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SOCIAL DIFFERENTIALS IN THE BIOLOGICAL STANDARD OF LIVING DURING THE DECLINE OF INDUSTRIALIZATION IN ANDALUSIA: A DISTRICT-LEVEL ANALYSIS IN ANTEQUERA

José Miguel Martínez-Carrión and Antonio D. Cámara[∝]

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DIFERENCIAS SOCIALES EN EL NIVEL DE VIDA BIOLÓGICO DURANTE EL DECLIVE DE LA INDUSTRIALIZACIÓN ANDALUZA: UN ANÁLISIS A NIVEL DE DISTRITO EN ANTEQUERA

José Miguel Martínez-Carrión[#] **y Antonio D. Cámara**[•]

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ABSTRACT

Anthropometric history has shed light on some consequences of industrialization and urbanization on the biological dimensions of living standards across different areas of Spain. Yet the impact of these processes on specific segments of the population together with the magnitude of intra-urban differences, remain largely unexplored in this country. This paper presents and discusses male height differentials by occupation and urban districts in the industrial town of Antequera (Andalusia, Southern Spain) between 1879 and 1899 (cohorts born between 1859 and 1879). This period witnessed the halt of the growth experienced by wool-based manufacturing and its subsequent decline in this town. Anthropometric and socio-demographic data are utilized that were compiled from military enlistments held over that period which included more than five thousand young males aged 18-20. Descriptive analyses and multivariate linear regression analysis are conducted. Results illustrate the influence of two components of inequality and poverty in past urban societies during the dynamics of industrialization: income levels and physical environment. For the most part, the peasantry exhibits the lowest height averages. Within this group, those living in the industrial periphery of the town display lower mean statures.

Keywords: Anthropometric history, industrialization, biological living standard, Andalusia, 19th century.

RESUMEN

La historia antropométrica ha puesto de relieve algunas consecuencias de los procesos de urbanización e industrialización en diferentes zonas de España. El impacto sobre el nivel de vida biológico de segmentos específicos de la población así como la magnitud de las diferencias intraurbanas son los aspectos menos investigados. Este trabajo presenta estaturas masculinas por grupos socio-ocupacionales y distritos urbanos en la ciudad de Antequera durante el periodo 1879-1899 (generaciones 1859-1880) coincidiendo con el fin de la expansión del subsector textil lanero y su subsecuente declive. Los datos antropométricos y socio-demográficos utilizados proceden de los alistamientos militares del mencionado periodo que incluyeron a más de cinco mil mozos de entre 18 y 20 años. Se realizan análisis descriptivos y análisis de regresión lineal multivariable. Los resultados revelan la influencia de dos componentes de la desigualdad y la pobreza en la sociedad urbano-industrial del pasado: el nivel de renta y el ambiente físico. El campesinado muestra las medias de estatura más bajas. En este sector, los mozos residentes en la periferia industrial de la ciudad muestran estaturas inferiores.

Palabras clave: Historia antropométrica, Industrialización, nivel de vida biológico, Andalucía, siglo XIX.

[#] Universidad de Murcia. Correo electrónico: jcarrion@um.es
[•] Universidad de Jaén. Correo electrónico: adcamara@ujaen.es

SOCIAL DIFFERENTIALS IN THE BIOLOGICAL STANDARD OF LIVING DURING THE DECLINE OF INDUSTRIALIZATION IN ANDALUSIA: A DISTRICT-LEVEL ANALYSIS IN ANTEQUERA[°]

Introduction

The literature dealing with the biological standard of living during industrialization has rapidly spread over the last decades in several fields of the social sciences and in the field of economic history in particular.[1] The availability of data on past heights (mostly referred to adolescent and adult males) since the 18th century has permitted to explore health and nutritional-related dimensions of living standards during the transition to the industrial society[2]. As historical anthropometric sources are largely associated with mandatory conscription practiced on most modern States since those times, studies have recently been published that even cope with the evolution of biological well-being over the last two centuries on a global perspective.[3]

The Spanish historiography has partaken of this extraordinary development of anthropometric history. Along with significant differences in height between rural and urban areas, height differentials in Spain have been documented between towns and their hinterlands which in addition did not remain constant over time. These differentials and variations have been connected with the evolution of key components of health and nutrition as well as with the evolution of social inequalities during diverse economic cycles.[4] Some of these studies have focused on the biological living standards

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[1] Nicholas and Steckel (1991); Komlos (1993, 1998); Floud and Steckel (1997); Ewert (2006); Cinnirella (2008a, 2008b); Humphries and Leunig (2009); Floud, Fogel, Harris and Hong (2011).

[2] Komlos (1995); Steckel (1995, 2009); Komlos and Küchenhoff (2012); Martínez-Carrión (2012).

[3] Blum (2013).

[4] Martínez-Carrión and Moreno-Lázaro (2007); Hernández, Moreno and Vicente (2009); Cámara and García-Román (2010); Escudero and Pérez-Castroviejo (2010); Puche (2011); Ramón-Muñoz (2009, 2011); Ayuda and Puche (2014).

during the first stage of the industrialization in this country.[5] The results have displayed similar biological living standards (as approached by mean height) across Spanish industrial towns and they have also uncovered lower mean statures than those found in industrial towns from other European countries.[6] Also, differences within Spanish towns (i.e. between districts and between specific segments of the urban population) together with dropping-height cycles have been found which have been associated with the negative impact of early industrialization processes on the net nutritional status of the population.[7] Moreover, some studies have argued that these negative consequences should be related to relative poverty which was initially higher in early-industrialization areas.[8] Being this development of anthropometric studies remarkable, the puzzle of living standards during the Spanish industrialization ideally requires more case studies in order to be solved.

This paper presents results on mean male height in the Spanish industrial town of Antequera (Southern Spain) in a context of industrial stagnation and subsequent decline during the last third of the 19th century.[9] Heights come from enlistments held in Antequera between 1879 and 1899 thus reporting on the net nutritional status of males born between 1859 and 1880 whose physical growth process mostly took place matching the halt of economic growth associated with the development of wool-based textile manufacturing in this town. The decline of this industrial sector was apparent since 1875 which has been associated with the acceleration of market integration in Spain as well as the lack of the necessary investment in face of growing national-level competitiveness.[10]

The work is organized in the following sections hereafter. First, a succinct description of the local economy is presented with the focus on the development of wool-based manufacturing during the central decades of the 19th century and its subsequent decline during the last third of that century. Second, sources and methods are explained which is followed by the results of the analyses. In the main, these results are segmented by age and occupational groups although specific attention is also

[5] Hernández and Moreno (2011); Martínez-Carrión and Pérez-Castejón (1998), Pérez-Castroviejo (2006); Ramon-Muñoz (2011).
[6] Martínez-Carrión, Puche-Gil and Cañabate (2013).
[7] Hernández, Moreno and Vicente (2009), Martínez-Carrión, Pérez-Castroviejo, Puche-Gil and Ramon-Muñoz (2011).
[8] Hernández and Moreno (2011).
[9] Anthropometric studies focused on Andalusia have been few to date (Cámara, 2009; Cámara and García-Román, 2010).
[10] The local economy of Antequera was extensively analyzed by Antonio Parejo (e.g. Parejo, 1987).

devoted to the main single occupations recorded among young males in Antequera. Moreover, height differentials by urban districts (established through conscripts' baptism parish) are explored and discussed. Some conclusions close this paper.

The industrialization of Antequera during the 19th century

By the middle of the 19th century Andalusia was one of the most industrialized regions in a context of a relatively weak and delayed industrialization at a country level. The rise of industrialization in this region took place between 1830 and 1860 and it mainly based on iron and steel founding, lead metallurgy and textile industry which for the most part developed in the Mediterranean coast.[11] Antequera, in the province of Malaga, was among the rising industrial towns of this region in the 19th century and it outstood as a wool-based manufacturing center in Spain.[12] Several factors explain the success of industrialization in this town.

Antequera enjoys a central location in the region of Andalusia being a crossroad on the routes between the four major historical Andalusian cities: Seville, Malaga, Cordoba and Granada. The town had developed an artisan-based textile sector prior to industrialization, during the 18th century, similarly to what happened in other Andalusian towns like Ecija (province of Seville) and Priego (province of Cordoba). These pre-industrial textile centers were specialized in wool and silk artisan productions and they mainly met the low-purchase-power demand of nearby markets.[13] Industrialization during the 19th century was founded on this artisan tradition which provided specialized work force together with on easy access to raw materials and the existence of some protoindustrial premises associated with cloths production: workshops, fulling mills, tanneries, etc. Similar processes of industrialization took place in other Spanish towns (e.g. Béjar -province of Salamanca- and Alcoy -province of Alicante-) although none of them was comparable in magnitude and intensity with the process of industrialization experienced in some towns of Catalonia like Terrassa and Sabadell.[14]

[11] Nadal (1987); Parejo (1997, 2004).
[12] Parejo (2006).
[13] Parejo (1980a, 1985, 1987).
[14] Parejo (1987).

It is important to note that well into the 19th century pre-industrial and industrial production system coexisted in Antequera and complemented each other. For instance, large textile factories often utilized domestic work as a way to lower their production costs. To this regard it is illustrative that the number and percentage of artisans and industrialists were larger than that of industrial workers among the young conscripts analyzed in this paper. This, in our opinion, points to the importance of domestic and small-scale textile industrial production in Antequera where small companies spread between 1833 and 1880.

Two main phases may be established during the development of large-scale textile manufacturing in Antequera. Since the decade of 1830s up until the decade of 1870s this sector expanded and between 1875 and 1900 it stagnated and declined subsequently. During the first period a number of textile factories were settled which mainly were placed close to the stream of the river of the town. Though ephemerally, cotton-based industries added to wool industries during the central decades of the 19th century.[15] As a result, an industrial district originated and developed around the area known as *Ribera de la villa* (*ribera* refers to riverside)[16]. This area was located back to the town center and relatively isolated from other neighborhoods because of the hill called *Peña de los Enamorados* (altitude 900 m) where some historical sites like the castle and Santa María Parish settled (Figure 1). Importantly for the interpretation of our results, the vital registers (births, deaths and marriages) of this industrial district were held at San Juan Parish (Figure 1). During these decades of industrial take-off between four and five large factories and twenty smaller textile workshops (owning between one and ten looms each) worked simultaneously in Antequera on average.

Tanning activities also developed on a mixed basis (industrial-artisan). By the middle of the 19th century, ten large tanneries work in town. Illustratively tanners (n=206) were one of the largest occupational group among the young males recorded in the enlistments along the time period analyzed in this work, behind peasants (n=2,626), shoemakers (n=255), shopkeepers (n=227), students (n=210) and wool workers (n=208).

By the middle of the 1870s the stagnation of the industrial sector in Antequera was apparent that was followed by its rapid decline since 1890 as the decreasing number of spindles and looms illustrates. Between 1875 and 1900 (largely matching the period

[15] Parejo (1979, 1987).
[16] Ibídem.

of the military enlistments analyzed in this paper; 1879-1899) more than half of the looms stopped working in Antequera. Several factors must be mentioned for this decline.

Firstly, water-based power provided by the river of the town was clearly insufficient to meet the needs of a growing industry and the large investments required to cope with growing power needs were not undertaken[17]. Secondly, markets integrated rapidly in Spain over the last third of the 19th century in association with the development of transport means (mainly roads and railroads). This integration had negative consequences for old textile towns specialized in cloths like Antequera which were unable to compete with the powerful textile industry developed in Catalonia, especially since 1880.[18] Last but not least, previous studies displayed that many industrialists in this and other industrial towns in Andalusia readdressed their investments to the growing agrarian sector in search of new opportunities that the olive oil sector opened since the decade of 1870s. This was preferred to investing and modernizing the textile sector.[19]

The evolution of the local economy that has just been described is well reflected on the occupational distribution of young males that were conscripted between 1879 and 1899 (Table 1 and Figure 2). For instance the proportion of peasants increased over the analyzed period (from 49.8% to 57.6% between 1879-1884 and 1895-1899) paralleling a decrease in the proportion of industrial workers, the latter mainly consisting of wool industry workers (from 11.2% to 5.2%) (Figure 2)[20].

Some demographic figures follow which will conclude this introduction (Table 2). Population growth was particularly intense between 1840 and 1850 thus coinciding with the development of the industrial sector in Antequera. A period of stagnation followed due to some mortality crisis.[25] The whole picture of demographic growth in Antequera cannot be understood without immigration. Illustratively, nearly one third of young males conscripted in this town between 1879 and 1899 were born elsewhere. Of them, 90% were born in the province of Malaga.

[17] Ibídem, pp. 278-279.
[18] García Sanz (1994), Parejo (1992), Nadal (1992 and 2003).
[19] Parejo (1987), pp. 293 y ss., y 337-338.
[20] The weight of industry within the local economy is likely underestimated from this figures due to the textile production that was carried out domestically thus involving a part of the peasantry as well as a good number of women which are not captured in this source. This said, our data agree for the most part with studies that have studied the local economy at the middle of the 19th century through other historical sources (Campos-Luque, 2014). Parejo (1987), p. 302
[25] Parejo (1980b and 1980b).

Data and methods

Data were collected from several types of documents which formed the so called *conscription acts* (e.g. enlistments, measurement and examination acts, drafts, etc.)[21] We worked on the period 1879-1899 as conscription acts from this period preserved at MHAA contained all the information required for our purposes (i.e. height, occupation, place of birth and parish of baptism among other variables). The total number of cases that were processed amounted to 5,519 (4,908 recorded heights of which 3,797 correspond to young males born in Antequera). Only conscripts born in Antequera whose height was recorded are analyzed in this work.

Age at measurement is always provided in the sources and it ranged from 18 to 20 years which implies the birth cohort coverage of this study ranges from 1859 to 1880 (Table 3).[22] As adult height is the cumulative net result of living conditions from birth to the end of physical growth our study approaches the trends and differentials of biological living standard in Antequera between 1859 and 1899 (the year males born in 1880 were conscripted).

Importantly, conscription acts during this period included all young males whether they were enrolled in the army or not. Thus there is no height truncation in our data. Moreover, the degree of normality of height distributions is quite acceptable despite some heaping (Figure 3). Standard deviation remained quite constant over time and it ranged close to the figures from normal distributions observed among modern populations that were measured more precisely.[23] We lack of heights in 1884 (birth cohort 1864) and 1894 (birth cohort 1875).

As conscripts' names and two surnames were also tabulated, we proceeded by doing record linkage in order to compile the remaining variables that were disperse across several sections of conscription acts (i.e. occupation, place of birth, baptism parish and literacy). Three types of analyses have been conducted, namely 1) of mean heights by occupational group, 2) of mean heights by parish of baptism and 3) multivariate regression analysis that includes additional control variables such as age and birth cohort.

[21] A detailed description of this source, in Cámara (2006).
[22] Birth cohorts were aggregated into four groups: two 6yr groups (1859-1864 and 1875-1880) and two 5yr groups (1865-1869 and 1870-1874).
[23] Cole (2000).

Only young males born in Antequera were included in the analyses (about 70% of cases) aiming at controlling for environmental circumstances during the growth cycle that might have differed substantially from those existing in Antequera. This is needed as we do not have any information on the time immigration into Antequera occurred among those individuals born elsewhere. Likewise, as the variety of occupations was scarce among those individuals living out of the town (most of them were recorded as peasants), only individuals living in town at the time of enlistment were selected for analysis. To this regard, again, it is not possible to control for potential exposure to a given environmental context within the municipality (either in town or out of town) in absence of information on the duration of residence in a given location. We have reasonably assumed that those individuals living in town at the time of enlistment were born and raised in town. Similarly, the parish of birth recorded in the enlistments has been taken as an approximation to the neighborhood of residence which of course may or may not be the case for all individuals. In sum, analyses are founded on heights from young males born in Antequera which lived in town at the time of enlistment. These young males were classified by occupation and parish of baptism.

In order to ease the interpretation of descriptive analyses, all figures depicting height means range from 1.560 to 1.660 millimeters. This range always contains the highest and lowest mean stature of any specific segment of the population that is analyzed in this study. These descriptive analyses were segmented by age because it was found that mean height changed across ages (Figure 4). For instance, an average difference of more than one centimeter was found between ages 18 and 20 which is in line with the results from previous anthropometric studies in 19th-century Spain. Nevertheless, these differences by age were not significant once they were controlled for the rest of variables involved in the study.

In our linear regression model, height (in millimeters) is the dependent variable. In this analysis age 18 was removed because it was not represented across all cohort groups that were examined. Regression coefficients indicate the expected change in mean height as a function of a change (in one unit or in one category) in a given independent variable once changes in the remaining independent variables are controlled for. All independent variables, but age, are nominal so that they were dichotomized to be included in our model. Thus, their coefficients report on the expected change in mean height with respect to the reference category that is indicated in each case. Positive coefficients indicate a higher mean height (in millimeters) with

respect to the reference category, the remaining covariates being constant. Negative coefficients indicate an expected lower mean stature.

Results

The mean male height in Antequera ranged between 160 and 162 cm during the analyzed period which is substantially lower than what has been found in other Andalusian municipalities (for instance, mean male height in Montefrio, province of Granada, ranged between 163 and 164 cm[24]). That mean is also lower (by about two cm) than those found in urban-industrial areas of Catalonia.[25] By contrast, it is approximately one cm above of those found in Castille-Leon and, specifically, two cm above of that found in the town of Zamora during the same historical period.[26]

The Group of Figures 5 displays the mean height by age and occupational group among males born in Antequera who lived in town (birth cohorts 1859-1880) whereby the advantage for non-manual occupations is apparent. By contrast the lowest figures are found among agrarian occupations (peasants) which are systematically below the average of the town.

As for specific occupations with a minimum of 50 valid cases (Figure 6) only the students exhibit substantially higher mean statute than the average whereas peasants exhibit the lowest mean height.[27] For the most part these results are in line with the findings from other studies carried out on the South East of Spain and the region of Valencia (Eastern Spain).[28]

Table 4 and Figure 7 examine mean height by parish of baptism within the town of Antequera. San Juan, the core of the industrial district, exhibits substantially lower mean stature than the town average whereas San Sebastian, the core of the historical town center that hosted much of the local nobility and the emerging industrial

[24] Cámara (2009), Cámara and García-Román (2010).
[25] Urban-industrial Catalonia was studied by Ramon-Muñoz (2011), p. 60. The town of Elche (province of Alicante) was studied in Martínez-Carrión and Pérez-Castejón (1998).
[26] Castille-Leon towns are studied in Hernández, Moreno (2011); for the town of Zamora, Hernández, Moreno and Vicente (2009).
[27] Young males aged 20 that were enlisted were living out of the town were very few for any occupation. The only solid comparison to this regard can be done for peasants. 465 peasants aged 20 and living out of the town were recorded that measured 1,618 mm on average which is very close to the mean of peasants living in town.
[28] South East region in Martínez-Carrión and Pérez-Castejón (2002); for the Region of Valencia, Ayuda and Puche (2014); the case of the town of Zamora, in Hernández, Moreno and Vicente (2009). Students were also the tallest in European towns in correspondence with the socioeconomic status they embody (elites and well-off families) (Komlos, 1995; Alter, Neven and Oris, 2004).

bourgeoisie, is systematically above the average. This finding is consistent with the urban penalty hypothesis associated with overcrowding and poor living conditions in working-class districts located around manufacturing areas.[29]

Figure 8 presents the distribution of young males born in the two abovementioned parishes, San Juan and San Sebastian, by occupational group. As expected, industrial jobs prevail among males born in San Juan whereas these are much less among those born in San Sabastian (23% and 7% respectively). Differences between San Juan and San Sebastian are also remarkable regarding the proportion of young males engaged in trade activities and services (three times more in San Sebastian with respect to San Juan). Finally, students and non-manual skilled professionals rose to about one fifth of young males in San Sebastian whereas they are residual in San Juan.

Table 5 presents regression coefficients (height regressed on the independent variables that are listed). Over the analyzed period the mean height of young males in Antequera did not experience any significant variation with respect to the reference cohort group (males born between 1859 and 1864). In other words, the biological living standard in Antequera, as approached by height, did not experience any significant change between 1879 and 1899 (cohorts born between 1859 and 1880).

Age does not exhibit any significant influence on the mean height once other potential determinants are controlled for. Similarly, the effect of literacy goes on the expected direction but it is not statistically significant (sig. >.05).

Two of the four occupational groups included in this analysis display higher and statistically significant mean stature with respect to the reference group (peasants). Individuals engaged in trade and services would be approximately 1.4 cm taller and those engaged in studies and non-manual professions would be 3.4 cm taller than peasants, other variables partialled out. Industrial workers and artisans did not differ significantly from peasants when other variables are controlled for.

Finally, intra-urban differences are worth prompting. After controlling for age, birth cohort and occupation, individuals born in the peripheral parish of San Juan (i.e. the industrial district of the town) were expected to be 2.5 cm shorter than those born in the town center (San Sebastian). Although the sign of the coefficients goes in the same

[29] Hernández, Moreno and Vicente examined intra-urban differences in height in the town of Zamora. They found that those differences were noticeable between central (within old walls) and peripheral (out of old walls) neighborhoods. Differences were particularly large between journeymen's district and the town center.

direction for the remaining parishes, differences are not statistically significant once other variables are controlled for.

We cannot determine the precise determinants of shortness in San Juan for the moment (i.e. whether they are mainly the result of high exposure to non-lethal consumptive diseases or they mostly reflect differences associated with the social structure of this district which would be only partially captured by the occupations recorded at conscription). It might be the case that the poorest segments of the local population or the poorest segments of specific occupational groups concentrated in San Juan as it is suggested in Figure 9. In this analysis we compare the mean height of the same occupation (peasants) across the parishes of the town. While peasants are distributed quite homogeneously across parishes, those born in San Juan hardly attained an average height of 1.59 m (n=64) which is not only significantly lower than the figures from the central parish of San Sebastian (1.62 m) but also lower than the means from other peripheral districts of the town.

Conclusions

This paper has analyzed the cohort trend and differentials in height (as a proxy of biological living standard) among young males in the Andalusian town of Antequera during the last third of the 19th century, coinciding with the stagnation and decline of wool-based cloth manufacturing. Occupation and the physical environment within the town have focused our attention.

Our results are indicative of poor biological living standards in this town during the analyzed period. Mean height in Antequera was lower than those observed in other industrial towns although it was close to the mean found for the whole of the country which was among the lowest in Europe.

Although this must be taken with caution we believe that a decrease in mean height might have occurred in Antequera among the analyzed birth cohorts with respect to male cohorts born 1837-1839 that were conscripted in 1857-1859 at the age of 20 years. These averaged nearly 165 cm which is nearly three cm higher than the mean observed during the period examined in this work. If this was confirmed in future works, the drop in height would indicate a worsening of key components of well-being (i.e. health and nutritional components) during the last third of the 19th century. It is suggestive to associate this decrease in mean height with the industrial decline

experienced in this town during the last third of the 19th century. However, factors other than the economic dynamics might contribute to explain these results.

For now, a solid contribution of this work is worth noting: the strong inequalities in net nutritional status found within a relatively small industrial town like Antequera. These inequalities are observed at two levels (social and/or environmental) in that height differentials are not only associated with occupation and its presumably income-related levels, but also with physical contexts. The latter might be indicative of physical factors in themselves or of wealth-related inequalities within occupational groups which might be reflected on residential segregation.

The lowest mean heights in Antequera are found among the peasantry regardless the specific occupation recorded at conscription (i.e. peasant, journeymen or plowman). It is necessary to point out that this group likely included not only individuals from agrarian occupations but also from the less qualified categories of industrial work. Both occupations would have formed a mixed labor profile that strongly compares to students and non-manual professions which recorded the highest mean statures, as expected.

In geographical terms, it is apparent that peripheral districts like the parish of San Juan were disadvantaged in comparison with the town centre. We believe that this finding has partly to do with the sociological composition of the neighborhoods but also, presumably, with physical environment factors related to hygiene, basic sanitation premises and population density. This is suggested by significant height differentials within the peasant group across urban birth districts in Antequera.

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Annex 1. Single occupations (n=20 and over) in occupational groups

Occupational group	Original record (Spanish)	English	n	Percentage (2)
Peasants	*Campo*	peasant	2,626	96.9
	Jornalero	journeyman	34	1.3
	Labrador	plowman	34	1.3
	Total (1)		**2,710**	**99.5**
Artisans and manufacturers	*Carpintero*	carpenter	121	12.8
	Cerrajero	locksmith	49	5.2
	Cordelero	ropemaker	20	2.1
	curtidor / zurrador	tanner	206	21.8
	Fundidor	smelter	49	5.2
	Herrero	blacksmith	50	5.3
	Zapatero	shoemaker	255	26.9
	Total (1)		**947**	**79,3**
Industrial workers	*Maquinista*	operator	34	8,5
	Tejedor	weaver	116	29.0
	Trabajador de la lana	wool worker	208	52.0
	Total (1)		**400**	**89.5**
Non-manual and students	*escribiente o amanuense*	scribe	34	11.3
	Estudiante	student	210	69.8
	militar o soldado	military	36	12.0
	Total (1)		**301**	**93.1**
Commerce and services	*Albañil*	mason	111	18.3
	barbero	barber	72	11.8
	comerciante	trader	32	5.3
	dependiente de comercio	shopkeeper	227	37.3
	molinero	miller	52	8.6
	sirviente o mancebo	servant	28	4.6
	Total (1)		**608**	**85.9**

(1) of this occupational group at conscription acts

(2) that represents the single occupations listed here

Source: conscription acts, MHAA

There were 554 invalid cases for analysis which correspond to 514 missing cases (no occupation recorded), 34 cases of “empleados” whose occupation could not be assessed and 6 cases of occupations that could not be determined.

Table 1

Number of cases by occupational group and enlistment period

	1879-1884	1885-1889	1890-1894	1895-1999
Peasants	649	671	660	730
Artisans and manufacturers	267	245	201	234
Industrial workers	146	112	76	66
Non-manual and students	84	70	79	68
Commerce and services	156	155	129	168
Total	1,302	1,253	1,145	1,266

Source: conscription acts, MHAA

Table 2

Population size

Municipality of Antequera, 1860-1910

	Population				
	de facto	*de jure*	Households	*de facto* /household	Annual Cumulative Growth rate (per thousand)
1860	25,851		6,445	4.01	
1877 (*)	25,664	25,481	6,987	3.67	-0.43
1887	27,070	27,001	6,996	3.87	5.35
1900	31,609	31,665	7,829	4.04	12.00
1910	32,366	32,215	7,708	4.20	2.37

* Prior to 1860 the municipality of Antequera had added the village of Bobadilla and between the local censuses of 1860 and 1877 it added Villanueva de Cauché. Source: National Statistics Office (INE).

Table 3

Mean height (mm) by birth cohort and age at enlistment

Cohort	Age	Mean Height	N	std. dev.	std. error of the mean
1859-1864	19	1619.13	645	60.092	2.366
	20	1623.64	558	58.006	2.456
1865-1869	19	1605.65	418	65.391	3.198
	20	1619.13	693	59.362	2.255
1870-1874	18	1600.37	402	64.223	3.203
	19	1614.51	671	63.631	2.456
	20	1623.21	269	66.770	4.071
1875-1880	18	1613.61	596	67.744	2.775
	19	1622.05	632	63.712	2.534
	20	1623.13	24	68.603	14.004

Source: MHAA, own calculations

Table 4

Mean male height (mm; in-town residents) by age and parish of baptism

		Mean (mm)	n	Std. dev.
Age 18	No info		2	57.276
	San Juan	1601.12	49	58.929
	San Miguel	1613.54	103	61.543
	San Pedro	1610.25	206	72.432
	San Sebastián	1616.61	141	70.690
	Santa María	1608.05	96	64.556
	Santiago	1602.96	69	79.428
	Total	1610.18	666	69.135
		Mean (mm)	**n**	**Std. dev.**
Age 19	No informa	1619.09	510	59.702
	San Juan	1595.03	89	64.999
	San Miguel	1613.70	161	65.341
	San Pedro	1609.49	367	62.970
	San Sebastián	1627.30	229	65.292
	Santa María	1613.75	173	70.779
	Santiago	1611.02	122	63.549
	Total	1615.12	1651	63.889
		Mean (mm)	**N**	**Std. dev.**
Age 20	No informa	1622.36	439	60.231
	San Juan	1586.03	39	71.322
	San Miguel	1613.70	80	64.225
	San Pedro	1623.84	148	58.214
	San Sebastián	1628.53	112	59.461
	Santa María	1618.30	90	70.846
	Santiago	1610.10	52	42.958
	Total	1620.07	960	61.319

		Mean (mm)	N	Std. dev.
Total	No informa	1620.46	951	59.989
	San Juan	1594.73	177	64.700
	San Miguel	1613.65	344	63.781
	San Pedro	1612.65	721	65.068
	San Sebastián	1624.46	482	65.702
	Santa María	1613.36	359	69.096
	Santiago	1608.53	243	64.756
	Total	1615.56	3277	64.333

Source: conscription acts, MHAA, own calculations

Table 5

Regression coefficients. Expected change in mean height (mm)

		Unstandardized Coefficients	
		B	Std. error
	(Constant)	1548.850***	84.689
	Age	3.422	2.726
Birth cohort *1859-1864* (ref.)	c1865_69	-5.378	40.274
	c1870_74	-1.728	40.832
	c1875_80	1.178	41.284
Group Peasants (ref.)	Non-manual and students	34.423***	8.197
	Commerce and services	12.480**	5.113
	Industrial workers	8.614	5.606
	Artisans and industrialists	3.821	4.176
Parish of baptism *San Sebastián* (ref.)	San Juan	-24.903***	6.950
	San Miguel	-3.583	5.775
	San Pedro	-4.658	4.895
	Santa María	-5.174	5.531
	Santiago	-5.894	6.309
Literacy Iliterate (ref.)	Literate	7.134*	3.960

Source: MHAA, conscription acts, own calculations

Note: *** (significant at 99%) ** (significant at 95%) * (significant at 90%)

Figure 1

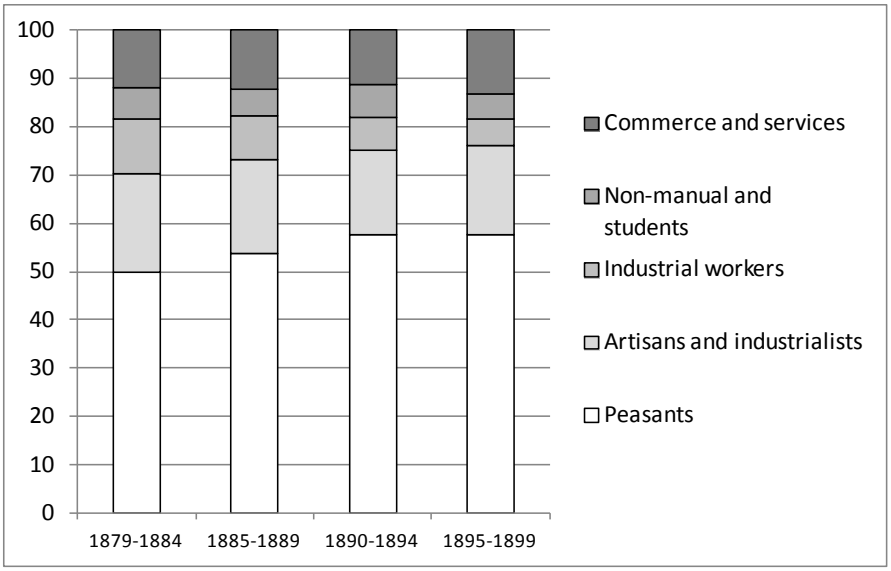
Map of the town of Antequera in 1864.

Location of parishes and the industrial district *Rivera de la Villa*

Source: Antonio de Quevedo y Donis, commited by the Town Hall. In Moreno-García (2013), pp. 658-659.

Figure 2

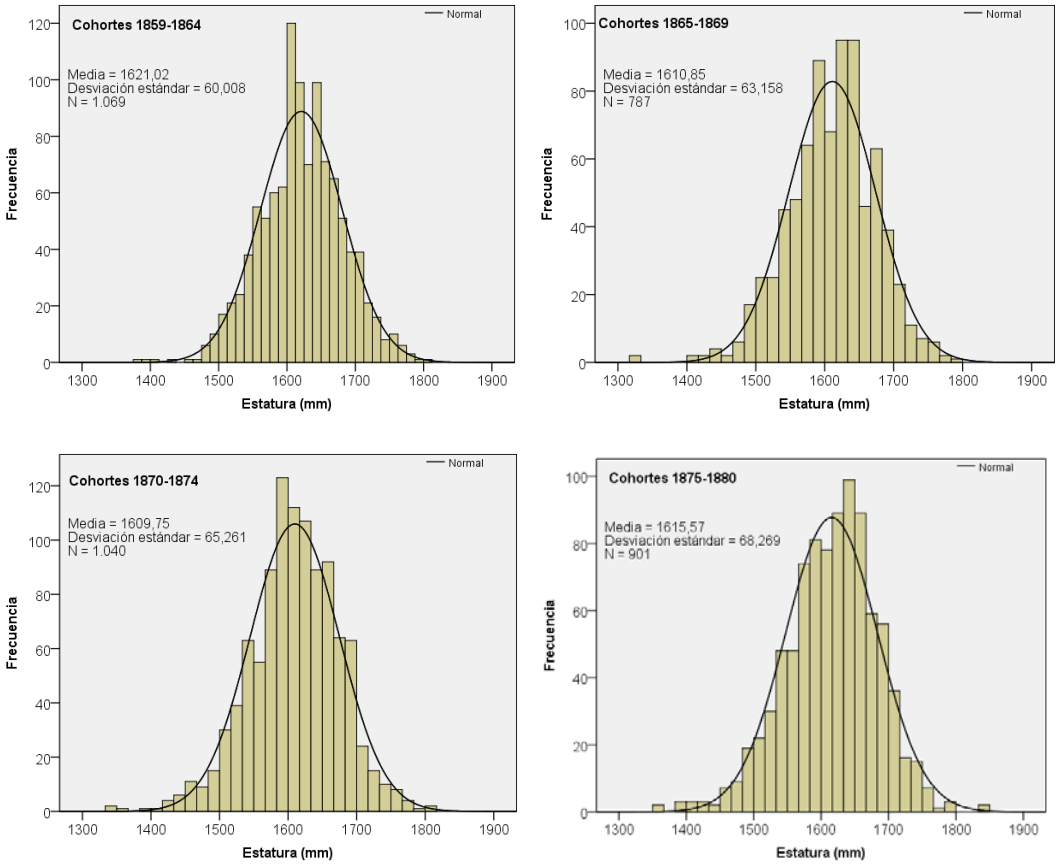
Occupational composition of conscripts in Antequera (enlistments 1879-1899)



Source: MHAA. Occupations included in each of these groups are detailed in the appendix of this work

Figure 3

Height frequency by birth cohort group in Antequera (cohorts 1860-1879)

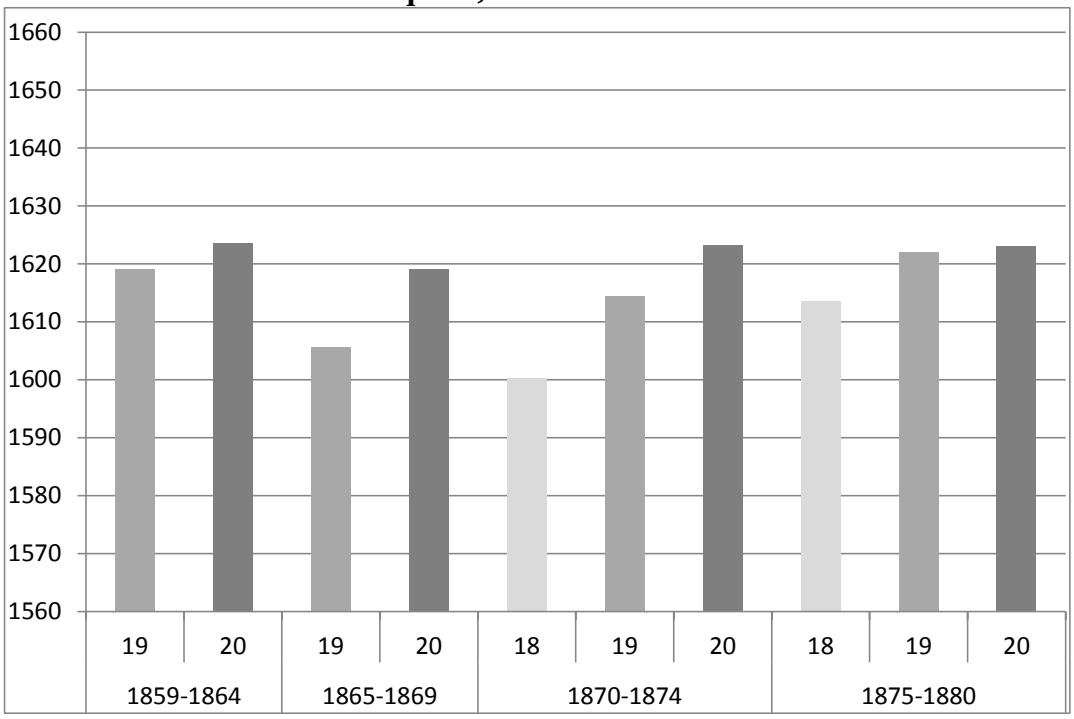


Source: MHAA, conscription acts

Figure 4

Male mean height (mm) by cohort group and age

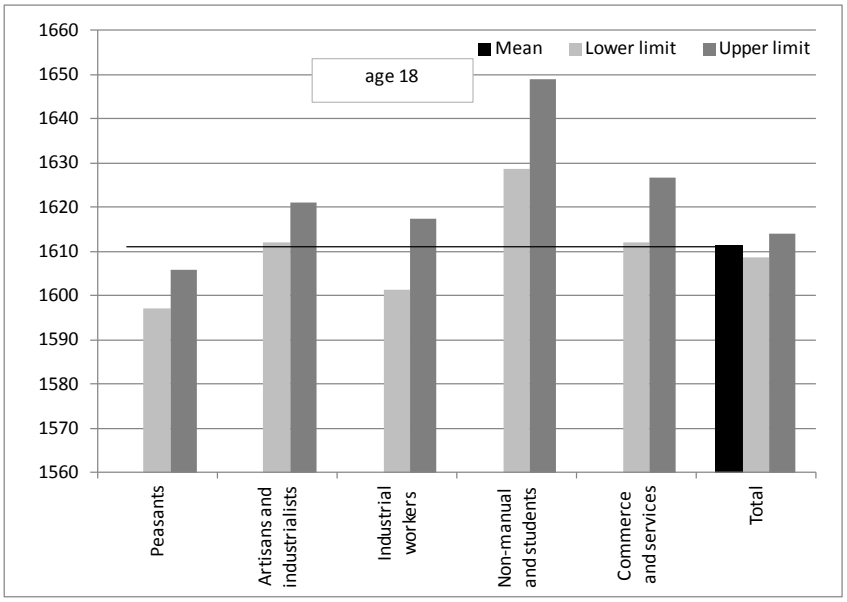
Antequera, cohorts 1859-1880

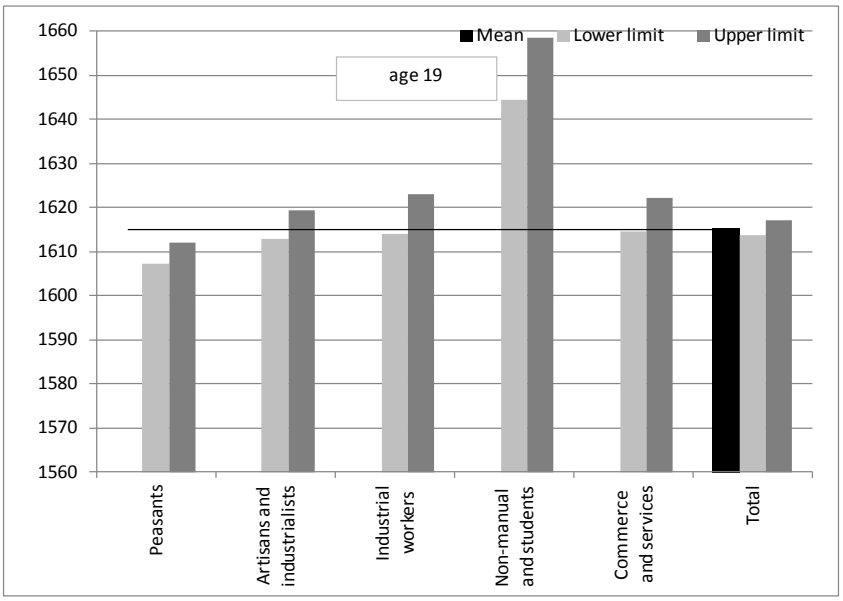


Source: MHAA, conscription acts, own calculations

Group of figures 5

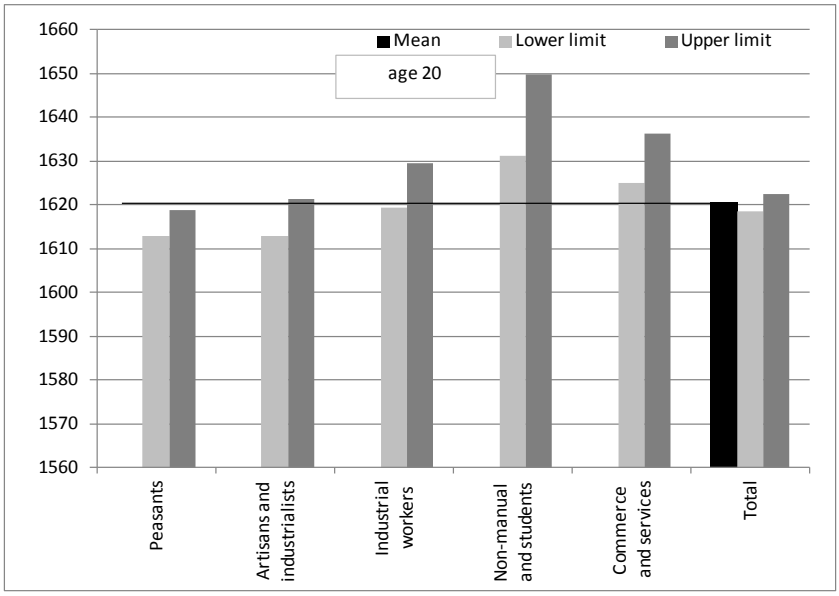
Mean male height by occupational group. Antequera, 1879-1899





Group of figures 5 (Cont.)

Mean male height by occupational group. Antequera, 1879-1899

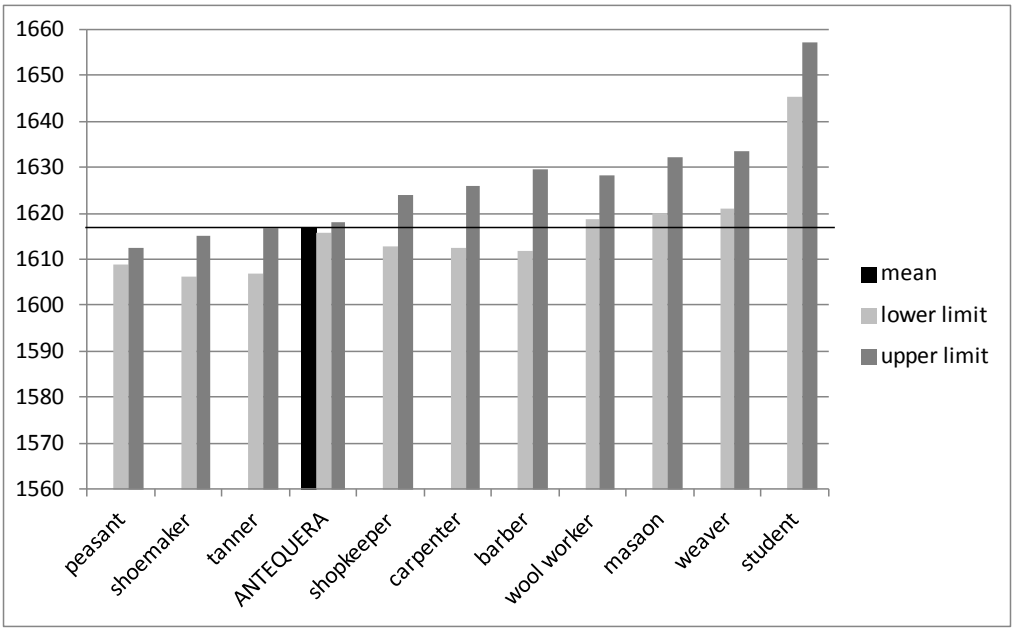


Note: All occupational groups contain more than 50 valid cases for each age
Source: MHAA, conscription acts, own calculations

Figure 6

Male mean height (mm) by occupation

Antequera, 1879-1899



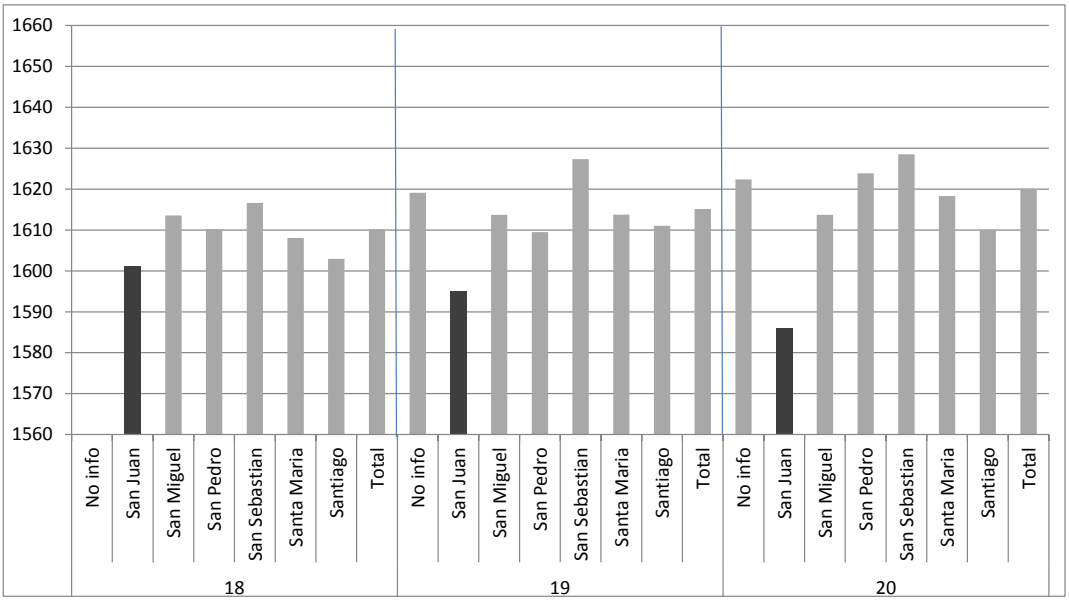
Note. The mean of Antequera is made of males aged 19 and 20, born in Antequera who lived in town at the time of enlistment (all occupations are included in this mean).

Source: MHAA, conscription acts, own calculations

Figure 7

Male mean height (mm) by age and parish of baptism

Antequera, 1879-1899

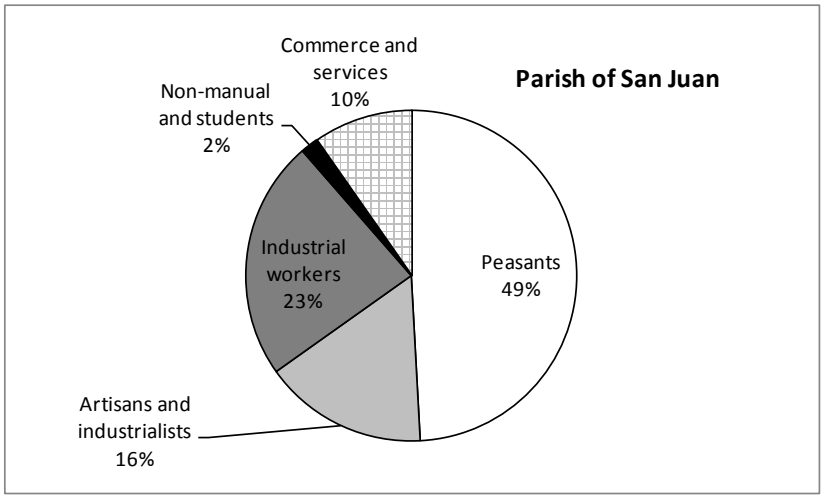


Source: MHAA, conscription acts, own calculations

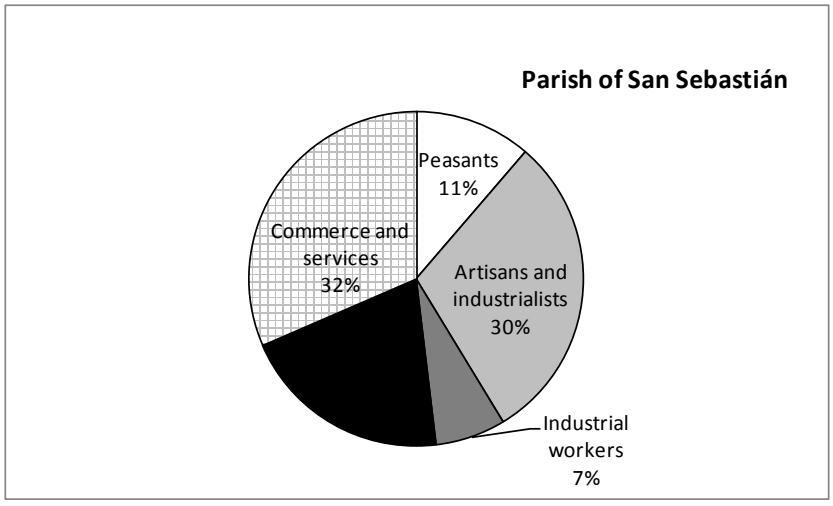
Figure 8

Male occupational composition among conscripts in the parishes of San Juan (industrial periphery) and San Sebastian (town center) 1879-1899

Panel A. Parish of San Juan



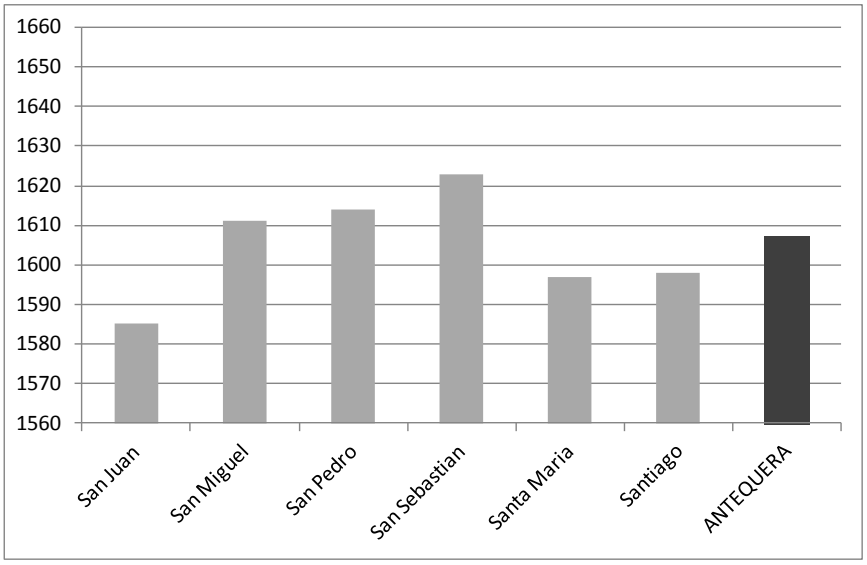
Panel B. Parish of San Sebastian



Source: MHAA, conscription acts, own calculations.

Figure 9

Mean male height of among peasants conscripted (mm) by parish of baptism Antequera, 1879-1899



Source: MHAA, conscription acts, own calculations