The biological wellbeing of the working-poor: The height of prisoners in Buenos Aires Province, Argentina, 1885–1939*

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**A B S T R A C T**

As a way to contribute to the debate on social inequality, poverty, and well-being in Argentina’s long-term development, this article presents new evidence on the stature of prisoners in Buenos Aires province, the richest province in the Pampa region. The evidence shows very modest gains in the stature of prisoners for the period 1885–1939. This finding clearly indicates the persistence of early childhood malnutrition and poor health among families of the working-poor in the small towns of Buenos Aires province. Five decades of modest stature growth underscores the limitation of state policies of education, sanitation, and social reform in elevating the health and nutrition conditions of the working-poor. At the heart of the pampas, in the context of a successful food exporting economy, a working-class population cursed by the combination of low human capital and social vulnerability failed to attain a substantial improvement in their biological wellbeing.

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1. Introduction

Anthropometric history had made great progress since it was first launched by scholars such as R. Fogel, R. Floud, R. Steckel, and J. Komlos in the 1980s and 1990s. (Komlos, 1998, 2003; Fogel, 2004; Komlos and Baten, 2004; Steckel, 2009; Floud et al., 2011). In the last 18 years, the progress of the discipline has been truly remarkable in Latin America, where scholars have made important contributions to the measurement and understanding of biological wellbeing. (Baten et al., 2009; Baten and Carson, 2010; Baten and Mumme, 2010; Salvatore 2004a, 2004b, 2009; Lopez Alonso, 2007; Meisel and Vega, 2007; Oliveira and Quintana-Domeque, 2014; Nuñez and Perez, 2015; Llorca-Jaña et al., 2018). Mean heights is a robust indicator of biological well-being in early infancy that reflects the impact of nutrition, disease environment, work intensity, and parents’ socio-economic conditions.1 In this essay, I use prison records to estimate long-term trends in the biological well-being of Buenos Aires province’s working-poor. The use of prison records to study the evolution of average heights is an established practice in anthropometric history. Scholars have used prison records to measure stature in Great Britain and Ireland,2 the United States,3 New Zealand, Canada,4 Brazil, Peru,5 and other countries.

Though scholars recognize that prison inmates rarely represent the overall population of a country, efforts have been made to assess the selectivity biases of such samples. In some cases the prison samples replicated quite nicely the characteristics of the working class. This happened with transported British and Irish felons to Australia and the inmates of Newgate prison at London. (Nicholas and Oxley, 1996; Stephen and Oxley, 1996) In other cases prison samples presented important selectivity biases, yet researchers considered this advantageous for studying certain peculiarities of the population (gender, race, ethnicity, or lower skills) not captured by other sources. (Maloney and Carson, 2008; Carson, 2008a,b; Horell et al., 2009; Inwood et al., 2015).

In this essay my interpretation follows an intermediate line. The Buenos Aires criminal justice system imprisoned mostly members of the working classes, particularly those who, due to their low skills and education, could only aspire to unstable and low-paying jobs. Alternatively, one could reason along with H. Bodenhorn et al (2012), who argued that, due to malnutrition and lower cognitive

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1. Studies in anthropometric history are too numerous to mention. In his review of the field, Richard Steckel (2009) found 325 new publications since 1995. The first studies using stature as a measure of well-being date back to the early 1980s; leading scholars shaping the field were Robert Fogel, Roderick Floud, Richard Steckel, and John Komlos, all of them acknowledged the influence of Evelth and Tanner’s work on human growth. For a contemporary view of the achievements of anthropometric history, see Fogel (2004) and Floud et al (2011).

2. Nicholas and Shergold (1982); O Gráda (1991); Nicholas and Oxley (1996); among others.


4. Inwood et al. (2015); Arsenaault Morin et al. (2017).

5. Frank (2006); Twrdek and Manzel (2010).

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abilities in early infancy, some individuals acquire insufficient education and skills for the job market. Finding limited opportunities of employment, these individuals enter criminal activities. Whether workers poor in health and human capital “select themselves” into the criminal sector, or are specially targeted by the police and the judiciary, we often find within prison individuals who belong to the disadvantaged part of the working-class.

The discovery of an important repository of prison data offered us the possibility of interrogating the biological welfare of Buenos Aires province during two crucial periods of development: the Belle Époque (1880–1914); and the so-called “Great Delay” (1915–1939). The first was a period characterized by rapid economic growth fostered by the expansion of the agrarian frontier, foreign investment in transportation and ports, and mass European immigration, when the country integrated into world markets exporting grain, mutton, and beef. The second was a period of slow growth characterized by reduced flows of immigration and foreign direct investment, the exhaustion of fertile lands to exploit, increasing difficulties in export markets, and the gradual abandonment of liberal economic policies. Did the welfare of the working poor, as reflected in prisoners’ bodies, improve or deteriorate over these two periods?

Prisoners’ data renders good estimates of stature for the residents of the country’s most populous and richest province: Buenos Aires. The new data add nuances to our previous findings about the evolution of stature in 20th century Argentina based on data of military recruits (Salvatore, 2004a). The fact that the data comes from prison records presents advantages and disadvantages. The sample represents chiefly the lower strata of the working-poor; workers with little formal education and few special skills. (For the cohorts 1901–1940, the illiteracy rate for army recruits from Patricios Battalion was 2.7%; the corresponding figure for prisoners was 15.8%.) Prison inmates had committed felonies and were either undergoing trial or had already received a sentence. They came from towns and middle-sized cities; this alters somehow our understanding of the Pampas as composed of “rural settlements” or “open spaces.”

Representing the poor in small-town Buenos Aires province, prison data shows minimal improvement of biological wellbeing for a period extending more than five decades. On average the inmates of Buenos Aires prisoners gained 1.3–1.6 cm in stature between the 1880s and the 1930s, most of this growth attained during the 1930s.

Over the long-run prisoners’ net-nutrition status would have remained stagnant, were it not for two episodes of change: a fall in stature during the 1890s and a comparative rise in stature during the 1930s.

The fact that these estimates refer to individuals born and raised in Buenos Aires province makes the findings all the more interesting. For Buenos Aires was the center of a rich export economy producing cereals and beef for external markets. Prior to imprisonment, these individuals lived in small towns near the most productive farm lands of the country. Hence, “food proximity” was not the problem. It was rather workers’ low human and social capital which accounted for their limited job opportunities prior to incarceration—and probably, for their entry into criminal activities. This study shows that the biological wellbeing of the working-poor improved very little during five decades of significant transformations in the province’s wealth, human capital, and infrastructure.

In addition, the data brings important new information concerning immigration, human capital, and other sources of social inequality. Though residing in a prosperous region enjoying a benign weather, clean air and water, and highly productive soil, the data shows important height differences related to literacy, schooling, and household socio-economic conditions. Prisoners’ data underscore the positive association between nutrition and health status during early childhood and years of school attendance. It shows also that sons of European parents were taller than sons of native parents. In addition, the data points that various indicators of social and economic vulnerability (single motherhood, being an unskilled laborer, being mestizo) were related with lower stature.

In the first section I discuss the concentration of wealth and resources in Buenos Aires province during the Belle Époque. Then I describe the data, arguing for the relative homogeneity of sample composition throughout the period 1885–1939. Next, I estimate the trend using standard regression methods, and report the main results. Then I compared these results with earlier findings based on military data. After this, I discuss the impact of schooling, immigration, and social differences on prisoners’ heights. In the conclusion I advance some ideas about why the working poor of the richest province in Argentina attained such small gains in stature.

2. The richest province in a growing agrarian economy

During Argentina’s export-led development, Buenos Aires province was clearly the richest province. Already by 1892, according to the estimates by Michael Mulhall, Buenos Aires concentrated 55.3 percent of the wealth in Argentina. The four provinces of the Pampa region (Buenos Aires, Entre Ríos, Santa Fe, and Córdoba) concentrated 79.2 percent of the aggregated wealth; while the ten interior provinces accounted for the remaining 20.8 percent. (Mulhall and Mulhall, 1892: 21) The total wealth of Buenos Aires province was almost seven times higher than any of the provinces of the Pampa region, and 26 times the average of the Interior provinces. Buenos Aires’ per capita wealth in 1892 was 48 percent above that of the other three provinces of the Pampa region, and three times larger than the average of the Interior provinces (Mulhall and Mulhall, 1892).

Being in control of the main port and its customs office, the province also secured an important share of the nation’s tax revenues. In 1880, its budget amounted to 5.4 million gold pesos, 58 percent of the combined revenues of the rest of the fourteen provinces. (Llach, 2007: 12) This continued to be the case in 1910, when the province’s budget exceeded 38 million pesos. Historian James Scobie wrote: “The governor of Buenos Aires might almost equal the President in power and prestige, while the size of Buenos Aires provincial budget compared favorably with that voted by the national Congress.” (Scobie, 1964a: 150)

Between 1880 and 1914 the province experienced an explosive growth of population and agrarian production, due to the expansion of the railroad network, the massive inflow of European immigrants, and the incorporation of modern technology to grain farming and cattle-raising. (Cortés Conde, 1979; Vázquez Presedo, 1979; Zymelman, 1994; Taylor, 1997; Rocchi, 2013. In a recent essay, Juan Manuel Palacio presents Buenos Aires province as “the main engine of agro-export development” in Argentina. (Palacio, “La economía rural bonaerense” 2013: 185).

Mulhall’s estimate was based on a summation of the value of land, cattle, housing, railways, and a 25 % allowance for “sundries.”

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6 During the period 1885–1914 GDP grew at 5.3 % per year, while population increased at 3.5 % per year. During the period 1915–1939 GDP grew at 3 % per year, while population increased at 2.3 % a year. Gerchunoff y Llach. El ciclo de la lluvia y el descontento (2002), pp. 487–88; V. Vazquez Presedo. El Caso Argentino (1971), p.92; and by the same author, Crisis y retraso (1978), p.191.

7 For the economic history of Argentina during the Golden Age and the subsequent Great Delay, see: Di Tella y Zymelman, 1967; Cortés Conde, 1979; Diaz Alejandro, 1970; Vazquez Presedo, 1979; Adelman, 1994; Taylor, 1997; Rocchi, 2013. In a recent essay, Juan Manuel Palacio presents Buenos Aires province as “the main engine of agro-export development” in Argentina. (Palacio, “La economía rural bonaerense” 2013: 185).

8 Mulhall’s estimate was based on a summation of the value of land, cattle, housing, railways, and a 25 % allowance for “sundries.”
1979; Della Paolera and Taylor, 2003) Between 1881 and 1914, the population increased from 526,000 to 2 million, the area cultivated with wheat and corn increased from 189,800 to 3.9 million hectares, and the stock of cattle rose from 4.7 million to 9.0 million (Palacio, 2013a:194).

Due to new land settlements to the south and west, to the change in the composition of exports, and to the adoption of technological improvements, by the mid-1920s the provincial economy had expanded significantly. The production of wheat, corn, and linseed acquired unprecedented importance in the composition of exports. Cattle herds came to occupy lands previously allocated to sheep-raising. Cattle-raisers improved their stock with European breeds and better pastures. Farmers acquired new agricultural machinery, chiefly tractors, threshers, and reapers. Railway and export companies built grain elevators near railroad stations and ports.9

The growth of urban areas—small and middle towns in the pampas—was also impressive. With 64.9 percent of the population living in centers over 2000 inhabitants, the province was by 1914 the most advanced in terms of urbanization. Between 1895 and 1914 the province increased its urban centers from 61 to 147. (Lattes and Andrade, 2012; Scobie, 1964a: 148) The sample taken from Buenos Aires prisons indicates that rural historians of Argentina were mistaken: most of the population was not rural; hence, the story about bonaerenses’ welfare was not just a story of landowners, tenants, and peons.

Since most of these transformations took place in territory of Buenos Aires province, this continued to be the richest district in the nation. By 1937 Buenos Aires province had 40 percent of the cattle stock of the nation, 42 percent of the land cultivated with wheat and 34 percent of the land cultivated with corn. (Palacio, 2013b:191). Possessing lands of higher productivity than other regions, the province’s share in the country’s production of the chief agricultural staples was even higher. 10 The little industry that developed during the Golden Age tended to concentrate in the city of Buenos Aires and its surrounding towns, the so-called Conurbano.11

During the 1930s, a process of import-substituting industrialization took place; thousands of provincianos (residents from the interior provinces) moved to the capital city and the Conurbano in search of employment in manufacturing or services. By 1946, the province had a per capita GDP of $1,620, a figure that was two times larger than the per capita GDP in the Northwest, and 63.3% of the capital city’s per capita GDP. (Talassino, 2015, table 20).12 Differences in hourly wages were less substantial. In 1940–42 workers in four cities of Buenos Aires province earned 0.92 $/hour, while the hourly wage in the capital city was 1.02 $. In four cities of the interior the average wage amounted to 0.73 $/hour. (Anuario Geográfico Argentino 1941 and 1942)13

Scholars agreed that most of the increased physical capital and technology that characterized the age of export-led growth concentrated in the Littoral and not in the interior.14 Yet few have examined the welfare implications of this uneven regional growth in terms of physical wellbeing. (Salvatore, 2009) Discussions about differences in wellbeing between Pampa and Interior often depend on the spotted evidence on real wages and on impressions left by travelers and social reformers about the life of rural workers and tenants.15 In this regard, the legacy of James Scobie’s work has been long-lasting.

Scobie saw the “agricultural revolution” of the pampas as a mixed blessing.16 Unlike the colonization of Santa Fe province, where small-scale property remained dominant (Gallo, 1983), the expansion of the agrarian frontier in Buenos Aires preserved the structure of latifundia, the land being farmed by impoverished, itinerant tenants.17 As tenants tended to save on wage labor, using instead family labor, this type of economic growth tended to generate too few salaried jobs. (Scobie, 1964b) Since Scobie’s time much new work have enhanced our understanding of the nature of the agrarian elites, the role of credit and technology, the responsiveness of producers to prices incentives, the importance of tenancy, and legislative reforms related to land and labor. (Adelman, 1994; Barsky, 1998; Hora, 2003; Sesto, 2003; Miguez, 2008). But still, we are uncertain about how changes in population settlement, economic growth, agrarian productivity, transportation, and urbanization affected the physical wellbeing of the working-poor.

3. Data and methods

The Historical Archive of the Penitentiary Service of Buenos Aires province kept a collection of over 500 register books containing information about convicted felons who entered the provincial prison system between 1902 and 1979. Prison books included data about the prisoner’s height, age, birthplace, literacy, occupation, parents’ nationality, and number of siblings.18 From these register books we took a sample of 12,783 cases. The data was gathered in the following manner: Each odd-numbered book was selected and from them, a random sample was taken. When a prisoner’s ficha (registration page) was incomplete, the next prisoner was recorded. As recidivist delinquents and transferred inmates could produce double counting, we checked and eliminated duplicate information.

For the birth-cohorts 1885–1939 the height data presents a quasi-normal distribution. (See Fig. 1) While the data exhibits a small heaping problem—heights multiple of five have frequencies above normal—, this does not seem to affect the reliability of the estimates. (See online Appendix) By contrast, the height distribution for the birth cohorts 1940–1959 showed such a severe heaping problem that made the reliability of the estimates suspect. Consequently, we decided to drop all information of these two problematic decades. This reduced our sample to 8,987 observations.19

Table 1A (see Online Appendix) shows the general composition of the sample. The prisoners were predominantly working-class: almost 90 percent of them were workers; 64 percent unskilled laborers. Only 10 percent of prison inmates were members of the

10 Buenos Aires province produced almost 50 percent of all wheat, 38 percent of all corn, and 37 percent of all linseed produced. Scorci, 2013: 89.
11 By 1914 30 percent of industrial establishments, 26 percent of industrial capital and 39 percent of industrial power were located in Buenos Aires province, followed closely by the city of Buenos Aires. Tornquist, 1919, pp.34–42.
13 This hourly wage refers to an average of eight occupations (carpenter, electrical worker, blacksmith, baker, tailor, weaver, typographer, and turner). The four cities of Buenos Aires province are La Plata, Bahía Blanca, Mar del Plata, and Avellaneda. The four cities in the interior are Catamarca, Salta, San Juan, and Resistencia.
14 It was usually the case with railroads, banks, agricultural machinery, and factories. (Scobie, 1964a; Llach, 2007; Francis, 2013)
15 Discussions about welfare based upon real wages cannot be considered valid for the Humid Pampa and less for Buenos Aires province, since the most reliable wages relate to the city of Buenos Aires (Courdès Conde, 1976).
16 The settlement of new frontier lands, the cultivation of grain for export, and the diffusion of tenancy.
17 Unfortunately, in our prison sample, there is no special category for “tenant-farmers”. All agriculturalists are classified as “farmers,” regardless of whether they were owner of the land or not.
18 The inmates, prosecuted for all types of felonies, were serving terms at one of the nine provincial prisons: Mercedes, Olmos, Dolores, Azul, Bahía Blanca, Sierra Chica, San Nicolás, and La Plata.
19 I discuss the heaping problem and its possible solution in a methodological section, see Appendix C.

middle sectors (students, merchants, farmers, industrialists, and proprietors). The vast majority of inmates (94.1 percent) had been born in the Pampa region; 76.4 percent in Buenos Aires province. Prisoners born in the Interior provinces were a minority (5.9 percent); as were those born in the Capital city (8.2 percent).

Prison inmates were predominantly urban (62 percent), most of them born in cities of 5,000–20,000 inhabitants; only 12.5 percent had been born in cities of 25,000 inhabitants or more.

The majority (85.3 percent) of prison inmates had reached their adult height, their ages ranging from 21 to 54. By design our sample contains only people born in Argentina. Yet the sample includes second-generation immigrants: 28.5 percent of prison inmates had immigrant fathers. Prison book-keepers registered also the skin color of an important number of prisoners: 45 percent were considered white, 36 percent “trigueño” (mestizos), and less than 1 percent mulattos. At some point in time, book-keepers stopped recording this attribute, hence, the skin-color of 18 percent of our sample went un-recorded.

This sample contains important information about years of schooling: 17.7 percent of prisoners had never attended school; another 72.4 percent had attended but not completed elementary school. Only 9.5 percent of the sample had completed primary education. Less than 1 percent of the inmates said to be students, teachers, or members of liberal professions. In addition, prison registers provide information about family size (number of siblings). Apparently, prisoners came from large families. In addition, almost 11 percent of prison inmates declared “unknown” fathers; they probably grew up in households headed by single mothers.

Based on these attributes, we can conclude that the great majority of the inmates populating of Buenos Aires prisons were native-born Argentines with minimal labor skills and very low educational attainment. While we do not have information about family incomes or employment, we can infer that most prisoners confronted situations of unstable employment and low wages prior to incarceration. In other words, the criminal justice system produced a sample of the population of Buenos Aires province that came predominantly from the lowest strata of the working-class.

4. Changes in sample composition

During the period under examination significant changes affected Argentine society, among them: the decline in European immigration after 1914; the increase of internal migrations after 1930; and long-term improvements in literacy, school attendance, and skills. Few of these changes, however, seemed to have affected the prison population of Buenos Aires province. In terms of literacy, schooling, nationality, and region of origin the prison population under analysis showed more signs of continuity than of change.

In the National Census of 1914, 36.7 percent of the province’s population was made up by foreigners; in the 1947 census that proportion had declined to 18.3 percent. In our sample the proportion of prisoners with European fathers showed a rather small decline between 1880–1914 and 1915–1935 (from 28 to 24 percent). Sons of immigrants from neighboring countries and from other world regions (Asia, Middle East or Africa) represented a negligible minority. The great majority of inmates were Argentines, sons of Argentine fathers.

According to the 1914 national census, 90.5 percent of the Argentine population of the province had been born in the same province; the other 9.5 percent had migrated from the Buenos Aires city, the rest of the Pampa region, or the interior provinces. After 1930 the inflow of migrants from the interior to the province of Buenos Aires became massive. The 1947 census reported that 27 percent of the province’s population had been born in other provinces. The proportion of interior migrants in our sample is quite small, rising from 3.8 to 6.5 percent from the first to the second period. The majority of inmates in state prisons had been born—and probably raised—in Buenos Aires province.

As stated before, the largest share of the sample was of working-class origins. This remained so throughout the period: 88 to 90 percent of the sample belonged to the categories “unskilled laborer,” “skilled worker,” and “employee.” From the first to the second period, there was a small reduction in the proportion of unskilled laborers (66 to 62 percent) and a parallel increase in the proportion of skilled workers (from 14 to 17 percent), reflecting the increased demand for skills created by the incipient industrialization of the post-WWI period. Yet it is clear that the better educated and the highly skilled elements of the working-class managed to keep away from the prison system.

During this period Argentina made important achievements in the reduction of illiteracy and the gradual and sustained extension of elementary education (Tedesco, 1977; Salvatore, 2013). For the country as a whole, the illiteracy rate declined from 35.9% in 1914 to 13.6% in 1947. For Buenos Aires province, it dropped from 30.7% to 9.8%. (National population censuses 1914 and 1947). The prison population, however, did not reflect a similar progress. Though we see some progress in the reduction of illiteracy among prisoners (from 21 to 15 percent), the proportion of those who completed elementary education showed very little improvement (from 5.3 to 8.5 percent). We must conclude then, that during the earlier period (1880–1914), the prison data contains a positive selectivity.

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[20] The classification scheme was biased in favor of whitening: even the people who acknowledged African and Middle East parents, as well as those whose parents came from neighboring Latin American countries were classified as either “white” or “trigueño.” Apparently, to the prison book-keeper “trigueño” was the all-encompassing category representing people who did not look quite “white.”

[21] According to this information, prisoners with 3 to 6 siblings (families of 5 to 8 members) were the most frequent.

[22] For details, see tables B1 to B4 in Online Appendix.

[23] For the period under consideration, national population censuses do not provide information about the educational level of the working classes. This information exists in relation to the 1960 population census. Then, workers with incomplete primary education constituted 59.8 %, those with complete primary education 30.7 %, and those with post-primary education (secondary and technical) accounted for just 0.7 %. J.C. Tedesco, Industrialización y educación en Argentina (1977), table 7, p.27.
while in the latter period (1915–1939) there was a negative selectivity. Consequently, the prison data exaggerates the stagnation in heights in comparison with the Argentine male population in general. Those who continued into high-school—without completing it—represented a very small minority: around 2 percent. In other words, the typical prisoner was an unskilled laborer (a peon) with only minimal reading and writing skills.

5. Regression results

Through regression analysis we controlled for these and other changes in sample composition. Regression 1 shows estimates of average heights per decade controlling for age, occupation, region of birth, urban-rural, and years of schooling (See Appendix B). The growth period continued until age 20, when prisoners seem to have reached their adult height. 15-year-old inmates were 6.5 cm shorter than 21-year olds; 19-year olds were 1 cm shorter. Those born in urban settings (> 5000 inhabitants) were about 0.40 cm shorter than those born in rural areas. That is, moving to a small or medium city implied a penalty in terms of biological welfare. But in “big cities” (localities of over 25,000 inhabitants), urban disamenities were probably compensated by greater income-earning opportunities. Prisoners born in “big cities” were not different in stature than those born in rural areas.

With two exceptions, dummies for occupation were generally very significant. The stature of street peddlers was not significantly different from that of unskilled laborers. The category “industrialist” contained too few cases to provide stable, reliable coefficients. The rest of the occupational dummies show the expected sign and differences. Skilled workers were 0.39 to 0.59 cm taller than unskilled laborers; employees and clerks were 1.24 to 1.63 cm taller. Prisoners coming from middle families had better nutrition and health status. Farmers were 1.43 to 1.57 cm taller than peasants; while merchants were 1.53 to 1.90 cm taller. Students and teachers were the tallest group: 1.95 to 2.48 cm taller than unskilled laborers.

Prisoners born in Buenos Aires city were neither taller nor shorter than those born in Buenos Aires province. This may indicate that greater opportunities for economic and social advancement afforded by the city were compensated by negative externalities such as contagious diseases and other “urban disamenities.” Alternatively, one could assume that the labor markets of the city and of the countryside were complementary, workers migrating seasonally from one to the other to supplement
their incomes or avoid falling in unemployment. We failed to find any significant difference in stature between individuals born in Buenos Aires province and those born in other provinces of the Pampa region (Santa Fe, Cordoba, Entre Rios and La Pampa). By contrast, migrants from the interior were 1.0 cm shorter in average than those individuals born and raised in Buenos Aires province.

6. Estimated trend

Dummies by decades were used to estimate trends. All coefficients proved significant, except for those of the 1880s.\textsuperscript{24} Table 2 presents the estimates stemming from regressions 1 to 3 (See Appendix B). The estimates refer 21–55 year-old prisoners, unskilled laborers born in Buenos Aires province, who had completed one to three years of schooling. The estimate for the 1880s is high, probably due to the concentration of observations in the last years of the decade, a period of rapid economic growth and financial speculation. (Llach, 2007). The evolution of the trend is quite consistent, indicating a fall in stature between the 1880s and the 1890s, then very small increases in stature during the three first decades of the 20th century, and then a sudden growth of stature in the 1930s. Regardless of the model of estimation used, there seems to be a fall of about one centimeter from the 1880s to the 1890s, then remarkable stability, and then a growth of 1.0 or 1.1 cm from the 1920s to the 1930s (Fig. 2). In our discussion of selectivity above, we found that the prison sample became more negatively selected over time—in particular, in terms of literacy. Hence, one would not expect a similar long-term stagnation in stature (prior to 1930) for the Argentine male population as a whole.

Our estimates show that, in spite of this negative selectivity, prisoners’ biological welfare improved in the 1930s. This might have been the result of lower food prices and rising industrialization. By 1930 prisoners of Buenos Aires province (169.9–170.0 cm) were taller than average men in Southern Europe (Italy 168.1 cm; Spain 165.2 cm), and also in comparison with men in middle-income countries of South America (Uruguay 168.1 cm; Brazil 167.0 cm; Colombia 165.5 cm). Yet they were 3.5–6.9 cm shorter than average males in Scandinavia (Norway 176.9 cm; Sweden 175.5 cm), Northwestern Europe (Netherlands 175.1 cm; Germany 174 cm; Denmark 173.9 cm; United Kingdom 173.8 cm), and the United States (173.4 cm).\textsuperscript{25}

One salient result of these estimates is the relative long-run stability of stature. From the 1880s until the 1930s the average height of unskilled laborers in Buenos Aires prisons rose between 0.3 and 0.8 cm. If we start from 1900-09 the estimated gain in stature increases to 1.3 to 1.8 cm. (See regressions 1–8 in Appendix B) That is, in the richest province of Argentina unskilled workers made small gains in stature over the course of five and a half decades (from 1885 to 1939). This could hardly be considered progress for workers contributing their labor power to one of the most successful export economies of the period. If we average out the different occupations with fixed proportions, the trend looks like the one depicted by Fig. E1 (see Online Appendix). Here the line for “all occupations” is only a little above the standardized height of unskilled laborers. Using this estimate, the gain in stature from the 1880s to the 1930s is even lower: 0.59 cm (Fig. 3).\textsuperscript{26}

These poor results, we must remember, refer to groups born in the richer districts of the Humid Pampa, in the province supplying grains, beef, mutton and other foodstuffs to the world economy. Our estimates underscore the important decline in stature that resulted from the crisis of 1890–92. This was the most severe of all crises. A financial panic led to the fall of important banks and to Argentina’s second default. This pushed Baring Brothers into bankruptcy and this generated a severe shortage of credit that

\textsuperscript{24} A small number of observations, clustered in the latter years of the decade, may explain the lack of significance of the coefficient for the 1880s. For the rest of the decades, the coefficients are all significant.

\textsuperscript{25} Baten, Joerg and Mathias Blum (2015). Height. \url{http://hdl.handle.net/10622/IAELK}, accessed via the Clio Infra website.

\textsuperscript{26} Calculating averages with changing weights for occupations according to the period we reach an estimated gain in stature of 0.66 cm over the six decades. Here the weighted average is between the mean for employees and farmers (above) and the mean for unskilled laborers (below).

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**Table 2**

<table>
<thead>
<tr>
<th>Birth cohort</th>
<th>Estimated Mean Height</th>
<th>Stature Change</th>
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<tbody>
<tr>
<td></td>
<td>Reg 1</td>
<td>Reg 2</td>
</tr>
<tr>
<td>b1890_99</td>
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<td></td>
</tr>
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<td></td>
</tr>
<tr>
<td>b1910_19</td>
<td>169.3</td>
<td></td>
</tr>
<tr>
<td>b1920_29</td>
<td>169.4</td>
<td></td>
</tr>
<tr>
<td>b1930_39</td>
<td>170.5</td>
<td></td>
</tr>
</tbody>
</table>

Regression 1: born in small cities (>5000); no control for schooling.
Regression 2: both urban and rural; controlled for schooling (1–3 years).
Regression 3: controlled for schooling (1–3 years schooling); and by city size (pop>5000).

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**Fig. 2.** Standardized Mean Heights, Trend.

**Fig. 3.** Estimated Trend by Occupation.
impacted negatively internal production and employment. During this time, the government had neither the instruments nor the inclination to alleviate the growing unemployment. So, its contractive monetary and fiscal policies increased unemployment and stimulated immigrants to return to Europe. (Gerchunoff and Llach, 2005: 50–53)

During the Great Depression, however, while the agrarian economy went into a deep recession (Chu, 1972; Thorp, 1984; Hora, 2014), the mean stature of prisoners increased. According to the best sources, GDP fell almost 15 percent between 1929 and 1932, while export prices fell 42 percent. (Gerchunoff and Llach, 2005: 112) Under these conditions, the improvement in the health and nutrition of these prisoners appears puzzling. Unlike the 1890 crisis, this time the government produced a rapid policy response (the establishment of exchange controls, significant currency devaluation, and the exit from the gold standard) that cushioned the domestic impact of the international trade recession. Simultaneously, a change in relative prices in favor of manufactures jump-started a process of import-substituting industrialization. (Chu, 1972; Thorp, 1984) Apparently, the drop in relative food prices more than compensated the fall in unemployment and wages.27 Food consumption (measured by per-capita daily caloric intake) actually rose during 1930 and 1931, falling in the following two years. (Salvatore, 2010: 136–139)

Fig. 4 presents estimates of average stature by triennia. The estimates refer to prisoners who were unskilled laborers, native-born Argentines, from small cities, and with 1–3 years of schooling. The figure shows that the 1890s depression had a profound effect on the net-nutrition of prisoners, lasting until the end of the decade. And, save for a spurt in 1909–11, stature remained stagnant until 1921–23, when it started a solid recovery that lasted into the 1930s. This information confirms the findings of a previous article (Salvatore, 2004a): the quasi-stagnation of mean heights during the first 15 years of the 20th century.28 Hence, our earlier conclusion for the Belle Epoque stands: from 1900–02 to 1912–14 there was no improvement in stature.29

Table 3

<table>
<thead>
<tr>
<th>Measure</th>
<th>1885–1914</th>
<th>N*</th>
<th>1915–1939</th>
<th>N*</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Crude Means</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>workers</td>
<td>169.17</td>
<td>3,568</td>
<td>169.59</td>
<td>4,480</td>
<td>0.42</td>
</tr>
<tr>
<td>non-workers</td>
<td>170.93</td>
<td>446</td>
<td>171.56</td>
<td>484</td>
<td>0.63</td>
</tr>
<tr>
<td>b) Standardized Means</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>workers</td>
<td>169.12</td>
<td>3,568</td>
<td>169.65</td>
<td>4,480</td>
<td>0.57</td>
</tr>
<tr>
<td>non-workers</td>
<td>170.81</td>
<td>446</td>
<td>171.53</td>
<td>494</td>
<td>0.72</td>
</tr>
</tbody>
</table>

* based on regressions 9 & 10.

As it was the case with Buenos Aires city recruits, the stature of prisoners improved during the first years of the Great War, then deteriorated until 1921–23. After that, average stature rose continuously until 1930–32. The period 1933–38 were signaled by stagnation of wellbeing, after which stature started to rise again. The transition from a regime of export-led growth to one of import-substitution industrialization produced small gains in the biological wellbeing of prisoners. While it is clear that non-workers made greater gains than workers (the gap between the two increased from 1.69 cm to 1.88 cm in five decades), the results in terms of net-nutrition gains were rather poor. (See Table 3)

In the following sections, we focus on three aspects of biological wellbeing in the richest province of the Argentine pampas: educational attainment; social inequalities attributed to occupation and other variables; and the influence of European immigration. But first, let us compare these results with those previously obtained working with army data (Table 4).

7. Comparing prisoners with recruits

We now briefly consider how this new evidence squares with earlier findings based on military records (Salvatore, 2004a). We expect prisoners to be taller than recruits, largely because recruits are 18-year old, while 85% of prisoners are 31 years and older. The evolution of their mean stature of prisoners and recruits seems to follow a similar, parallel trend (See Fig. 5). However, soldiers and prisoners do not seem to have gained stature at the same time. Prisoners’ data presents a longer period of stagnation in stature. Soldiers’ heights start to rise after WWI and continued growing almost uninterrupted until the end of our period, while prisoners seem to have gained stature only in the late 1920s and particularly during the early 1930s. If we compare instead prisoners’ mean heights with the average stature of an 18-year-old recruit from the Pampa region for the inter-war period,30 the conclusion remains: prisoners are as tall or somewhat taller than soldiers.

Compared with recruits’ data, our sample of prisoners presents additional indicators (unknown father, 1–3 years of schooling, large families, and black or mulatto complexion) that speak of the vulnerability of prison inmates. Even when they may share similar conditions in nutrition and health during infancy, a group of army recruits would continue their education and attain higher economic and social status; while other segment will learn a trade and also attain above-poverty income. Prison inmates will most probably not. Having joined criminal activities and being indicted is a clear indication of their relative failure: early child conditions had prevented them from completing primary education or acquiring a trade skill. So, they have found themselves with fewer employment opportunities and have joined the criminal

27 For a more pessimistic assessment of the impact of the recession in Argentina, see Hora, “The Impact of the Depression” 2014.
28 The episode of absolute decline in stature that I have called “nutrition stress” in a food-rich export economy appears in this sample interrupted by a good triennium, 1909–11.
29 During the two first decades of the 20th century, the prison sample shows a positive selectivity with regard to literacy. Despite this, the estimates show stagnation in stature.
30 Work on progress on the evolution of heights by great regions of the country. Our estimate for a sample of 21 agrarian districts of the Pampa region during 1904-1910 is 168.5 cm (Salvatore, 2010), already quite similar to our estimate for recruits’ heights for the whole period 1901-1943.
sector. In prison they were forced to work for a fraction of the lowest wage in freedom.

8. Sources of height inequality

8.1. Human capabilities and stature

We cannot overemphasize the importance of early childhood growth for educational attainment. Prisoners with 1–3 years of schooling were 0.83 cm taller than those who were unable to attend elementary school.31 Prisoners with 4–6 years of schooling were 0.56 cm taller than those with 1–3 years of schooling, while those with 7–10 years of schooling – those who had completed elementary education – were 1.45 cm taller.32 This is an important finding: the greater the gains in net-nutrition during infancy, the longer the child remained in school. (See Table 5)

Educational attainment and stature were related in both directions. The most important association runs from nutrition and health during early infancy to children’s cognitive ability and, from this, to school performance. (Belfield and Rashad Kelly, 2013; Case and Paxson, 2011; Cinnirela et al., 2011; Coneus et al., 2012; Spears, 2012) Yet school persistence complements children’s growth as well. First, since the 1930s children were offered food in elementary schools, usually a cup of milk and a piece of bread. Second, the children of working-class families usually dropped out of school and started working in the family farm or business.

Table 4
Comparing the Height of Prisoners with those of Pampa Region Recruits.

<table>
<thead>
<tr>
<th>Birth Cohort</th>
<th>Buenos Aires Prisoners</th>
<th>Recruits Pampa Region</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1916</td>
<td>169.47</td>
<td>168.03</td>
<td>1.44</td>
</tr>
<tr>
<td>1929</td>
<td>169.74</td>
<td>169.65</td>
<td>0.09</td>
</tr>
<tr>
<td>1934</td>
<td>170.43</td>
<td>169.98</td>
<td>0.45</td>
</tr>
<tr>
<td>1943</td>
<td>170.55</td>
<td>170.02</td>
<td>0.53</td>
</tr>
<tr>
<td>1951</td>
<td>170.85</td>
<td>170.06</td>
<td>0.79</td>
</tr>
</tbody>
</table>

StANDARDIZED MEANS; 18 YEARS OLD; UNSKILLED LABORER.

Fig. 5. Comparison between Recruits’ and Prisoners’ Heights (crude means).

Those who remained at school spent less energy for work and, consequently, grew taller. The phenomenon of child labor was particularly severe during the Belle Époque; it was the constant predication of social reformers that one way to reduce child labor was to force parents to keep them at school.33 Third, elementary schools provided children with basic capabilities that later–during adolescence and early manhood– helped them obtain better jobs. The “school attendance premium” for taller prisoners increased over time. Whereas for the period of the Belle Époque (1880–1914) the coefficient for having 11 or more years of schooling proved non-significant, during the so-called Great Delay (1915–1939) unskilled laborers with that level of education were 1.39 cm taller than those with 1 to 3 years of schooling.34 Youngsters who had completed elementary education and entered into secondary school had greater chances of attaining a job, and hence, supplement family income. Conversely, in a society that was rapidly disseminating basic reading and writing skills through public education, the “stature penalty” for being illiterate increased: in our case, it rose from ~0.65 to ~1.04 cm.

8.2. Stature, socio-economic status, and economic vulnerability

The occupation of prison inmates was taken as an indicator of their families’ socio-economic status. Tables 6a and 6b report the main results. Prisoners who said they had been “proprietors” and “students” were the tallest: 2.4 and 2.6 cm taller than unskilled laborers. Next followed those who reported being “merchants” and “farmers”; they were 1.5–1.8 cm taller than unskilled laborers. Prisoners who reported being workers, skilled or unskilled, were the shortest of the sample. The exact difference between these socio-economic groups varied with the specification of the model, but it is clear that there were important stature differences associated with the prisoner’s occupation.

Prisoners’ information validates what we have found for Buenos Aires city recruits: during the first four decades of the century,

Table 5
Stature Difference by Years of Schooling.

<table>
<thead>
<tr>
<th>Years of Schooling</th>
<th>1885–1914</th>
<th>1915–1939</th>
<th>1885–1939</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate (0 schooling)</td>
<td>-0.65</td>
<td>-1.04</td>
<td>-0.83</td>
</tr>
<tr>
<td>1-3 years of school</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4-6 years of school</td>
<td>+0.51</td>
<td>+0.60</td>
<td>+0.56</td>
</tr>
<tr>
<td>7-10 years of school</td>
<td>+0.78</td>
<td>+1.77</td>
<td>+1.45</td>
</tr>
<tr>
<td>11 years and more</td>
<td>non-signif</td>
<td>+1.39</td>
<td>non-signif</td>
</tr>
</tbody>
</table>

in relation to unskilled, rural laborers, with 1–3 years of schooling.

Table 6a
Stature Difference by Occupation.(1885–1939)

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Reg 1</th>
<th>Reg 2</th>
<th>Reg 3</th>
<th>Reg 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>unskilled laborer</td>
<td>reference</td>
<td>reference</td>
<td>reference</td>
<td>reference</td>
</tr>
<tr>
<td>skilled worker</td>
<td>+0.59</td>
<td>+0.39</td>
<td>+0.43</td>
<td>+0.80</td>
</tr>
<tr>
<td>employee</td>
<td>+1.63</td>
<td>+1.26</td>
<td>+1.27</td>
<td>+1.86</td>
</tr>
<tr>
<td>student &amp; teacher</td>
<td>+2.48</td>
<td>+1.99</td>
<td>+1.98</td>
<td>+2.64</td>
</tr>
<tr>
<td>farmer</td>
<td>+1.57</td>
<td>+1.50</td>
<td>+1.50</td>
<td>+1.75</td>
</tr>
<tr>
<td>merchant</td>
<td>+1.92</td>
<td>+1.54</td>
<td>+1.56</td>
<td>+2.13</td>
</tr>
<tr>
<td>proprietor</td>
<td>+2.65</td>
<td>+2.37</td>
<td>+2.37</td>
<td>+2.81</td>
</tr>
</tbody>
</table>

31 Results obtained from the variable “illiterate” were almost identical to those obtained with the variable “0 years of schooling”; a clear indication that, for the prison staff illiteracy meant never having attended school.

32 There was no clear “reward” in stature for prisoners with 11 or more years of schooling. This may be due to the fact that other occupational categories, such as “employee” or “students” capture this effect.

33 Child labor represented in 1908 22.2% of the permanent workforce of farming and 5% if the seasonal workforce. See Salvatore, “After the Conquest of the Desert” (unpublished paper), Table 4.

34 Similarly, the height advantage for those prisoners with 7-10 years of schooling (those having completed at least primary education) rose from 0.78 centimeters to 1.77 centimeters between 1885–1914 and 1915–1939.
inequalities among social groups correlated with important stature differences (Salvatore, 2004a, b). In addition, over time, differences in socio-economic status were associated with greater differences in heights. In the transition from the Belle Époque to the interwar period, students and merchants showed greater gains in stature than workers.

It is hard to separate the effect of skill from the socio-economic condition of the prisoner and his family. A student is generally an individual who, due to better family income, is able to remain in school at an age in which most other working-class boys are already working. Similarly, an “employee” is usually a person who has the special abilities to perform clerical work and the social connections to secure such type of employment. To the extent that they require some assets ownership, categories such as “farmer,” “merchant,” and “proprietor” indicate a middle to upper socio-economic status. The fact that students, farmers and merchants were taller than skilled or unskilled workers tells us more about the persistence of social differences than about rewards to skills.

In addition, this sample provides information about other attributes not found in our sample of recruits: family size, race, and single motherhood. These indicators can increase our understanding of economic vulnerability, beyond the prisoner’s occupation, a proxy for socio-economic status. The number of siblings is a proxy for family size, a variable we expected to have an impact on net-nutrition. Larger families may mean additional income-earners, but more frequently, it means lesser calories available per family member. Unfortunately, our proxies for family size produced non-significant coefficients (see Table 1, regression 6).35

Until the first years of the 1930s, prison staff continued to annotate the skin color of new inmates. They were generally either white or trigueño (sun-burned mestizo), for there were few remaining people of African or indigenous descent. As expected, trigueños (mestizos) were 1.1 cm shorter than whites. Mulattoes did not show any significant height difference from whites. (See regression 11, Appendix E, Online Appendix) This finding confirms our intuition that still in early 20th century Argentine skin color mattered in the allocation of job opportunities. Children raised in mestizo families apparently lived in less healthy environments and received poorer diets.

Finally, we have additional information related to economic vulnerability. A proportion of the inmates said to be sons of “unknown” fathers. Female-headed households tended to generate lower family incomes. In addition, “illegitimate children” carried with them a social stigma that adversely affected their educational and economic opportunities. In our estimates sons of unknown fathers and Argentine mothers were 0.51 cm shorter than average. (See Table 1, regression 5) It is clear that the condition of single-motherhood, generally associated with poverty and social vulnerability, had a cost in terms of children’s biological welfare.

### 8.3. The immigrant factor

During the period of mass immigration (1880–1914) Argentina received immigrants from Northwestern Europe that were taller than native Argentines. Among them were Swedes (176.1 cm), Belgians (173.1 cm), Yugoslavs (172.3 cm), Germans (171.4 cm), French (168.4 cm), Poles (167.5 cm) and Russians (167.3 cm). (López, 1954) But these were minority groups in comparisons with the vast numbers of Spanish and Italian immigrants who constituted 83 percent of total immigration to Argentina.

Southern European immigrants, coming from backward peasant economies, were much shorter in stature. Examining a sample of naturalized immigrants born in the period 1890–1895, Juan S. López (1951) estimated the average stature of Spaniards in 165.2 cm and in 166.1 cm that of Italians.36 Since these figures were 2.8 to 3 cm lower than the mean stature of Argentine recruits born in 1924, he concluded that immigrants’ sons had improved significantly their standard of living in relation to their parents. López attributed this to nutrition and health advantages offered by the Pampa region, a country blessed with abundant food supplies.

What was the influence of European immigration in the stature of Buenos Aires prisoners? Prisoners with a European father had a stature advantage of 0.65 cm over other prisoners. Those with European mothers were no different from the average. (See Table 1, regression 5) Having parents born in one of the neighboring countries (Uruguay, Paraguay, Bolivia, Chile and Brazil) had no detectable influence on average heights. The same could be said with regard to prisoners with Arab or Middle-Eastern ancestry. Our estimates confirm the suspicion that children born of European immigrants had nutritional and health advantages over children born of Argentine parents.

This was the result of both labor market conditions and perhaps, genetic stock. Due to better skills and a dose of positive employer discrimination, European immigrants had better opportunities in local labor markets compared with their native counterparts.37 Contrary to the situation of immigrants in the United States or in other countries of recent settlement, immigrant workers in Argentina occupied the more qualified and better paying jobs of the economy (Moya, 1998; Baily, 1999). Hence, in spite of the fact that Spanish and Italian parent were shorter than natives, it is not surprising that European immigrants had taller children.

### 9. Conclusions: meager stature gains in a rich agrarian economy

In the transition from the Belle Époque to the interwar period, the small-town working poor of a rich and successful export economy received little benefits in terms of net-nutrition. Workers made only meager gains in stature from 1885851914 to 1915–1939. This is the story that Buenos Aires prison records tell. This result is congruent with the deceleration of economic growth after WWI—a trend reversal that has been confirmed by many authors since Alejandro Bunge called attention to it in the 1920s (Bunge, 1940). And it is also consistent with our earlier finding about 18-year-old army recruits from the Patricios Battalion (Salvatore, 2004a). Between 1900–09 and 1930–39 18-year-old recruits grew 1.34 cm

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35 Only in the most simplified regression models, with no controls for occupation and place of birth, our variable “large family” (5 or more siblings) produced a significant coefficient of 0.30 cm of stature difference.

36 The Spaniards who came to Argentina were about 1.6 cm taller than the average Spaniard and, similarly, Italian immigrants to Argentina were about 1.5 cm taller than their national average. That is, immigration itself implied a process of self-selection. J.S. López, 1951 and 1954.

37 European immigrants had more stable and higher incomes. S.B. Baily, 1999, chapter 3; and J. Moya, 1998, chapter 5. The report Biellet Masé delivered to the Argentine government in 1904 spoke abundantly of the marked preference of employers for European immigrants, a preference that was, in many cases clearly discriminatory. Biellet Masé, 1884.
in stature, while inmates of provincial prisons ages 22–54 grew about 1.51 cm in average. Yet, in terms of the timing of the evolution of net-nutrition, prisoners of Buenos Aires province and army recruits from the whole country show different inflexion points. The average stature of army recruits showed a continued growth from 1918 to 1935, after a deterioration of stature in 1901–10. Prison data shows a prolonged stagnation of average stature stretching from 1895 to 1922. This strengthens our presumption that prison inmates were a selective sample of the lowest strata of the working poor population.

Prison data dramatizes the impact of the 1890s recession upon the health and nutrition status of residents of Buenos Aires province. This did not happen with subsequent external shocks: during the First World War and the Great Depression stature rose rather than fell. The stature of prisoners showed no significant improvement between 1900–09 and 1920–29. If there was any improvement this occurred during the early 1930s, a time of a closed economy, incipient industrialization, lower food costs, and governmental efforts to reduce child labor.

Data on prisoners’ heights has helped us explore important dimensions of human welfare in Buenos Aires province: human capital, European immigration, family size, and socio-economic status as measured by occupation. Education, a public good available to all families promised to increase the income earning capacity of youngsters. Yet apparently, nutrition and health in early childhood greatly conditioned school persistence and performance. Stature was positively correlated with years of schooling. Taller prisoners were able to stay longer at school than shorter prisoners.

A second important finding of this article refers to European immigration. We have shown how sons of European fathers were 0.65 cm taller than sons of Argentine fathers. This difference does not seem to be only associated with genetic factors. Differential labor skills, positive discrimination in labor markets, and greater access to credit or help during distress (the work of mutual-aid societies) may explain why immigrants’ sons were taller than natives’ sons. In the long-run the role of immigration played a less important role as determinant of stature. Having increased in the period 1890–1915, the proportion of children with European fathers decreased in the following period, to become negligible in the mid-1930s.

Let us sum up the disadvantages of the working-poor whose height was recorded in prison, and “measure” them in terms of centimeters below the mean stature. By doing so, we are not assuming a causal relation between these indicators of disadvantage and adult stature as a robust measurement of net-nutrition in early infancy. In fact, it could well be that causality runs in the opposite direction (from heights to schooling and employment opportunities). We do this exercise only to have a sense of the possible impact of these disadvantages.

Ordered by the size of the estimated coefficient, two disadvantages appear to be the worse: a) having low human capital (0 to 3 years of schooling) translates into being 1.09 cm shorter; and b) having darker skin (trigueño or mulatto) translates into 1.07 cm disadvantage. Other disadvantages impacted less upon mean stature: having been born in the interior provinces (–0.71 cm); and being a common laborer (–0.71 cm), which means having only the most basic rural skills. Finally, other disadvantages that translated into still lower stature difference were: being a worker (–0.59 cm); and not having a known father (–0.51 cm). (Family size probably had a negative influence on average stature, yet errors in measurement prevented us from asserting this). Any worker having a combination of these attributes would indeed be much shorter than average. Low schooling and darker skin alone were associated with individuals that were over 2 cm shorter than average. Malnutrition in early childhood, combined with parents’ need for children’s labor force, caused the individual to drop out from school than this led into a path of lower and instable income. Yet the skin complexion speaks of a feature that was probably associated with discrimination in the school and job market (for adolescents), and also to the socio-economic condition of prisoners’ parents.

This study confirms the findings of previous work (Salvatore, 2004a). In terms of nutrition and health status the Belle Époque was not a “golden age;” it was a period of nutrition stress for workers residing in the richest province of the Pampa region.

Whether this was the result of a worsening of income distribution, of the lack of improvement in sanitary conditions, or the slow regulation and control of child labor is still open to further examination and debate. But it is now clearer that the 1930s showed a turn-around in biological welfare for the low-income groups of Buenos Aires province. Apparently, this improvement was not associated with the process of urbanization (moving to small cities reduced stature) and could hardly be attributed to gains in literacy and schooling. It affected prisoners with minimal reading and writing skills and low levels of occupational specialization. Whether industrialization and the increased regional specialization it generated were determinants of this process will be the topic of a following paper.

Acknowledgements

I would like to mention that Guillermo Banzatto and Guillermo Quinteros assisted me in the gathering of the dataset. Amilcar Challú helped me investigate the heaping problem and confirmed the reliability of my estimates using quintile regressions. I also want to thank to the comments I received from colleagues: among them, Joerg Baten; Linda Twrdlek; Kris Inwood; Deborah Oxley; Adolfo Meisel Roca, Moramay López-Alonso; John Coatsworth; among others. Yet my greatest debt is to John Komlos, who over the years have inspired all of us to collect new evidence about biological wellbeing and use the latest research methodologies to provide reliable trends and innovative insights into the field of Anthropometric History.

Appendix: A-E Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.ehb.2019.01.007.

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38 Regression results are not reported. All coefficients are negative and significant under the 95% confidence rule. Only “street peddler” is significant at the 90% confidence.