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**The Evolution of Adult Height Across Spanish Regions 1950-1980:
A New Source of Data**

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Abstract

This paper presents new evidence on the evolution of adult height across Spanish regions for cohorts born between 1950 and 1980 using the available augmented sample of the European Community Household Panel (ECHP) for Spain. This augmented sample is available only for the year 2000, and collects self-reported height data representative at the Spanish region level (Comunidad Autónoma). Our main findings show that female average height experienced an increase of 4 cm between 1950 and 1980, while male average height increased by 5 cm. We also make available a new dataset of quinquennial mean heights across Spanish regions, in a conventionally accessible form, which allows researchers to study the determinants of population heights by means of a within-country analysis.

JEL classification codes: I31; J11

Keywords: Spain; Height; ECHP

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1. Introduction

Adult height is a well-known biological indicator of a population (Fogel, 2004; Komlos and Baten, 1998). There is wide empirical evidence documenting a systematic relationship between adult height, income and life expectancy (Waalers, 1984; Leon et al., 1995; Jousilahti et al., 2000; Battya et al., 2009). Perhaps for this reason, economists are becoming more and more interested in the determinants of height and its consequences (Steckel, 2009).

Recent empirical evidence on the potential determinants of adult height shows that, across a range of European countries and the United States, cohorts born between 1950 and 1980 in years of low postneonatal (ages 1 month to 1 year) mortality tend to be taller when they reach adulthood (Bozzoli, Deaton and Quintana-Domeque, 2009).

Potential consequences of adult stature have also been recently examined. Taller individuals tend to earn more (Case and Paxson, 2008; Lundborg et al., 2009), and they are also more likely to report positive emotions such as enjoyment and happiness (Deaton and Arora, 2009).

In this note we describe the evolution of adult height across Spanish regions for the cohorts of men and women born between 1950 and 1980. More importantly, we present a new dataset of quinquennial mean heights across regions within a country, Spain, which allows researchers to study the determinants of population heights by means of a within-country analysis. One of the main advantages of a within-country analysis is that it should be less likely to be confounded by omitted variables than a cross-country analysis.

Our short article complements Garcia and Quintana-Domeque (2007), who used the standard ECHP 1994–2001 to describe the evolution of adult height across 10

European countries for cohorts born between 1950 and 1980, and made available a dataset to explore the determinants of European population heights.

This communication is organized as follows. Section 2 offers a description of the data source used to construct the dataset. Section 3 shows the evolution of adult height across Spanish regions (Comunidades Autónomas) for the cohorts of men and women born between 1950 and 1980. Finally, Section 4 concludes.

2. Data

The data used in this paper come from the augmented sample of the European Community Household Panel (ECHP) for Spain. According to the Spanish Statistical Institute (INE, Instituto Nacional de Estadística), the Spanish ECHP augmented sample, which was conducted only in 2000, is intended to help researchers to exploit cross-sectional variation in their studies. Indeed, the Spanish ECHP augmented sample is representative at the second level of the Nomenclature of Territorial Units for Statistics (NUTS2) for Spain, Comunidades Autónomas, and not only at the national level. This augmented sample has been recently made available by the INE (http://www.ine.es/prodyser/micro_phogue.htm).

For the purposes of this paper, the available individual information in the ECHP-augmented sample 2000 for Spain that we use is: sex, year of birth, region of current residence, self-reported height, migration trajectory, and mode of interview.

Regarding height, individuals are asked the following question: *¿Cuánto mide usted sin calzado?* (What is your height without shoes?). Note that self-reported height is subject to measurement error, not only random, but systematic (Boström and Diderichsen, 1997). The empirical evidence in Thomas and Frankenberg (2002) and in Ezzati et al. (2006) shows that, in the US, men over-report their height more than women of the same age and the bias tends to increase with age for older people (above 60 years old), although the bias for both men and women is close to constant for ages 20 to 50.

We focus our analysis on cohorts born between 1950 and 1980 (i.e., they are 20-50 years old when reporting their heights). This helps us to partially deal with the age-

bias in self-reported height, provided that the evidence in Thomas and Frankenberg (2002) and Ezzati et al. (2006) also holds in Spanish regions.

The ECHP provides also information on migration trajectory. Specifically, we can identify two main groups of individuals: those who were born in the region of current residence (approximately 82%), and those born in Spain who were residing in a different region before living in the current one (14%). Our analysis focuses on the former group, interpreting average adult height of a cohort as capturing environmental conditions in the year of birth (at least for those who were born in a region and stayed there, stayers).

Finally, mode of interview is also likely to generate biases in the response to height questions (Ezzati et al., 2006): 75% of the individuals were personally interviewed while for 20% of the sample individual information was obtained through a proxy respondent. The 5% left was obtained from the same individual through a questionnaire or telephonic interview. We include individuals who were personally interviewed or filled in a questionnaire, excluding those who were telephonically interviewed or those whose information was obtained through another family member (proxy respondents).

To conclude, we compute average height for each region by cohort and sex, using the available weights in the ECHP, focusing on those individuals living in the region where they were born and who report their heights in a personal interview or filled in a questionnaire.

3. The evolution of adult height across Spanish regions

In Table 1 we report female quinquennial height averages for cohorts born between 1950 and 1980 across Spanish regions. The Table shows that female average height increased from nearly 161 cm, for cohorts born in 1950–1955, to 165 cm, for cohorts born in 1976–1980, an increase of 4 cm. The highest increases in height means are observed in Aragón and Asturias, more than 6 cm, while the lowest ones are found in Madrid and País Vasco, less than 2 cm. If we rank regions in terms of their female average heights for the youngest cohort, 1976–1980, the tallest ones are Asturias (168.3cm), Extremadura (166.8 cm) and Aragón (166.5 cm), while the shortest ones are Madrid (161.8 cm), Catalunya and Navarra (163.4 cm).

Table 1
Average heights by cohort, women (cm)

	1950–1955	1956–1960	1961–1965	1966–1970	1971–1975	1976–1980	Total
Andalucía	160.1	160.0	161.1	164.0	162.6	164.8	162.1
Aragón	160.0	161.0	163.0	164.1	162.9	166.5	162.9
Asturias	161.7	160.6	163.2	164.2	164.7	168.3	163.8
Balears (Illes)	160.1	163.4	163.2	163.1	164.9	166.2	163.5
Canarias	161.5	162.8	161.2	162.5	163.9	165.6	162.9
Cantabria	161.6	159.2	162.7	160.0	166.2	166.1	162.6
Castilla – La Mancha	160.6	161.8	163.2	163.5	164.3	164.2	162.9
Castilla y León	160.0	161.7	162.8	162.5	165.3	165.3	162.9
Catalunya	159.3	159.5	161.2	161.9	162.3	163.4	161.3
Comunitat Valenciana	158.2	159.5	161.5	161.7	163.8	164.3	161.5
Extremadura	163.7	164.4	163.1	165.4	164.2	166.8	164.6
Galicia	161.5	161.3	161.7	162.4	163.1	164.9	162.5
La Rioja	162.3	160.6	161.4	162.5	164.6	165.0	162.7
Madrid	160.3	160.8	164.0	163.4	161.3	161.8	161.9
Murcia	161.1	161.3	161.8	162.7	163.8	165.3	162.6
Navarra	158.4	159.6	162.2	163.9	165.5	163.4	162.2
País Vasco	162.3	161.2	162.3	162.7	161.7	164.0	162.4
Total	160.7	161.1	162.3	163.0	163.8	165.0	162.7

Source: Authors' calculations from the augmented sample 2000 ECHP for Spain. *Note:* Table A1 in Appendix A reports the number of observations.

Table 2 contains male quinquennial height averages for cohorts born between 1950 and 1980 across Spanish regions: male cohorts born in 1976–1980 are almost 5 cm taller than cohorts born in 1950–1955; while the youngest cohort is 176.3 cm tall, the oldest one is 171.5 cm. The two Spanish regions that experienced the highest increases in male height are Catalunya (8.2 cm) and Cantabria (7.9 cm), while Balears (2.6 cm) and La Rioja (–2.7 cm) are those that experienced the lowest increases, even negative increases in the case of La Rioja. The regions with the tallest and youngest cohorts are Catalunya (179 cm) and Canarias (178.5 cm), while the shortest ones are Navarra (174.9 cm) and La Rioja (169.8 cm).

Table 2
Average heights by cohort, men (cm)

	1950–1955	1956–1960	1961–1965	1966–1970	1971–1975	1976–1980	Total
Galicia	169.8	172.4	173.9	175.4	176.6	175.2	173.9
Asturias	172.8	174.0	172.4	174.4	175.2	176.1	174.2
Cantabria	172.8	173.7	168.8	173.5	178.0	177.3	174.0
País Vasco	172.9	173.2	175.4	176.5	174.7	175.5	174.7
Navarra	170.9	172.5	174.1	172.3	175.2	178.5	173.9
La Rioja	168.7	175.8	174.1	176.5	174.8	176.5	174.4
Aragón	171.4	172.9	174.2	175.0	176.0	178.0	174.6
Madrid	172.2	176.3	172.5	176.8	176.6	177.5	175.3
Castilla y León	170.8	171.1	171.6	173.1	175.3	179.0	173.5
Castilla – La Mancha	168.8	169.0	169.7	174.4	173.6	176.1	171.9
Extremadura	171.4	175.1	174.1	175.0	174.3	175.3	174.2
Catalunya	173.4	173.0	174.9	175.1	176.1	175.8	174.7
Comunitat Valenciana	172.5	172.4	176.6	173.1	177.5	169.8	173.6
Illes Balears	174.2	172.1	170.3	172.4	176.4	178.4	174.0
Andalucía	170.8	170.9	173.3	173.4	174.6	175.3	173.0
Murcia	169.0	172.7	170.5	174.6	175.4	174.9	172.8
Canarias	173.8	172.8	172.3	174.2	176.6	177.5	174.5
Total	171.5	173.0	172.9	174.4	175.7	176.3	174.0

Source: see Table 1. Note: Table A2 in Appendix A reports the number of observations.

In Table 3 we look at the annual growth rates in average cohort heights. The highest female height growth rates are found in Aragón and Asturias (0.16%), while Madrid (0.03%) and País Vasco (0.04%) have the lowest ones. For men, Catalunya (0.19%), Canarias and Cantabria (0.18%) are the regions with the highest rates, while Galicia (0.5%) and La Rioja (−0.06%) are the regions with the lowest growth rates.

Table 3
Annual growth rates in average cohort heights (%)

	Women	Men
Andalucía	0.12	0.13
Aragón	0.16	0.07
Asturias	0.16	0.10
Balears (Illes)	0.15	0.06
Canarias	0.10	0.18
Cantabria	0.11	0.18
Castilla – La Mancha	0.09	0.15
Castilla y León	0.13	0.12
Catalunya	0.10	0.19
Comunitat Valenciana	0.15	0.17
Extremadura	0.08	0.09
Galicia	0.08	0.05
La Rioja	0.07	−0.06
Madrid	0.03	0.09
Murcia	0.10	0.10
Navarra	0.12	0.14
País Vasco	0.04	0.08

Source: Note: The annual growth rate is defined as the annual rate of variation $\left[\left(\frac{\bar{h}_{1976-1980} - \bar{h}_{1950-1955}}{\bar{h}_{1950-1955}} \right) / 25.5 \right] \times 100$, where $\bar{h}_{1976-1980}$ and $\bar{h}_{1950-1955}$ are the means of the average heights of the cohorts born between 1976 and 1980, and 1950-1955, respectively. 25.5 is the number of years between the mid-points of the cohort intervals.

So far we have looked at the 17 Spanish regions (Comunidades Autónomas), which correspond to the second level of Nomenclature of Territorial Units for Statistics (NUTS2) used by Eurostat. However, these can also be grouped into 7 regions at the first level of NUTS (NUTS1): E1: Galicia, Asturias, and Cantabria; E2: País Vasco, Navarra, La Rioja and Aragón; E3: Madrid; E4: Castilla y León, Castilla – La Mancha, Extremadura; E5: Catalunya, Comunitat Valenciana, and Balears; E6: Andalucía, Murcia and Ceuta y Melilla; and E7: Canarias. This classification is very convenient when graphically representing the evolution of height across regions, as it can be seen from Figures 1, 2 and 3.

Figures 1 and 2 summarize the information contained in Tables 3A and 4A in Appendix A and they describe the evolution of adult height for men and women across Spanish regions at the NUTS1 level. Figure 3 describes the evolution of the average height for both men and women (see Table 5A) in Appendix A.

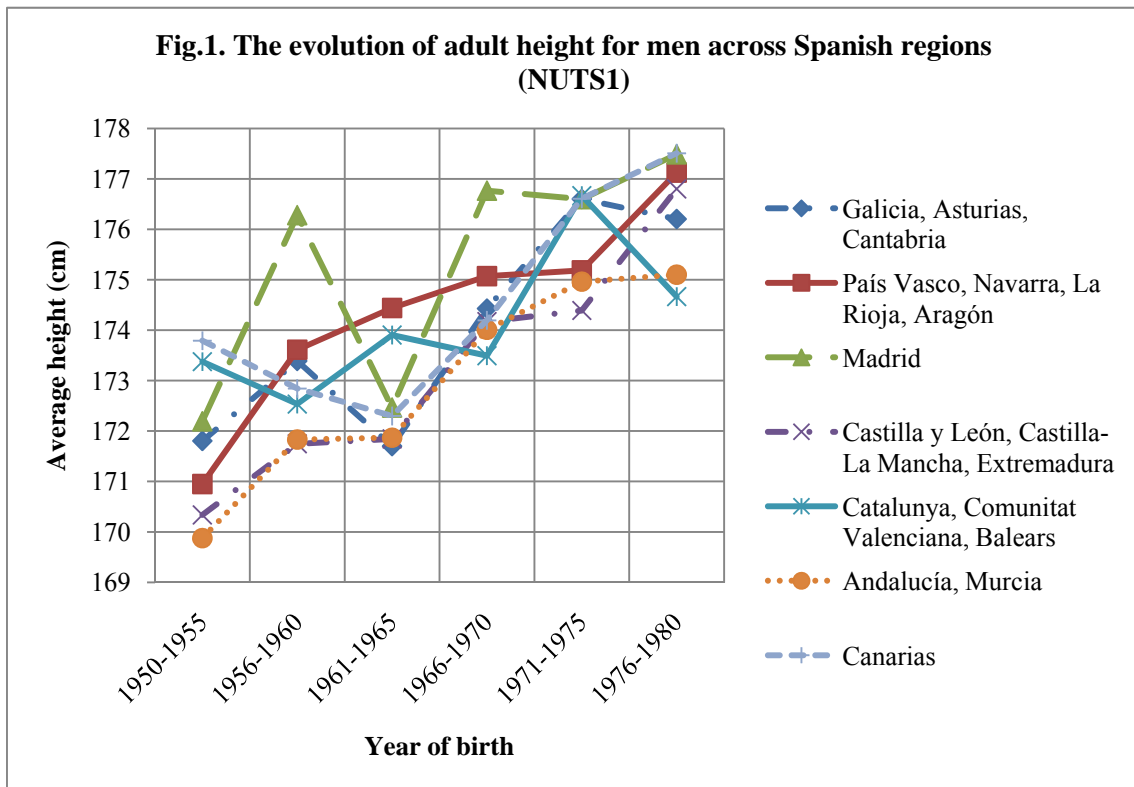


Fig.2. The evolution of adult height for women across Spanish regions (NUTS1)

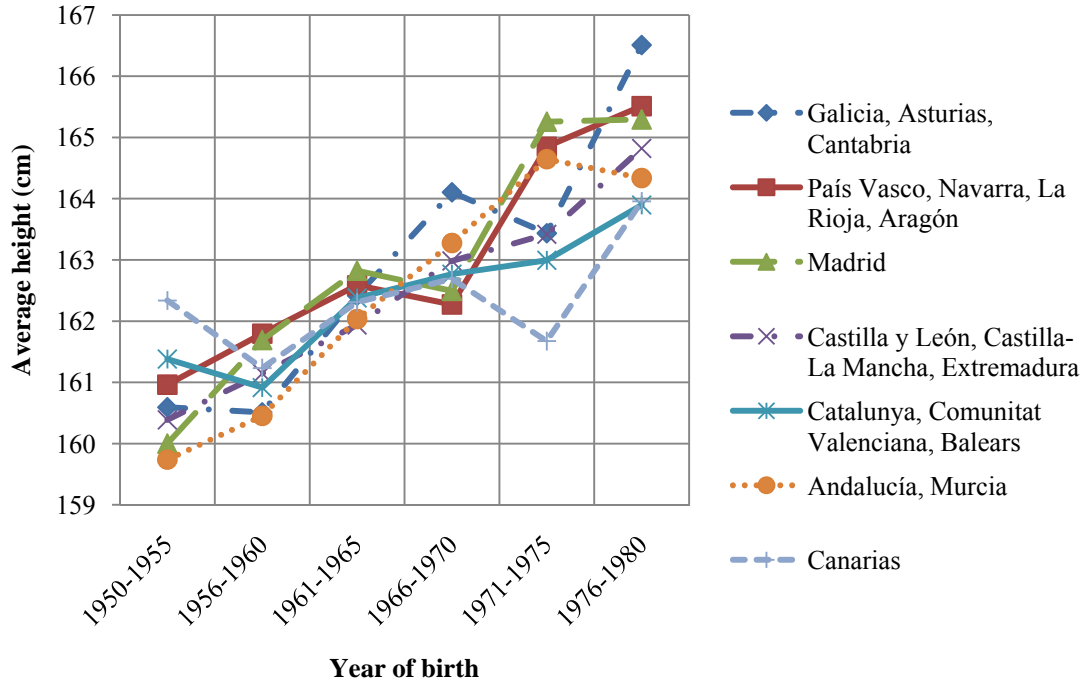
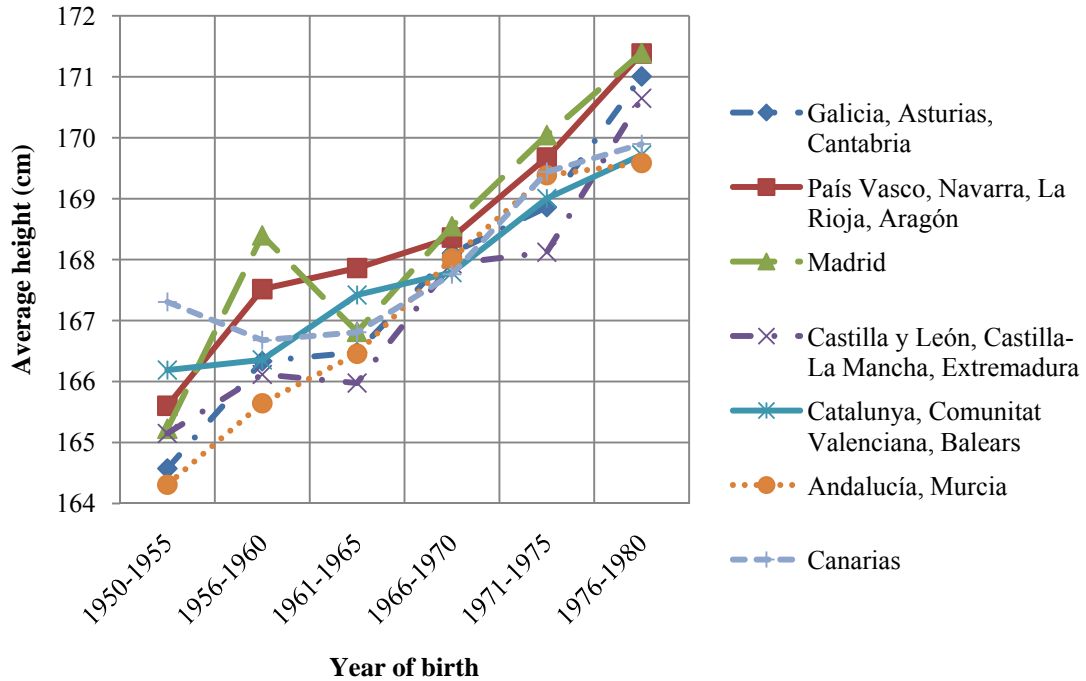


Fig.3. The evolution of adult height across Spanish regions (NUTS1)



4. Discussion

This short article has offered a brief description of the evolution of adult height across Spanish regions for cohorts born between 1950 and 1980. Female average height experienced an increase of 4 cm between 1950 and 1980, while male average height increased by 5 cm. The regions who grew more in terms of average height were Aragón and Asturias for women, and Catalunya, Canarias and Cantabria for men. Madrid and País Vasco in the case of women, and Galicia and La Rioja in the case of men, were the regions who experienced the lowest growth in average height.

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Appendix A

Table A1
Number of observations by cohort, women

	1950–1955	1956–1960	1961–1965	1966–1970	1971–1975	1976–1980	Total
Galicia	86	89	74	73	64	97	483
Asturias	54	43	42	40	41	35	255
Cantabria	53	40	29	39	29	47	237
País Vasco	38	50	55	65	58	52	318
Navarra	33	26	35	35	22	38	189
La Rioja	30	22	33	26	26	21	158
Aragón	55	47	53	34	41	43	273
Madrid	48	47	58	57	63	58	331
Castilla y León	50	52	65	56	58	46	327
Castilla – La Mancha	54	51	57	64	66	64	356
Extremadura	58	46	58	54	50	67	333
Catalunya	97	86	75	108	92	83	541
Comunitat Valenciana	61	58	76	82	76	56	409
Illes Balears	23	19	21	32	22	17	134
Andalucía	156	164	177	163	180	190	1,030
Murcia	48	57	60	64	62	52	343
Canarias	77	77	83	94	84	91	506
Total	1,021	974	1,051	1,086	1,034	1,057	6,223

Source: See Table 1.

Table A2
Number of observations by cohort, men

	1950–1955	1956–1960	1961–1965	1966–1970	1971–1975	1976–1980	Total
Galicia	45	63	52	46	40	60	306
Asturias	31	41	38	27	26	45	208
Cantabria	29	33	22	23	25	39	171
País Vasco	40	42	55	47	44	42	270
Navarra	23	29	27	30	30	42	181
La Rioja	25	22	21	24	20	22	134
Aragón	47	38	44	41	29	47	246
Madrid	36	40	41	42	46	58	263
Castilla y León	54	45	40	39	38	48	264
Castilla – La Mancha	51	39	48	61	50	68	317
Extremadura	40	47	38	39	44	45	253
Catalunya	75	49	64	83	97	82	450
Comunitat Valenciana	39	55	58	78	48	61	339
Illes Balears	14	24	14	31	16	23	122
Andalucía	133	133	164	136	147	183	896
Murcia	38	49	41	48	55	49	280
Canarias	59	68	68	74	91	71	431
Total	779	817	835	869	846	985	5,131

Source: See Table 1.

Table A3**Average height by cohorts, women (cm)**

	1950–1955	1956–1960	1961–1965	1966–1970	1971–1975	1976–1980	Total
Galicia, Asturias, Cantabria	160.6	160.5	162.4	164.1	163.4	166.5	162.9
País Vasco, Navarra, La Rioja, Aragón	161.0	161.8	162.6	162.3	164.8	165.5	163.0
Madrid	160.0	161.7	162.8	162.5	165.3	165.3	162.9
Castilla y León, Castilla-La Mancha, Extremadura	160.4	161.1	161.9	163.0	163.4	164.8	162.4
Catalunya, Comunitat Valenciana, Balears	161.4	160.9	162.4	162.8	163.0	163.9	162.4
Andalucía, Murcia	159.7	160.5	162.0	163.3	164.6	164.3	162.4
Canarias	162.3	161.2	162.3	162.7	161.7	164.0	162.4
Total	160.7	161.1	162.3	163.0	163.8	165.0	162.7

Source: See Table 1.

Table A4**Average heights by cohorts, men (cm)**

	1950–1955	1956–1960	1961–1965	1966–1970	1971–1975	1976–1980	Total
Galicia, Asturias, Cantabria	171.8	173.4	171.7	174.4	176.6	176.2	174.0
País Vasco, Navarra, La Rioja, Aragón	170.9	173.6	174.4	175.1	175.2	177.1	174.4
Madrid	172.2	176.3	172.5	176.8	176.6	177.5	175.3
Castilla y León, Castilla-La Mancha, Extremadura	170.3	171.7	171.8	174.2	174.4	176.8	173.2
Catalunya, Comunitat Valenciana, Balears	173.4	172.5	173.9	173.5	176.7	174.7	174.1
Andalucía, Murcia	169.9	171.8	171.9	174.0	175.0	175.1	172.9
Canarias	173.8	172.8	172.3	174.2	176.6	177.5	174.5
Total	171.5	173.0	172.9	174.4	175.7	176.3	174.0

Source: See Table 1.

Table A5**Average heights by cohorts, men and women (cm)**

	1950–1955	1956–1960	1961–1965	1966–1970	1971–1975	1976–1980	Total
Galicia, Asturias, Cantabria	164.6	166.3	166.5	168.1	168.9	171.0	167.6
País Vasco, Navarra, La Rioja, Aragón	165.6	167.5	167.9	168.4	169.7	171.4	168.4
Madrid	165.2	168.4	166.8	168.5	170.0	171.4	168.4
Castilla y León, Castilla-La Mancha, Extremadura	165.1	166.1	166.0	167.9	168.1	170.6	167.3
Catalunya, Comunitat Valenciana, Balears	166.2	166.4	167.4	167.8	169.0	169.7	167.7
Andalucía, Murcia	164.3	165.6	166.5	168.0	169.4	169.6	167.2
Canarias	167.3	166.7	166.8	167.8	169.4	169.9	168.0
Total	165.4	166.6	166.9	168.1	169.1	170.6	167.8

Source: See Table 1. These means use the number of female and male individual observations that gave rise to the corresponding female and male cohort-region average heights.

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