THE STATURE OF THE COLOMBIAN ELITE BEFORE THE ONSET OF
INDUSTRIALIZATION, 1870 - 1919

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Abstract

The average height of Colombian women increased 8.95 cm between 1905 and 1985 and that of men 8.96 cm, in the same time period. Thus the country was a success story according to international standards in this respect. The information for the adult height of Colombians born between 1905 and 1985 was obtained from a database with more than 9 million observations constructed with the national ID cards. This implies that the results are indicative of what happened to the overall population. For the pre-industrial era in Colombia, which is before the 20th century, information on height is only available from 1870. The source in this case is the records of the passports issued to Colombian citizens, for which we have obtained about 17,000 observations.

The analysis of those records for the period 1870-1919 reveals some striking results. In the first place, the long run behavior of height was stable, unlike what is observed with the national ID card records, beginning in 1905, in which case heights were increasing. The group included in the passport records is much taller than those from the ID card. For the period 1905-1909 the average passport height for men was 168.7 cm compared with 162 cm for national ID cards. In the case of women the former had an average height of 158 cm and the later 150 cm.

Another characteristic found in the passport sample is that there were almost no regional differences, unlike what is observed in the case of the national ID cards. The reason why the behavior of the height of Colombians obtained from the passports differs from the one recorded in the national ID cards is that in the 19th century and early 20th century Colombians who traveled abroad, mainly to Europe and the US, belonged to the elite. Thus, they seemed to have good levels of nutrition and living conditions which made them relatively tall even by the standards of European countries at that time. However, although tall by the standards of the 19th century these Colombians had an average height which was below that of Colombians born in 1985. While the average height for men in this group in 1900 was 168.2 cms, Colombians born in 1985 grew to an average height of 170.6 cm. The health conditions under which the elite found itself was probably holding back its height. Only until the late 1920's, when at the earliest, the international advances in modern medical technology would have been felt, could many of the health impediments for advances in height would have begun to be eliminated.
I. INTRODUCTION

The 19th century was a period of economic decline and civil wars in many Latin American countries. Colombia experienced both economic decline, until around 1850, and numerous civil wars, of which the War of the Thousand Days (1899-1902), with an estimated 100,000 casualties, was the bloodiest. The study of the standard of living in this time of turmoil is very important since the impact of economic and political events on people’s lives can be better understood.

The difficulty with the study of the standard of living in this period is that the relevant information is often not available. For the period before 1905 there are no estimates for Colombia’s GDP per capita. The available records for wages and salaries are very fragmentary. Additionally, there are no reliable price indexes for the 19th century, so that it is quite difficult to know the evolution in the purchasing power of various groups. For this reason the advances of anthropometric history in the last 30 years are very helpful for a better understand of the behavior of the material standard of living, at least during a sub-period of the 19th century.

Since the pioneering work of Robert W. Fogel and his associates in the late 1970’s on anthropometric history, economic historians have increasingly resorted to height as a measure of the biological standard of living, since adult stature reflects both the net nutritional status during the years of growth (0-18 years old) and the genetic potential.

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1 The best introduction to the history of Colombia in the 19th century is Palacios and Safford, *Colombia: Fragmented*.
2 For an introduction to the field of anthropometric history see Steckel, “Stature and the Standard”.
The passports issued in Colombia to people born from 1870 to 1919 are a very important source to trace the evolution in the biological standard of living since they contain anthropometric information.

In this paper we study the behavior of height for a group of more than 16,000 Colombians, mostly from the elite, born between 1870 and 1919. The quality of the information is very good, especially since it is available for a relatively long time period, for both men and women, and contains additional data, such as destination, reason for travelling, and place where the passport was issued.

The database, and the results obtained in this paper, complements a previous study done by the authors for the period 1905-1985 using a larger sample from the national ID cards. The advantage of using the passport records for the period 1870-1919 is that it allows us to know something of what was happening with the standard of living for one group of Colombians born in the last thirty years of the 19th century and the first two decades of the 20th.

II. THE DATA

The information on height used in this paper was obtained from the passport records of the Colombian Ministry of Foreign Relations. Passports are documents required to travel abroad.

Colombia begins issue passports in 1824 when the recently created republic issued a law authorizing the granting of passports to those Colombians who found themselves abroad.

The database used in the present study was constructed by the authors from the records for passports issued in the period 1870-1919 by the Colombian

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3 Meisel and Vega, “La estatura”.
4 The records for the passports issued by the Colombian government in the period 1870-1919 are found in the Archivo General de la Nación and in the archives of the Foreign Ministry.
5 Salamanca, Manual para el servicio, 208-222.
Ministry of Foreign Relations. This information has never been used up to now by social scientists, although it is in excellent conditions. These records contain valuable information, not only for anthropometric history, but also for social history.

For the period 1870-1919 a total of 15.911 observations were obtained from the passport archives. A growing number of observations per year were obtained until 1906, when 420 records for men and 219 for women were found. Then, the sample drops to 83 observations per year for both men and women. All passports that reported the exact height were included, while those with no height or only a general description such as tall, average height, or short, were discarded. In most of our analysis we have used only information for those Colombians who obtained their passport when they were between 18 and 60 years old. The reason for using this range is that adult height is achieved by about 18 years of age and at more advanced ages, such as the 60’s, height may decrease.

<table>
<thead>
<tr>
<th>Date of birth</th>
<th>Average Male Height</th>
<th>Average Female Height</th>
<th>Increase in Height for Men (%)</th>
<th>Increase in Height for Women (%)</th>
<th>Number of observations Men</th>
<th>Number of observations Women</th>
<th>COVARIANCE</th>
<th>STANDARD DEVIATION (Men)</th>
<th>STANDARD DEVIATION (Women)</th>
<th>COEFFICIENT OF VARIATION (Men)</th>
<th>COEFFICIENT OF VARIATION (Women)</th>
<th>Centimeters increased Men</th>
<th>Centimeters increased Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>1870-1874</td>
<td>167.4</td>
<td>158.1</td>
<td>0.9%</td>
<td>-0.4%</td>
<td>189</td>
<td>120</td>
<td>315</td>
<td>8.44</td>
<td>6.20</td>
<td>0.0497</td>
<td>0.0393</td>
<td>0.155</td>
<td>0.177</td>
</tr>
<tr>
<td>1875-1879</td>
<td>168.2</td>
<td>157.9</td>
<td>0.9%</td>
<td>-0.5%</td>
<td>386</td>
<td>197</td>
<td>584</td>
<td>7.91</td>
<td>6.21</td>
<td>0.0415</td>
<td>0.0395</td>
<td>0.066</td>
<td>0.062</td>
</tr>
<tr>
<td>1880-1884</td>
<td>168.5</td>
<td>158.3</td>
<td>0.4%</td>
<td>-0.3%</td>
<td>509</td>
<td>331</td>
<td>840</td>
<td>7.91</td>
<td>6.21</td>
<td>0.0407</td>
<td>0.0483</td>
<td>0.051</td>
<td>0.065</td>
</tr>
<tr>
<td>1885-1889</td>
<td>168.8</td>
<td>158.5</td>
<td>0.1%</td>
<td>-0.4%</td>
<td>881</td>
<td>390</td>
<td>1,271</td>
<td>7.23</td>
<td>6.72</td>
<td>0.0428</td>
<td>0.0496</td>
<td>0.052</td>
<td>0.058</td>
</tr>
<tr>
<td>1890-1894</td>
<td>168.6</td>
<td>158.7</td>
<td>0.2%</td>
<td>-0.1%</td>
<td>1,229</td>
<td>512</td>
<td>1,741</td>
<td>7.23</td>
<td>7.62</td>
<td>0.0435</td>
<td>0.0477</td>
<td>0.051</td>
<td>0.059</td>
</tr>
<tr>
<td>1895-1899</td>
<td>168.8</td>
<td>158.9</td>
<td>0.1%</td>
<td>0.5%</td>
<td>881</td>
<td>390</td>
<td>1,271</td>
<td>7.23</td>
<td>7.62</td>
<td>0.0435</td>
<td>0.0477</td>
<td>0.051</td>
<td>0.059</td>
</tr>
<tr>
<td>1900-1904</td>
<td>168.5</td>
<td>158.6</td>
<td>-0.2%</td>
<td>0.5%</td>
<td>1,229</td>
<td>512</td>
<td>1,741</td>
<td>7.23</td>
<td>7.62</td>
<td>0.0435</td>
<td>0.0477</td>
<td>0.051</td>
<td>0.059</td>
</tr>
<tr>
<td>1905-1909</td>
<td>168.7</td>
<td>158.1</td>
<td>-0.3%</td>
<td>-0.2%</td>
<td>1,246</td>
<td>635</td>
<td>1,881</td>
<td>7.14</td>
<td>6.96</td>
<td>0.0424</td>
<td>0.0433</td>
<td>0.043</td>
<td>0.049</td>
</tr>
<tr>
<td>1910-1914</td>
<td>168.3</td>
<td>158.5</td>
<td>0.0%</td>
<td>-0.3%</td>
<td>1,246</td>
<td>635</td>
<td>1,881</td>
<td>7.14</td>
<td>6.96</td>
<td>0.0424</td>
<td>0.0433</td>
<td>0.043</td>
<td>0.049</td>
</tr>
<tr>
<td>1915-1919</td>
<td>168.6</td>
<td>158.7</td>
<td>0.2%</td>
<td>-0.1%</td>
<td>681</td>
<td>555</td>
<td>1,236</td>
<td>6.89</td>
<td>6.58</td>
<td>0.0407</td>
<td>0.0415</td>
<td>0.039</td>
<td>0.044</td>
</tr>
<tr>
<td>TOTAL</td>
<td>168.39</td>
<td>158.33</td>
<td>0.7%</td>
<td>0.4%</td>
<td>10,390</td>
<td>5,521</td>
<td>15,911</td>
<td>1.24</td>
<td>0.59</td>
<td>0.0397</td>
<td>0.0397</td>
<td>0.039</td>
<td>0.044</td>
</tr>
</tbody>
</table>

Source: Archivo General de la Nación and archives of the Foreign Ministry (hereafter: AGN_FM), and calculations by the authors. Note: Includes only persons whose age was between 18 and 60 years.

6 Although there is some information for passports issued in the period 1859-1869 the number of observations is so limited that the results are not significant. For this reason we have used only the data that begins in 1870. For the period before 1859 no information on passports is available at the archives of the Ministry of Foreign Relations.

7 These passports were issued from 1918 to 1940.

8 Since there could be possible changes in sample composition in the period 1870-1919, for example more people started to travel, we performed a correction for this possible bias using a weighted and restricted least-squares regression. Results for this correction are presented in Appendix 1. However, those results show that once the adjustment is introduced the results do not change very much from what it is observed. (see Appendix 1).
The passport data also contain 924 observations for those who were under 18 years old when they obtained that document. We have used that information to show the age-growth profile for both males and females.

The information in the Colombian passports for those born in the period 1870-1919 included name, city where it was issued, date of issue, age, height, color of eyes and hair, destination, reasons for trip abroad and occupation. It also included a photograph. The place of birth was not reported. All the above information is available in the database we have constructed, except the eye and hair color, which we did not consider useful for our purposes.

The data included in the passport records can be very valuable for multiple purposes. For all of the entries the name of the person is available. This allows researchers to look up specific individuals for which there is information on date of birth, anthropometric characteristics, and social characteristics (occupation, reason for travelling), as well as the year and country where the person travelled.

The quality of these data was tested by applying the Lilliefors and Jarque-Bera normality tests to the observations of each year. In both tests, and for almost every year, at the 3% level of significance the null hypothesis of normality was accepted. Graph 1 shows the frequency distribution for this sample for both men and women, using the data for the period as a whole.

Graph 1. Frequency Distribution of Height

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9 The name of the person is very important because Colombia at this time was a country with about 4.7 millions of population. Since additionally there was a relative very limited social mobility, the same families belong to the elite of the several generations. Thus the family names help to identify many of the persons of this data base, the majority as members of the Colombia elite.

10 The t-statistics for men under the Lilliefors test was between 0.05 to 0.14.
The reason for examining the period 1870-1919 is that in the aforementioned study we had obtained information for the height of Colombians from national ID cards beginning in 1905. However, it is important to have some knowledge about the evolution of height before 1905, especially since after 1905 the growth of coffee exports allowed Colombia to make the transition from a
stagnant to a rapidly growing economy. The data on height obtained from passports was extended until 1919 so that we could compare the results obtained from this source with those from the ID cards. When the heights from these two sources are compared (see Graph 2) it is evident that the average height obtained from passports is above that obtained from the ID cards: about 8 cm. for women and about 5 cm. for men.

Graph 2. Average Height from Passports and ID Cards, 1909-1919

Source: For passports data: AGN_FM, for ID cards: Registraduria Nacional del Estado Civil (hereafter: RNEC) and calculations by the authors.

The reason for the difference in average height between passport and ID card holders is probably related to the fact that while the information based on the later source is a representative sample for the Colombian population as a whole, the former represents the universe of a small segment of the population, since most of the persons included belonged to the social, economic, and cultural elite.

In the case of Mexico, Lopez-Alonso used information from passports issued between 1910 and 1935, with people born from the 1870’s to the 1910’s (3,970 observations). She found that the height of males from the passport sample, composed mainly of skilled manual workers, white-collar workers, and members of the elite and servants, remained fairly stable up to the last three decades of

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11 The average annual increase of per capita GDP for the period 1905-1924 was 3.4% and for 1925-1950, 2.16%. See GRECO, El crecimiento, 4.
the 19\textsuperscript{th} century. She also found a recovery for the cohorts who grew up during the years of the Revolution (1910-1917). Her results show that, for males, the tallest category of the elite was 4.4 cm. taller than the unskilled workers. For the 20\textsuperscript{th} century there is no sign of an upward trend in average height until the 1940’s.

In the case of the United States, Marco Sunder used a database with 19,722 observations for males born in the period 1800-1900, and 5,992 for females, born in the period 1820-1900, constructed from passport applications. Also in that country passport applications reflect the height of the wealthier segments of the population.\textsuperscript{13}

Sunder shows that for the first half of the 19\textsuperscript{th} century the height of passport applicants remained fairly stable, unlike the majority of the population which experienced a significant fall in average height during the half century before the US Civil War, the so-called “Antebellum Puzzle”. Additionally, beginning about the middle of the century the height of passport applicants increased rapidly and by 1900 they had an average height that was reached by the rest of the population only four decades later.\textsuperscript{14}

III. TRENDS IN AVERAGE HEIGHT

During the first decades after independence the territory of what is now Colombia, like most of Latin America, experienced a drop in its per capita GDP.\textsuperscript{15} Between 1802-1804 and 1846-1850, per capita exports in real terms fell

\textsuperscript{13} Sunder, “On the Biological”.
\textsuperscript{14} Ibid., 9.
\textsuperscript{15} Coatsworth, “Economic and Institutional”.
by 42%. However, exports recovered in the following two decades as a result of a short lived boom in tobacco exports. After 1880, and until 1910, export growth again stagnated, although experiencing short term fluctuations. As a result, in 1913, among the Latin America countries, only Haiti and Honduras had fewer exports per capita than Colombia (see Table 2).

Table 2. Latin America Exports and Foreign Investment, 1913
(Latin America = 100)

<table>
<thead>
<tr>
<th>Country</th>
<th>Per Capita Exports</th>
<th>Per Capita Foreign Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>343</td>
<td>306</td>
</tr>
<tr>
<td>Cuba</td>
<td>337</td>
<td>188</td>
</tr>
<tr>
<td>Uruguay</td>
<td>287</td>
<td>225</td>
</tr>
<tr>
<td>Chile</td>
<td>192</td>
<td>104</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>130</td>
<td>121</td>
</tr>
<tr>
<td>Bolivia</td>
<td>90</td>
<td>16</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>73</td>
<td>20</td>
</tr>
<tr>
<td>Brazil</td>
<td>65</td>
<td>78</td>
</tr>
<tr>
<td>Panama</td>
<td>60</td>
<td>13</td>
</tr>
<tr>
<td>Republica Dominicana</td>
<td>53</td>
<td>4</td>
</tr>
<tr>
<td>Venezuela</td>
<td>51</td>
<td>20</td>
</tr>
<tr>
<td>Paraguay</td>
<td>48</td>
<td>33</td>
</tr>
<tr>
<td>Mexico</td>
<td>47</td>
<td>131</td>
</tr>
<tr>
<td>Guatemala</td>
<td>46</td>
<td>48</td>
</tr>
<tr>
<td>Peru</td>
<td>46</td>
<td>37</td>
</tr>
<tr>
<td>Ecuador</td>
<td>44</td>
<td>15</td>
</tr>
<tr>
<td>El Salvador</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>Colombia</td>
<td><strong>34</strong></td>
<td><strong>8</strong></td>
</tr>
<tr>
<td>Haiti</td>
<td>31</td>
<td>14</td>
</tr>
<tr>
<td>Honduras</td>
<td>27</td>
<td>34</td>
</tr>
</tbody>
</table>

Source: Ocampo, Colombia y la economía, 53.

The fall in exports in the final decades of the 19th century and first decade of the 20th century seems to have led to a reduction in real wages. According to William P. McGreevey, real salaries in coffee production areas were falling from the early 1880’s to the first decade of the 20th century.

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16 Ocampo, Colombia y la economía, 87.
17 Ibid., 89.
18 Ibid., 53.
However, McGreevey argues that somewhere between 1905 and 1915 there occurred a transition from a period of virtual stagnation or decline to one of rapid economic growth. That expansion does not seem to have increased real salaries or the standard of living for the majority of the population, at least until the 1910’s. Thus, for the purposes of this study it is important to highlight that the standard of living in Colombia in the period 1870-1905 seems to have been basically stagnant. As we shall see, the anthropometric evidence that we have gathered using passports corroborates this.

### Table 3. Index of Colombian Real Exports Per Capita, 1871-1910

<table>
<thead>
<tr>
<th>Period</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1871-75</td>
<td>100</td>
</tr>
<tr>
<td>1879-81</td>
<td>110</td>
</tr>
<tr>
<td>1888-91</td>
<td>97</td>
</tr>
<tr>
<td>1898</td>
<td>135</td>
</tr>
<tr>
<td>1905-10</td>
<td>116</td>
</tr>
</tbody>
</table>

Source: Ocampo, Colombia y la economía, 89.

### 1. Trends in height

For the period 1870-1919 the records for the passports include the heights of 10,390 men and 5,521 women 18 to 60 years old. As shown in Table 1, the increase in height for men between 1870-1874 and 1915-1919 was only 1.24 cm., less than 0.25 cm. per decade. In the case of women the rate of increase was even lower, 0.12 cm. per decade. Furthermore, the trend for the heights of men and women in the period 1870-1919 is not statistically significant, when the data is corrected for changes in the sample mean as we commented before. (See Graph 3)

Graph 3. Average Height of Men and Women Born between 1870-1919.

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20 Ibíd., 44.

21 The coefficient of the trend of average height, corrected by changes in sample composition, show that there is no trend in this period. The t-statistic for the trend of average height of men is 1.6 and it is 1.78 for average height of women, which are no statistically significant at 5% of confidence (See Appendix 2).
The dispersion in the heights of Colombians who obtained passports in the period 1918-1940, as measured by coefficient of variation, was relatively constant, with a coefficient for the trend that is not statistically significant.\textsuperscript{22} The coefficient of variation is an important indicator of interpersonal inequality in height.

The coefficient of variation of height fluctuated around 0.04, for both men and women (see Graph 4). Thus the dispersion is less than what was observed in the period 1910-1919 with the heights obtained from the national ID card, which was around 0.044 for men and 0.050 for women. Only towards 1980 the dispersion of height obtained from the data of the ID card approaches a level similar to that observed for passports in the period 1870-1919. Thus, it can be concluded that the group in the passport sample was relatively homogeneous in social and economic terms.

\textbf{Graph 4. Coefficient of Variation of Average Height, 1870-1919}

\textsuperscript{22} The t-statistic for the trend of coefficient of variation is -1.09 for men and 0.53 for women, both are no statistically significant at the 5\% of confidence, correcting by changes in sample composition (See Appendix 2.)
The difference between the height of men and women born in the period 1870-1919 remained almost unchanged, with men’s height exceeding that of women by about 10 cm. This is a much smaller gap than was observed for the height between men and women in the period 1910-1985 using the ID card information. In this later case the difference was above 11 cm. and was as high as 13 cm. in some sub-periods. This indicates that there was a greater equality between genders in the nutrition status among the elite.

Although the height of Colombians who obtained a passport in the period 1918-1940 was stagnant, international comparisons show that this group was relatively tall in relation with what had been achieved by other countries. Table 4 shows the height of men for a group of countries in 1900. The height of Colombian men was above that of Great Britain, France, Italy, and Indonesia. Only the tallest countries in the world at the time were above the height of Colombian men in our sample: the United States, Sweden, Norway, and Holland. However, it is important to keep in mind that while the information on height for most countries included in Table 4 is based on the height of military
recruits, except for Mexico which is from elite database, that of Colombia was obtained from passport records, which at the time included mostly people from the elite and some skilled workers.

Table 4. International Comparisons of Men’s Height

<table>
<thead>
<tr>
<th>Country</th>
<th>1900</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>172,5</td>
</tr>
<tr>
<td>United States</td>
<td>171,0</td>
</tr>
<tr>
<td>Norway</td>
<td>171,0</td>
</tr>
<tr>
<td>Mexico</td>
<td>170,1</td>
</tr>
<tr>
<td>Netherlands</td>
<td>169,0</td>
</tr>
<tr>
<td>Colombia</td>
<td>168,5</td>
</tr>
<tr>
<td>Great Britain</td>
<td>167,0</td>
</tr>
<tr>
<td>France</td>
<td>165,5</td>
</tr>
<tr>
<td>Italy</td>
<td>164,5</td>
</tr>
<tr>
<td>Spain</td>
<td>163,6</td>
</tr>
<tr>
<td>Indonesia</td>
<td>160,8</td>
</tr>
</tbody>
</table>

Sources:
- c Drukker and Van Meerten, “Beyond Villermé”, 46.
- d AGN_FM and calculations by the authors.
- g Martínez-Carrón, “Estatura, salud”, 32-41.
- h Height for 1901. Van der Eng, “An Inventory”, 177.

2. Possible biases in the sample

That the sample obtained from passports is not representative of the total Colombian population is evident when comparing the average height obtained from passports and ID cards. Table 5 shows that in the period 1910-1914 the height of women obtained from passports was 7.8 cm. above the height obtained from ID cards. In the case of men the gap is smaller but significant: 4.8 cm. in 1910-1914 and 5.0 cm. in 1915-1919.

Table 5. Differences in Height between Passports and ID Cards

<table>
<thead>
<tr>
<th>Period</th>
<th>Men Passports</th>
<th>Men ID card</th>
<th>Difference Men</th>
<th>Women Passports</th>
<th>Women ID card</th>
<th>Difference Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>1905-1909</td>
<td>168,7</td>
<td>162,0</td>
<td>6,7</td>
<td>158,1</td>
<td>150,0</td>
<td>8,1</td>
</tr>
<tr>
<td>1910-1914</td>
<td>168,3</td>
<td>163,5</td>
<td>4,8</td>
<td>156,6</td>
<td>150,8</td>
<td>7,8</td>
</tr>
<tr>
<td>1915-1919</td>
<td>168,6</td>
<td>163,6</td>
<td>5,0</td>
<td>158,7</td>
<td>151,5</td>
<td>7,2</td>
</tr>
</tbody>
</table>

Source: RNEC, AGN_FM and calculations by the authors.
Another important difference between the heights observed in the passport records with respect to the ID card is that in the former the long term trend is constant, while in the later there is a clear positive trend in height, as can be seen in Graph 5.

Graph 5. Average Height of Men and Women by Source, 1870 - 1985

The height of Colombians derived from ID cards converges to the height obtained from passports in 1919 around 1960-1964, in the case of men, and around 1980-1984 in the case of women.

A significant finding is that the height achieved by the members of the Colombian elite in the late 19th century and early 20th century is below the average for the total Colombian population which was born in 1985. While in 1915-1919 the average height for men from the passport records was 168.6 cm., for the Colombian population born in 1980-1985 the average was 170.6 cm. Since there are currently large differences in the average height of Colombians according to the socio-economic stratification, it is evident that the contemporary elite must have a height which is above the current average for
the overall population. For example, in the sample obtained by Ordoñez, Polania, and Ramirez, for the early 1990’s the height of men from the highest socio-economic strata was 9.5 cm. above that of those from the lowest strata.\textsuperscript{23} This implies that at some point between 1919 and the 1980’s the average height of the elite must have grown in order to exceed that of the average population.

Furthermore, these results indicate that in the early 20\textsuperscript{th} century the Colombian elite was not achieving its potential height. Even if at that level of development its purchasing power allowed it to have a proper nutrition, perhaps because of health reasons it was not achieving its genetically determined maximum height.

The research of the epidemiologist Thomas McKeown would suggest that the reason why the members of the Colombian were not achieving their potential height, even if they had a good diet and adequate personal hygiene, was because the medical advances that improved life expectancy and height were available only in the late 1920’s and 1930’s, at the earliest.\textsuperscript{24}

Until the mid 1950’s the remarkable improvements in health and the decline in mortality observed in the developed countries since the 18\textsuperscript{th} century were mostly attributed to advances in medical technology.\textsuperscript{25} However, Thomas McKeown, challenged that consensus, showing that until the late 1920’s, at the earliest, the effect of the advances in medical technology on overall mortality were minimal, even in the developed countries. In his view the main reason for the almost continuous decline in mortality which began in the early 18\textsuperscript{th} century in countries like England was better nutrition due to the rise in agricultural

\textsuperscript{23} Ordoñez, Polania and Ramirez, “La estatura”, Table 4.
\textsuperscript{24} McKeown, \textit{The Origins}.
\textsuperscript{25} Fogel, “Nutrition and the Decline”, 440.
productivity, advances in transportation, and expansion of international trade. Better nutrition had such a large impact in mortality because there is a synergy between nutrition and the ability to resist infectious disease: when a person is well fed the possibility of surviving certain infectious diseases, such as tuberculosis, increases.26

After the 1870’s, the advances in public health observed in the more advanced countries, such as England, also contributed to the drop in mortality. These advances in public health were mainly the result of the improvements and extensions of water supply and sewage systems.27

According to McKeown, it was probably not until 1935, with the introduction of sulphasamids that changes in medical technology significantly contributed to the reduction in mortality.

In the case of Colombia, until the beginning of the 20th century there were almost no advances in public health, so that any fall in mortality was probably the result until then of gains in nutrition. It was only until 1938 that Bogotá, Colombia’s capital and largest city, had for the first time in its history a modern aqueduct which carried good quality water to most of its inhabitants.28

Until 1888, the distribution of water in Bogotá was similar to what it had been during the colonial period. Water was conducted through clay pipes to public fountains spread out through the city. There the liquid was loaded in clay pots which were sold from house to house by women who carried the pots in their heads or in burros, the so called aguateras, which were an important part of urban life until the late 19th century.29

26 Ibid., 481.
27 McKeown, An Introduction.
28 EAAB, Historia del agua, 67.
29 Ibid., 59.
In 1888, the first aqueduct was inaugurated in Bogotá, but the water it carried was not treated at all. It was only until 1921 that water was chlorinated. As a result there was a significant drop in the incidence of typhoid fever.\textsuperscript{30}

In Medellín, Colombia’s second city, the situation was not much different from that of Bogotá with respect to public health. During the colonial period and through the 19\textsuperscript{th} century the main source of drinking water was a creek which traversed the city, Santa Elena. During the 19\textsuperscript{th} century there were many complaints about its contamination. For example, it was then prohibited that clothes, donkeys, and mules be washed before 8:00 a.m., to allow the inhabitants to provide themselves with the drinking water they needed for the day before the water was affected by those activities.\textsuperscript{31}

Probably the situation of the rest of Colombia with respect to public health was even worse than in the two main cities. Bogotá is located in the most fertile valley in Colombia and over an altitude of 2600 meters. At the beginning of the twentieth century Medellín was the main city of the prosperous coffees cities of Colombia and the major industrial centre of the country. Thus, they were the richest cities of Colombia. Additionally, the altitude of these cities makes better health than the tropical low lands. Thus, it is not until the 1920’s, at the earliest, when it can be expected that the average height of the Colombian elite would have begun to show an upward trend that would allow it to maintain a height above the rest of the population.

The trend in the average height of the employees of the Colombian Central Bank\textsuperscript{32} perhaps shows what happened to the elite during the 20\textsuperscript{th} century, since

\textsuperscript{30} Ibíd., 62.
\textsuperscript{31} EEPPM, \textit{Una mirada}, 8.
\textsuperscript{32} The Central Bank sample was constructed by the authors with 16.909 observations from the archives of the Colombian Central Bank (Banco de la República).
it represents urban dwellers with formal education, which exceeds the national average height by about 4 cm. during the whole period\textsuperscript{33} (see Graphs 6).

Thus, the average stature of men from the elite could have moved upward from 168.6 cm. in 1915-19 to 172 cm. in 1984, as represented by men of the Central Bank. For women, it would have increased from 158.7 cm. in 1915-19 to 163 cm. in 1984.

\begin{center}
Graphs 6. Average Height by Source
\end{center}

\begin{center}
\includegraphics[width=\textwidth]{graphs6}
\end{center}

Source: RNEC, AGN_FM, Colombian Central Bank and calculations by the authors.

\section*{3. Destinations and reasons for travelling}

The analysis of height according to the place people travelled reveals interesting patterns. People who travelled to the United States, Canada, and Europe were the tallest. In contrast those who went to Central America and the islands of the Caribbean were 1.5 cm. shorter than the former, for both men and women (see Graphs 7). Obviously those who travelled farthest tended to be from more privileged backgrounds, and thus tended to be taller, as there is a correlation between social class and height, especially in the first stages of economic growth.

\begin{center}
Graphs 7. Height by Destination
\end{center}

\textsuperscript{33} As was seen in Graphs 8 and 9, the average height of the employees of the Colombian Central Bank shows an upward trend since the 1920’s and seems to have been stagnant before that date. It is very probable that something similar might have happened with the height of the elite.
There also seems to be a correlation between the reason for travelling abroad and height. The tallest people were those who went to foreign countries for medical reasons. Since health treatments in Europe or the United States, the most often chosen places for this effect, were costly, only the richest Colombians could afford this type of travel. The largest gap observed in height according to the motive for travelling is found in the case of women. For example, those who went abroad as emigrants were 3.0 cm. shorter than those who did it for health reasons (Graphs 8).

4. Regional aspects

The passport records for the period under discussion do not include information on the place of birth. However, we do know the city where the passport was issued. Passports could be obtained by Colombian citizens at the time in 12 cities, mostly departmental capitals. More than half were issued in Bogotá (4,820 for men and 2,546 for women). Although the city reported is not the
same one as the place of birth, there was probably a relatively close relation between them, or at least between the city of issue and its hinterland.

The information on the place in which the passport was obtained shows an interesting correspondence with average height. The shortest persons were those issued passports in the cities close to the frontier (Pasto, Popayán, Cúcuta) or that were seaports (Santa Marta, Cartagena). A reason for this pattern could be that to travel abroad from a city in the interior, like Bogotá or Medellín, was much more costly than doing so from a city close to the border. Thus people from interior cities who travelled to foreign countries were probably better off than those in the seaports and frontier cities. In contrast, in the latter cities workers who were not especially prosperous could afford foreign travel because distances, at least to neighboring countries, such as Ecuador, Venezuela, and Panama, was relatively cheap.

Regional differences using a restricted least-squares regression with regional dummies show differences between -1.6 cm. and 2 cm. from the mean of height for the whole cities34.

The evolution of the standard deviation of the logarithm of average height (sigma convergence) for the cities where passports were issued shows that the differences in height did converge over time.

IV. CONCLUSIONS

34 See Appendix 3 for regional deviation from the national mean height.
This study has examined the evolution of stature in Colombia, using a database with more than 16,835 observations from the passport records for persons born in the period 1870-1919.

The main conclusion from the above analysis is that, for Colombians born between 1870 and 1919 and who obtained a passport, the average height was stagnant throughout this period. The fact that per capita GDP was also probably stagnant at the time is perhaps not the main the reason for this result. Since the majority of those included in this sample belonged to the elite, it is likely that they were relatively well fed and had a life style characterized by good personal hygiene. As a result, these Colombians were taller than the French and British workers of the time.

A second conclusion is that they were significantly taller than Colombians who did not belong to the elite (by almost 5 cm.).

The third conclusion, and somewhat surprisingly, is that by present Colombian standards this group was short. While the average height for men in this group in 1900 was 168.2 cm., Colombians born in 1985 grew to an average height of 170.6 cm. Even if the Colombian elite was well fed at the beginning of the 20th century, the health conditions under which it lived were probably holding back its physical growth. Only until the late 1920's, when at the earliest the international advances in modern medical technology would have been felt, could many of the health impediments for advances in height have begun to be eliminated. Additionally, only until the 1930's were there modern water supply systems in the main cities, a lack that severely hindered the possibility of eliminating water borne infectious diseases, such as typhoid fever and cholera.
This would have allowed for growth in the average height of the elite with respect to what it had achieved in the late 19th century.
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www.lablaa.org/
Appendix 1.

Performance of correction by changes in sample composition

Using the method of restricted least-squares regression we estimated average height series for men and women, creating dummies for year, gender and place of issue. Since sample has bias, for example sample composition and rounded data, we complete the estimation using weighted least-squares regression. As we see in the next graphs a simple average height (crude average) do not varies from that average estimated as a mean of height. Thus, average height for men and women can be used for this analysis.

Appendix 2.

Results for Parametric Regression to show Significance of Trend

Average height of Men (Trend)

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>Number of obs = 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>1.82060276</td>
<td>1</td>
<td>1.82060276</td>
<td>Prob &gt; F = 0.1162</td>
</tr>
<tr>
<td>Residual</td>
<td>84.1477771</td>
<td>48</td>
<td>1.711412022</td>
<td>R-squared = 0.0308</td>
</tr>
<tr>
<td>Total</td>
<td>86.9683938</td>
<td>49</td>
<td>1.74048368</td>
<td>Root MSE = 0.8413</td>
</tr>
</tbody>
</table>

Mean Height | Coef. | Std. Err. | t | Pr(|t|) | [95% Conf. Interval]
--- | ------ | -------- | -- | ----- | ---------------------
Trend | -0.013223 | 0.0082638 | 1.60 | 0.116 | -0.033964 - 0.009724 |
_cons | 168.0956 | 2.122883 | 79.91 | 0.000 | 167.5696 168.6216 |

Bootstrap statistics

| Number of obs | 500 |
| Replications | 500 |

b_trend | 500 | 0.13023 | 0.002186 | 0.002001 | 0.007472 | 0.034631 | 0.009605 | 0.034245 | 0.009605 | 0.034245 |
| b_cons | 500 | 168.0585 | 0.428467 | 0.338331 | 167.3918 | 168.7213 | 167.3918 | 168.7213 |

Note: N = normal   P = percentile   BC = bias-corrected

Source: Calculations by the authors.

Once we control by changes in sample composition (sample size of each year), regression also show that trend is not statistically significant:
Average Height of Women (Trend)

Regression controlling by sample composition:
Appendix 3.

Height Regional Differences

Regional Deviation over National Average Height

\[ \alpha \text{ (constant)} = 159.28 \]

<table>
<thead>
<tr>
<th>Region 1</th>
<th>Region 2</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bucaramanga</td>
<td>Cartagena</td>
<td>2.17 -0.45</td>
</tr>
<tr>
<td>Medellin</td>
<td>Popayán</td>
<td>1.12 -0.43</td>
</tr>
<tr>
<td>Neiva</td>
<td>San Andrés</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>Regional Deviation from the Constant Term of Height</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Manizales</td>
<td>1.05 -0.72</td>
<td></td>
</tr>
<tr>
<td>Cúcuta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bogotá</td>
<td>0.77 -1.00</td>
<td></td>
</tr>
<tr>
<td>Pasto</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ibagué</td>
<td>0.33 -1.43</td>
<td></td>
</tr>
<tr>
<td>Santa Marta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.01</td>
<td>-1.65</td>
<td></td>
</tr>
</tbody>
</table>

**Regional Deviation from the Constant Term of Height.**