$$\ln(\text{height})_{i,j} = \alpha + \beta_1 \text{Year}_{i,j} + \beta_2 \text{Sex}_{i,j} + \beta_3 \text{Edu}_{i,j} + \beta_4 \text{Ocup}_{i,j} + \beta_5 \text{MunSize}_{i,j} + \beta_6 \text{Gastro}_{i,j} + \beta_7 \text{Resp}_{i,j} + \beta_8 \text{Matern}_{i,j} + \beta_9 \text{Aqued}_{i,j} + \delta FE_j + \varepsilon_{i,j}$$

We added **interaction** terms between sex, education, occupation, and size of the municipality, **with the year of birth** to **estimate differential growth rates of height**, given the category of interest.

Results

Effects of socioeconomic variables on the stature of Colombians born between 1920 and 1990: percentage difference⁺

Dependent variable: $\ln(\text{height})_{i,j}$		Dependent variable: $\ln(\text{height})_{i,j}$	
Year of Birth	0.014%*** (0.00005)	Occupation (reference=unskilled labor force)	
Sex (male=1)	5.537%*** (0.00079)	Skilled labor	-0.242%** (0.00105)
Sex*year of birth	0.029%*** (0.00002)	Student	-1.231%*** (0.00139)
Education (reference=primary)		Armed forces	0.377% (0.00366)
Secondary	1.069%*** (0.00101)	Skilled labor*year of birth	0.011%*** (0.00002)
Technical/Technological	2.666%*** (0.00265)	Student*year of birth	0.029%*** (0.00003)
University	2.755%*** (0.00137)	Armed forces*year of birth	-0.004% (0.00007)
Secondary*year of birth	0.004% (0.00002)	Health	
Technical/Technological*year of birth	-0.019%*** (0.00005)	Gastrointestinal Diseases Mortality Rate (GMR)	-0.002%** (0.00001)
University*year of birth	-0.006%*** (0.00003)	Respiratory Diseases Mortality Rate (RMR)	-0.002%** (0.00001)
Municipality Size (reference=rest)		Puerperal Diseases Mortality Rate (PMR)	-0.011%*** (0.00003)
Municipal Size	0.216%** (0.001)	Departmental fixed effects	YES
Municipal Size*year of birth	0.006%*** (0.00002)	Departmental*year of birth	YES
Constant	153.77*** (0.00276)		
Observations	120,732		
R-squared	0.446		

⁺ Percentage difference is estimated from de OLS coefficients. It is equivalent to $(e^{\hat{\beta}} - 1) * 100$.

III. The effects of socioeconomic characteristics and regional convergence: econometric estimations

Results

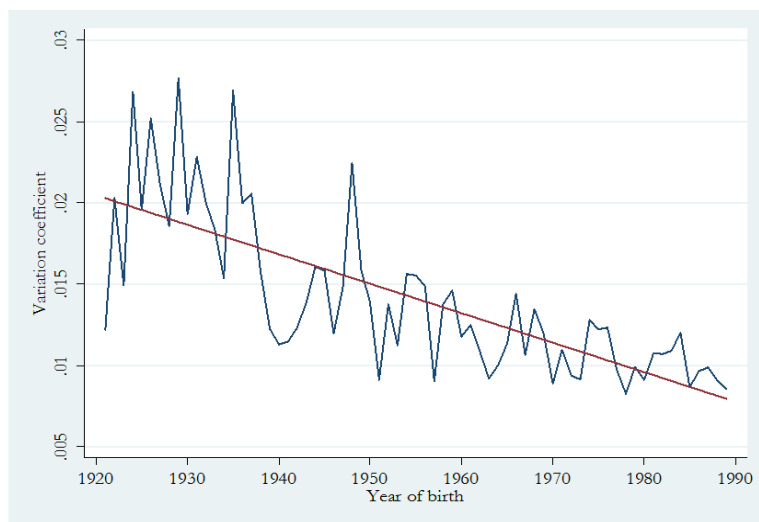
- ❖ The effects of almost all socioeconomic and health variables on height are **significant**.
- ❖ **Younger individuals are taller than the older ones:** *ceteris paribus*, individuals gain 0.014% of height with respect to the individual who was born a year before.
- ❖ **Men are 5.5% taller than women**, and men **grow annually 0.3% more** than women.
- ❖ **Individuals with more education are taller on average.** With respect to individuals with **primary education**, individuals with **secondary education are 1.1% taller, technicians 2.7% and university students 2.8% taller on average.**
- ❖ Individuals who were born in **large municipalities** are slightly **taller (0.22%)** than those who live in **smaller municipalities**.
- ❖ At the **beginning** of the century **skilled workers** and **students** were **shorter** than **unskilled workers**, but their **annual rate of growth was higher** than for individuals without qualification. Consequently, **students** and **skilled workers** were **taller** on average **than unskilled workers** at the end of the period.
- ❖ In line with the literature, we find a **negative** and **significant** relationship between the individual's height and the **mortality rates** from **gastrointestinal, respiratory, and puerperal** diseases.
- ❖ **Puerperal diseases have the largest effect** on adult height compared to other diseases. An **additional death** (per thousand individuals) from puerperal diseases in the year and department of birth leads to a **0.011%** decrease in adult height. This results are **consistent** with the literature that finds that **maternal health is vital for child health and development**.
- ❖ The results for Colombia are **similar to those found in the literature** for other countries such as Spain, The Netherlands, Hungary, Japan, among others, where socio-economic status plays an important role in stature achievements (e.g. Ayuda and Gil, 2014; Gyenis and Joubert, 2004; Bassino, 2006; Huang, van Poppel and Lumey, 2015).

III. The effects of socioeconomic characteristics and regional convergence: econometric estimations

Convergence

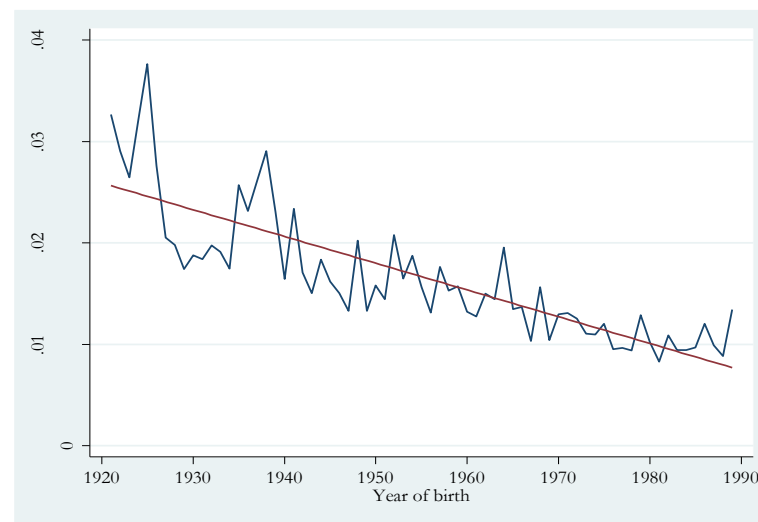
Sigma-Convergence

Men



Source: Authors' estimations.

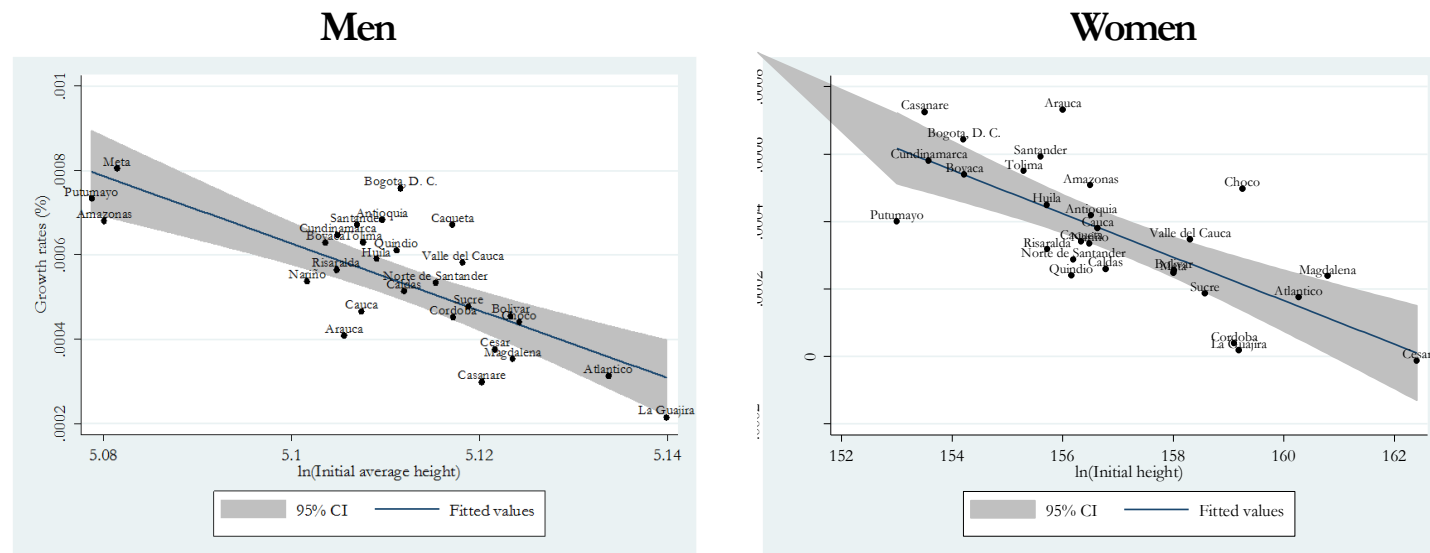
Women



Source: Authors' estimations.

III. The effects of socioeconomic characteristics and regional convergence: econometric estimations

Convergence Beta-Convergence



	Annual rate of growth	
	Men	Women
ln(initial level of height)	-0.00797*** (0.0013)	-0.0102*** (0.0018)
Constant	0.0413*** (0.0067)	0.0517*** (0.0091)
Observations	28	28
R ²	0.575	0.552

Note: The departments of Guainía, Guaviare, Vichada and Vaupés were grouped because of data availability. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Source: Authors' estimations.

V. Conclusions

- Our dataset of certificates of judicial background is **non-truncated, not self-reported**, highly **representative** of the population, and consists of **more than 225,000 observations**.
- We find a substantial **increase in the stature** of the population born between 1920 and 1990. Therefore, both women and men made gains throughout the century in their **biological well-being**.
- We make a quantitative contribution to the literature by estimating econometrically the socioeconomic determinants, including diseases and provision of public services, of height in an emerging country such as Colombia.
- We find important differences in the stature according to **sex, level of education, occupation, place, and date of birth**. Similarly, **disease environment** significantly affect people's height.
- We also find **spatial convergence** between Colombian departments along the 20th century by finding **significant beta convergence**.

THANK YOU!

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