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The Regional Dimension of Biological Welfare: Argentina in the 1920s

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1. INTRODUCTION

In August 1941, socialist deputy Alfredo Palacios delivered in Congress a memorable speech in which he blamed Buenos Aires' centralist policy for the backwardness and poverty of the interior (Palacios, 1944: 30-34). In his view, the concentration of resources in the capital city and the littoral provinces spelled disaster for the economic and biological wellbeing of people in the interior. If regional disparities continued to accentuate, he warned his audience, the project of a united Argentina might not be possible to sustain. To demonstrate his point, Palacios divided the country into three regions by drawing two semi-circles from Buenos Aires city. Each «belt» presented a widely different population density and resource endowment. The first semi-circular area, encompassing almost all of Buenos Aires province, a great part of Santa Fe and Córdoba, all Entre Ríos, and the southern part of Corrientes concentrated most of the wealth of the country. Back in 1922, economist Alejandro Bunge had used the same technique (drawing circles in a map) to demonstrate exactly the same point (Bunge, 1922). Palacios replicated the exercise only to show that from 1922 to 1941 the interior provinces had deteriorated in terms of literacy, health, nutrition, and production.

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FIGURE 1
Argentina: Main Regions

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Between 1937 and 1941, Palacios traveled to the northwestern provinces, trying to assess the living conditions of Creole Argentina[1]. Everywhere he went, he found appalling poverty, malnutrition, and exploitation. Diseases such as *bocio,* paludism, tuberculosis, hayfever, *chagas,* and *tracoma* were endemic. Poverty forced men to seek seasonal work in neighboring provinces. People lived in miserable *ranchos* (huts with adobe walls and thatched roofs), without access to potable water. School medical reports convinced Palacios that the children of the interior provinces were shorter than those of the Pampa region and that malnutrition and diseases were the causes of this. To persuade Congress that malnutrition was rampant in the interior he used military records. The army had been rejecting 36 to 45 percent of the youngsters enrolled between 1925 and 1934 (Palacios, 1938: 59-60). The fragmentation of the country in two areas (the rich pampas and the poor interior) seemed the sad result of previous government policies. The «abandonment» of the populations of the interior had produced a mass of weak bodies ill-equipped for contributing to the nation's defense.

Scholars dealing with the economic development of Argentina have tended to ignore the issue of regional disparities in human development. The success of agro-export development in the pampas appears as the chief reason for this oversight. Since the 1960s, scholars built a consensus that three interacting factors had produced the impressive economic growth of the Argentine «golden age» (1880-1914): European immigrants; foreign capital invested in infrastructure (particularly railroads); and land appropriation and settlement[2]. Argentina was a typical case of an «open space» economy receiving two scarce factors from abroad (labor and capital) that valorized vast amounts of hitherto unoccupied land used to produce export staples. The region provided a fertile territory for comparison with other «settler economies» and appeared as a clear-cut case of rapid economic modernization. The lack of evidence on the evolution of the interior economies constitutes a second factor explaining this oversight. Scholars could add little to what Bunge and Palacios had already established, for until quite recently there was no evidence of regional or provincial income[3].

Against this favorable account of economic growth during the «golden age» two types of critiques have been raised. One affirms that the gains from this type of economic de-

1. He published his impressions about the interior in *El dolor argentino* (1938), *La defensa del valor humano* (1939) and *Pueblos desamparados* (1944).

2. See among others Vázquez Presedo (1971), Cortés Conde (1979) and Díaz Alejandro (1970).

3. This type of evidence, in a quite imperfect fashion, became available in the 1970s. National accounts began with the creation of the Central Bank in 1935, but were only systematically calculated in the 1960s, when the Consejo Nacional de Desarrollo was set up. CFI published the complete series of estimates on «geographical GDP» only in 1989.

velopment went to the few: to land speculators, landowners, financial intermediaries, export-import merchants, and British investors[4]. The other states that export-led growth benefited mostly the «humid pampas» and the port city, living the interior provinces undeveloped and poor. This second criticism —the question of the regional concentration of economic growth—is central to our investigation. First noticed by social commentators and urban historians in the 1940s, the thesis of regional concentration in the Littoral was favored by partisans of the dependency school in the 1960s and 1970s[5]. It was argued that «dependent development» was responsible for the existing concentration of economic resources and productive activities in the littoral (Rofman, 1974). In the period 1880-1920 British investors and native landowners collaborated to develop the resources of the Humid Pampa. After WWII oligopolistic concerns, now investing in manufactures, continued to invest in the littoral region, where the great cities were located. This pattern of investment maintained and exacerbated existing regional disparities. Critics of regional inequalities based their claims on industrial concentration data. Estimates on income and wages were unavailable for the interior provinces before the mid-1970s.

Though long a contentious issue in Argentine politics, the uneven development of Pampa versus the interior failed to attract sufficient scholarly attention. Much historical work on the economic performance of Argentine has concentrated on the pampas. In the classic *El Progreso Argentino, 1880-1914,* Cortés Conde dealt mainly with the *Humid Pampa*. He devoted only an introductory chapter to the *país antiguo* (the whole territory of the viceroyalty of Río de la Plata), implying that the coming of economic modernization had fragmented the nation into two[6]. Other scholars, such as Solberg (1987), Scobie (1964), Giberti (1970), or Adelman (1994), shared Cortés Conde's lack of interest for economic development outside the Pampa region. Implicit in their writings was the conflation between «Argentina» and the «Pampa region». To examine the «Argentine case» was synonymous to analyzing development in the pampas. In the late 1970s and during the 1980s this situation started to change. New work studied the agro-industrial growth of Mendoza and Tucumán, as well as Argentina's «secondary cities»[7].

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4. Classical statements are Cortés Conde and Gallo (1973), Di Tella (1965) and Germani (1966).

5. The pioneer work of Scobie (1964), which sustained the continuity over time of the basic nineteenth-century duality between Buenos Aires and the rest of the country, was later replicated by other historians.

6. Cortés Conde (1979). His examples and data about the expansion of the wheat economy come all from Buenos Aires province. His analysis on employment is solely based on data from the capital city. Chapter 1 deals with the *país antiguo;* the discussion of internal migration in pp. 69-71.

7. Balán (1978), Guy (1980), Fleming (1986), Supplee (1988), and Scobie (1988). For an updated summary of the progress made in studying the interior provinces, Brennan and Pianetto (2000).

Some degree of spatial concentration is to be expected of every type of economic development. Agro-export development, however, is said to produce more regionally disparities, to the extent that foreign investment tends to concentrate in areas near the seaports[8]. Those who believed that «inward linkages» were important enough to disseminate the gains of trade over a larger geographical area have challenged this view (Cortés Conde and Hunt, 1985). Lacking crucial information to measure the welfare gains or losses generated by export-led development (geographic or regional income), the contenders of this debate were unable to prove their case. In the Argentine case, scholars could only assert the obvious: that Buenos Aires and the Pampa region concentrated a great proportion of the national wealth.

In this essay I examine the regional dimension of Argentine human wellbeing in the 1920s. Data on average heights by department for the 1924 cohort provides crucial evidence to measure regional disparities. With this data, we estimate the «net nutrition gap» that separated the interior provinces from Buenos Aires and the Pampa region. Used as an indicator of «biological wellbeing», average heights allow us to investigate the welfare impact of export-led growth. Old questions about the welfare impact of railroad development, urbanization, immigrants, land tenure systems, and land concentration are reexamined at the light of this new evidence. In the second section, I briefly discuss the differences between economic and biological welfare. Next follows a description of the data; its coverage and limitations. Section four underscores spatial differences in biological welfare. Section five presents the main factors affecting average heights. In the final section, we discuss the results of a cross-section regression analysis of the sample.

2. ECONOMIC VS BIOLOGICAL WELFARE

To attain an ideal measure of real income, a number of corrections to the original data on real wages of adult males need to be made. We need to transform weekly and hourly rates into annual earnings, incorporating assumptions about work-time lost and unemployment. To take into account the contributions of women and children to family income, household budgets are crucial. In order to correct estimates on family income, evidence on poor relief or other governmental transfers should be used (Horrell and Humphries, 1992). In developing economies, obtaining this type of information on a provincial or departmental level is often close to impossible. As a result, studies about regional income inequality tend to aggregate the data into a few large regions[9]. Excessive aggregation re-

8. Perhaps the most influential formulation of this thesis was FERRER (1963). Outward-oriented development had concentrated economic resources near the seaports.

9. For Britain, HUNT (1986) and LEE (1991).

duces the variance of the observed means, hence reproducing the fiction that national per capita real income represents accurately the «economic welfare» of the population.

To overcome the limitations of income measures of welfare, scholars have introduced a variety of non-income indicators; among them infant mortality, life expectancy, caloric intake, poverty rates, and anthropometric measures such as height, weight and body mass index (BMI). Of these, mean heights have been increasingly used, as a summary of information about wellbeing not generally captured by income/consumption indicators. Different authors have argued that biological measures, heights in particular, are better suited for the study of welfare in the past than per capita real income[10]. Measurements of stature are available for periods in which records of wages and income are quite rare. Information on stature, contrary to wage and income data, is generally available on an individual basis. Moreover, height data tend to cover a much broader range of age groups, occupations, and regions (Komlos, 1995).

There are important differences between economic and biological indicators of welfare. Mean stature measures a particular form of welfare: «biological welfare», only indirectly associated with the traditional notions of income achievement and consumer satisfaction (Komlos and Baten, 1998, Introduction). Net nutrition is the aggregate effect of the energy assimilated by the body through food intake, minus the energy consumed in bodily maintenance, work exertion, and fighting disease. Though the growth process is affected by economic and social conditions, scholars find it difficult to isolate the impact of malnutrition and poor health on adult heights[11]. Scholars agree that food regimes, disease environment, and work intensity influence adult stature. Yet there is still disagreement about the way these effects take place and how income mediates all these relationships. We suggest that «economic welfare» and «biological welfare» must be considered as two different dimensions of a unique social process interconnecting biological and economic and social determinants. Scholars need to evaluate in concrete cases the accuracy and comprehensiveness with which income and biological data summarize the effect of a complex variety of determinants: economic growth, property rights, social inequality, family composition, and public health, to name only the most important. The relative advantage of mean heights is apparent, for a number of reasons. Average height is a «final impact» measure, rather than an instrument to purchase wellbeing. It is not a choice variable. There are no market mechanisms that can compensate for ob-

10. Among others Steckel (1995), Komlos (1989; 1998), Floud, Gregory and Watcher (1990), Komlos (1989), Steckel and Floud (1997).

11. There are two crucial growth periods in the life of a person (early infancy and adolescence) that weight more heavily in adult stature, and these could not separated or statistically identified. We observe the aggregate effect of 21 years of growth.

served differences in biological performance, as is the case of capital flows and labor migrations. One-to-three year olds cannot escape the ravages of a disease-ridden environment or the circumstance of being a member of a poor family living in a region with few employment opportunities.

To scholars interested in questions of regional and social inequality, these special attributes of anthropometric indicators are of crucial importance[12]. For the analysis of regional disparities in the past, the comparison between economic and biological welfare is rarely feasible, due to the inexistence of sufficiently disaggregated wage and income data. How do social inequalities translate into regional differences in economic and biological wellbeing? In a neo-classical model, different regions with similar structural characteristics are supposed to converge in income levels with time, simply because of factor mobility and decreasing returns. Convergence of biological welfare (life expectancy, infant mortality and average heights) responds to different conditions. Even if income levels are not converging, due to institutional or structural regional inequalities, successful public policies in the areas of food accessibility, transportation infrastructure, public health and sanitation could generate conditional convergence on the national level.

This article joins the growing literature on anthropometric history in Latin America[13]. Using mean heights for a large sample of military recruits born in 1924, we estimate differences in biological welfare among Argentine regions. This exercise is meant to underscore the importance of regional disparities in wellbeing at the end of the period of Argentina's export-led growth. A second objective is to evaluate the importance of some determinants of these regional differences, namely: market integration, disease risk, human capital, land concentration, and land use. In a food-rich country, height differences between regions were important. The study of the regional distribution of heights can illuminate an overlooked aspect of Argentina's economic development: the presence of important regional inequalities in welfare.

3. THE DATA

The data used comes from the study by Juan Severino López, *La talla de enrolamiento en la Argentina,* published in 1948. The sample includes 142,105 conscripts born in 1924 and enrolled in 1942 (3.1 percent of all males in the country, approximately 81 percent

12. The significance of stature has moved some scholars to combine heights with income indicators in the evaluation of general welfare (Crafts, 1997).
13. For example, Burgard (2002); Smith *et al.* (2002); Challú (2004, mimeo); Salvatore (2004a, 2004b); Godoy *et al.* (2005); López Alonso (2007); Meisel and Vega (2007).

of all males age 18). All the conscripts registered were 18 to 19 years old at the time of the medical check up. Their average stature was 168.8 cm[14]. We gather from other sources that the 1924 cohort was relatively healthy compared to prior cohorts: 76 percent of those who underwent medical inspection were declared physically «apt for service,» and from them, 92 percent were drafted[15].

TABLE 1
Sample composition (in %)

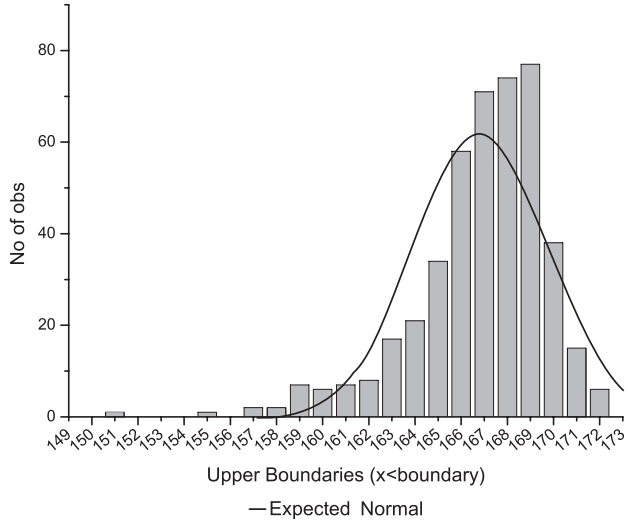
Province	Recruits	Population (1914 census)
Capital Federal	15.4	19.5
Buenos Aires	28.8	29.2
Santa Fe	11.8	11.5
Entre Ríos	5.9	6.5
Corrientes	3.8	4.2
Córdoba	10.7	10.3
San Luis	1.3	1.4
Santiago del Estero	3.7	4.1
Tucumán	4.2	4.6
Mendoza	3.9	3.7
San Juan	1.9	1.5
La Rioja	0.8	0.9
Catamarca	0.9	1.2
Salta	1.7	1.8
Jujuy	0.8	1.0
Chaco	2.1	0.7
Formosa	0.4	0.2
Misiones	1.0	0.7
La Pampa	1.2	1.3
Neuquén	0.5	0.3
Río Negro	0.8	0.5
Chubut	0.6	0.3
Santa Cruz	0.1	0.2
TOTAL	**100.0**	**100.0**

Source: Own estimates based on López (1948) and Argentina, Censo Nacional de Población de 1914.

14. We probably need to add 0.4 to 0.6 cm. to estimate mean stature at 21.
15. In previous birth cohorts, 1922 and 1923, 58 and 65 percent had been declared «apt for service,» and only 64 and 83 percent of them actually drafted. *Boletín Estadístico del Ejército,* año II, no. 10 (May-June 1948), p.53.

From a sample of 802 cases from the same register books we were able to obtain socio-economic information. We know that 78.3 percent of these conscripts were working class while 21.7 percent belonged to the middle class. Included in the latter category were students, teachers, members of the liberal professions, merchants, and the self-employed. Of the workers, 27 percent were unskilled (peons, policemen, servants, stevedores, construction workers), 25 percent were skilled (artisans and workshop workers), and the rest worked in offices and commerce. The data gathered by López appears more encompassing and diverse than any comparable evidence. The regional coverage of his study is excellent. The distribution of this data by province matches quite well the distribution of the population of the country. Since not all districts had a sufficient number of observations, we eliminated those departments with less than 25 observations in order to minimize sampling errors.

FIGURE 2
Frecuency Distribution (departmental means)
K-S d=.10846, p<.01; Lilliefors p<.01
Shapiro-Wilk W=.91730, p<0.000



Source: Own estimates based on López (1948).

The army did not impose minimum requirements for the draft. Presenting to the recruiting office was an obligation of all males after turning 18. Our sample includes those who turned up to the medical check up, whether they were later recruited or not. Hence, the data is not affected by the problem of «shortfall». The distribution of the data (departmental means) is skewed to the left (Fig. 2). From visual inspection of a quintile frequency distribution we gather that the original individual data (unavailable to this re-

searcher) was more normally distributed. Districts with high stature were quite numerous and with greater population density than the rest of the country: 113 of the 445 districts belong to the province of Buenos Aires. In order to estimate unbiased coefficients we used Weighted Least Squares, using the districts' population as the weight[16].

The recruitment process which generated this information was unrelated to the forces that produced spatial concentration or dispersion; namely: labor market opportunities, investment decisions, consumption, and government spending. At age 18 male citizens were asked to enlist for military service. As they showed up to the nearer recruitment unit, their stature was taken and recorded. Everybody, poor and rich, has to go through the process of medical inspection. Thus, the information collected by López is a good sample of Argentine males born in 1924. Our sample only includes males born in Argentina, not foreigners. The regions included had different ethnic composition. In the Pampa region a great proportion of the population were European immigrants or their descendants. In the Interior, the population was predominantly native or mestizo. Lack of information about the recruit's parents (in particular, their nationality) prevents us from isolating this important effect on average heights[17].

4. UNEVEN DEVELOPMENT AND THE NET-NUTRITION GAP

This data is used to estimate differences in net nutrition across the Argentine territory. Differences in heights computed from departmental averages (407 districts) give us a general picture of the spatial distribution of biological welfare. These estimates can help us understand better the regional dimension of export-led development. We consider López's sample as a panoramic view—taken at maturity—of the process of economic development during the period 1900-1927. We are looking at the average stature of recruits who were 1 to 3 years-old in 1925-1927. Their nutrition and health in these recruits were significantly affected by the economic structure, institutions, and sanitary conditions of the «Golden Age»[18].

The data shows large differences among different departments or districts. The «net nutrition gap» —the difference between the district with the highest average stature and

16. The distribution presented (of un-weighted means) failed the standard normality tests: Kolmogorov-Smirnov and Shapiro-Wilkes.
17. To quantify this effect we introduced the proportion of foreign-born population in each district. This effect was significant but relatively small (Regressions 13 and 14).
18. These recruits were 14 to 18 during the recovery that followed the Great Depression (1938-1942) posing another set of interesting questions to the analysis.

that with the lowest— is huge[19]. A gap of 20.8 cm is reduced to 13.7 cm when departments with less than 50 observations are eliminated. If this gap is a good indicator of economic and social inequality, Argentina was in the 1920s a country of great inequalities.

We can distinguish two extremes in this distribution. On the upper extreme there are departments with a mean stature of 171 cm or higher. Among them, 10 belong to Buenos Aires province, 7 to Santa Fe province, and the rest are located in the provinces of Entre Ríos, La Pampa, and Chubut[20]. These are districts with relative good records in terms of adult literacy (65.3 percent) and relatively 'low' infant and general mortality (82 and 9.6 per thousand). Most of these districts cultivate cereals or raise cattle. Those that do not, are semi-urban areas. On the other extreme, we find 20 departments whose average stature is lower than 164 cm: 7 are located in Jujuy, 5 in Salta, 2 in Misiones, 2 in Corrientes, 2 in Chubut, one in Tucumán, and one in Río Negro. This is a different Argentina. They are all outside of the grain belt. In fact, most fall in area 3 of Palacio's map: a frontier engaged in peasant production, the cultivation of sugar cane or tobacco, and extensive grazing. Here the rates of infant mortality are quite high (199 per thousand in average) and so are the rates of general mortality (22.4 per thousand). Adult literacy is somewhat lower (50.2 percent).

Table 2 presents a ranking of average stature by province. As expected, the provinces of the Humid Pampa and the capital city occupy the first positions in the ranking. In the lower positions we find Salta and Jujuy, two provinces with appalling conditions of poverty, malnutrition, and endemic disease. In between, we have a range of situations in which malnutrition and disease risk combine in different proportions. Similar levels of poverty do not reflect in similar net-nutrition status. Though equally poor, Tucumán and Catamarca present worse sanitary and nutritional conditions than Santiago del Estero. Average stature in Chaco, the province of cotton and *tanino*, where military colonization led to the deprivation and exploitation of indigenous peoples, is close to that of Mendoza, the province of vineyards, immigrants and rapid economic progress. Curiously, the three provinces in the Northeast frontier (Chaco, Formosa and Misiones) seem to enjoy a rather favorable situation in terms of «net nutrition». Biological welfare in Patagonia differs from one province to another. Those living in Santa Cruz share conditions similar to those of the Humid Pampas. Those residing in Chubut, on the other hand, have the same average stature as those coming from La Rioja. Recruits from Río Negro and Neuquén live in a poorer sanitary and nutritional environment.

19. Our data presents a maximum value of 172.8 cm (General Arenales in Buenos Aires province) and a minimum value of 151.9 cm (Santa Catalina in Jujuy).
20. The only «stranger» in this group is Santa Cruz, the most southern province of Patagonia.

TABLE 2

Ranking of provinces by stature (recruits b.1924)

Province	Average Height (cm)	Difference from Santa Fe	Difference from Pampa
Santa Fe	170.16	0	0.56
Santa Cruz	169.80	-0.36	0.20
Capital Federal	169.65	-0.51	0.05
Buenos Aires	169.56	-0.60	-0.04
Entre Ríos	169.46	-0.70	-0.14
Cordoba	169.20	-0.96	-0.40
La Pampa	169.10	-1.06	-0.50
Formosa	168.05	-2.11	-1.55
Chaco	167.99	-2.17	-1.61
Mendoza	167.55	-2.61	-2.05
Misiones	167.50	-2.66	-2.10
Santiago del Estero	167.38	-2.78	-2.22
Chubut	167.32	-2.84	-2.28
La Rioja	167.32	-2.84	-2.28
San Luis	167.31	-2.85	-2.29
San Juan	167.06	-3.10	-2.54
Corrientes	166.97	-3.19	-2.63
Rio Negro	166.79	-3.37	-2.81
Catamarca	166.46	-3.70	-3.14
Tucuman	166.21	-3.95	-3.39
Neuquén	165.91	-4.25	-3.69
Salta	164.51	-5.65	-5.09
Jujuy	162.85	-7.31	-6.75

Source: Own estimates based on López (1948).

Most interior provinces lagged behind those of the Humid Pampa. Whether we take differences in stature from Santa Fe or from the Pampa region, the results are the same. Among the interior provinces there are important differences. Those born in Formosa, Chaco, Mendoza, Misiones, Santiago del Estero, San Luis, Chubut, and La Rioja are 1.5 to 2.4 cm shorter than those born in the Humid Pampa. Recruits from San Juan, Corrientes, Río Negro, Catamarca, Tucumán, and Neuquén are 2.5 to 3.9 cm shorter than those in the Humid Pampa. Salta and Jujuy, the northern most provinces of Argentina, present extreme cases of under-development, malnutrition and disease, with heights 5 and 7 cm shorter than the Pampa region.

TABLE 3

Intra-province net-nutrition gap

Province	Maximum height (cm)	Minimum height (cm)	Range	Standard Deviation
Chubut	172.36	158.96	13.40	3.98
Salta	167.87	158.82	9.05	3.11
Jujuy	164.66	157.45	7.21	3.22
Catamarca	168.70	161.89	6.81	1.72
Misiones	169.48	162.69	6.79	2.47
La Pampa	171.48	165.34	6.14	2.69
Buenos Aires	172.82	166.74	6.08	1.08
Corrientes	168.67	163.03	5.64	1.46
Córdoba	170.87	165.30	5.57	1.40
Santiago del Estero	170.08	164.85	5.23	1.00
Mendoza	169.94	164.93	5.01	1.07
Río Negro	167.69	162.74	4.95	2.59
Neuquén	167.72	162.79	4.93	1.55
Santa Fe	172.65	168.25	4.40	1.14
La Rioja	170.34	165.96	4.38	1.25
San Juan	168.38	164.06	4.32	1.29
Entre Ríos	171.32	167.19	4.13	1.10
Chaco	170.34	166.60	3.74	1.34
Tucumán	167.43	163.95	3.48	1.09
San Luis	167.93	165.42	2.51	0.81
Formosa	169.28	167.05	2.23	1.63
Santa Cruz	170.89	168.95	1.94	4.34

Source: Own estimates based on López (1948).

The distribution of biological welfare proved also uneven within the same province. Table 3 computes the range and standard deviation associated with each province and ranks them according to their internal inequality. Leading the contest of inequality is Chubut, producer of sheep products for export, where the gap between the highest and lowest mean stature exceeds 13 centimeters. Also at the top of inequality are the northwestern provinces of Salta and Jujuy, with differences of 7 and 9 cm among departmental averages. Close to these are provinces such as Catamarca and Misiones with 6 cm between the highest and the lowest departmental mean. On a lower level of internal inequality we find provinces such as Santa Fe and Entre Ríos, with internal gaps of 4.1 and 4.4 cm. These were areas of immigrant colonization and small-scale farming. With less than 3 cm between maximum and minimum stature are the provinces of Chaco, Tucumán, San Luis, Formosa, and Santa Cruz.

It is difficult not to translate these differences into economic and social terms. Since the colonial period, the two northern provinces of Salta and Jujuy had been lands of high social inequality —a land *of señores de hacienda* and of dependent indigenous peons (Guy, 1980; Kirchner, 1980; Craviotti, 1992). Similarly, the Patagonian provinces evoke images of immense sheep-farms worked by low-paid indigenous peons. Misiones, Corrientes and Tucumán are often regarded as provinces with poor sanitary conditions, relative scarcity of nutrients, and exploitative work relations. In the Pampa region, sanitary conditions were better and immigrants' access to land was easier. These were areas of prosperous agricultural colonies, where the old landed class improved and subdivided their lands, and where the grain export-boom first started (Scobie, 1964; Gallo, 1983). In appearance, the places that attracted European immigration, railroad construction, and investment funds were also the places where average stature was higher and its distribution less unequal.

5. MAIN FACTORS IN THE REGIONAL CONFIGURATION OF WELFARE

Information about stature can be used to evaluate the validity of traditional explanations about the causes of the economic «backwardness» of the interior provinces. Drawing from discussions among Argentine historians about the regional impact of export-led development, one could derive a series of propositions about the determinants of regional variations of welfare.

5.1. Economic concentration versus market integration

There are basically two positions concerning the regional/ welfare impact of railroads. The railroads are presented as either an agent of diffusion of economic gains across the nation or as a force that contributed to the concentration of economic resources in Buenos Aires and its hinterland. Those who see the railroads as a factor of national integration emphasize the importance of lower transportation costs in the creation of markets. Those who view the railroads as a distorting, centripetal force argue that railway fares were designed to facilitate the access of import commodities to interior markets but that simultaneously, interior producers had to pay high freights to transport their produce to Buenos Aires[21].

21. Among the pessimists, the best exponent was nationalist Raúl Scalabrini Ortiz. His book *Los ferrocarriles deben ser del pueblo argentino* (1946) blames the railroads for preventing the progress of the interior, via discriminatory tariffs. Early on, BUNGE (1918) had rejected claims that railroad tariffs were overrated, arguing that in the post WWI agricultural prices and other costs had risen faster than tariffs.

In addition to the discussion about railroad fares, there is a more fundamental disagreement about regional specialization. Railroads engendered greater regional specialization. As a result, grain was left to the more productive pampas (Buenos Aires, Santa Fe, and Córdoba), while the rest of the country specialized in other crops: vines in Mendoza and San Juan; sugar in Tucumán, Salta and Jujuy, tobacco in Salta; yerba mate in Misiones; cotton in Chaco; etc. In the same fashion, livestock-raising became regionally specialized: sheep was displaced to Patagonia, while cattle claimed lands previously devoted to cereal farming. Did this specialization produced welfare gains, as theory would predict? Transportation improvements can play an important role in the distribution of nutrition. The fall in transportation costs can help reduce the price of food in the interior and increase food consumption. But this requires at least two conditions. First, that the regions connected by railroads find a competitive production to sell in the national marketplace. Second, that contractual agreements and property rights facilitate a relatively even distribution of the economic gains generated by the «export» activity.

5.2. Urbanization and Disease

Regarding urbanization there are also two points of view. Modernization theory had associated urbanization with the improvement in people's welfare through the reduction of work-time, better income and nutrition, and improved access to health care and education (Germani, 1962 and 1976). On the other hand, proponents of the «urban disamenities» thesis consider large cities as places that concentrated risks to people's health: contaminated waters, air pollution, accumulation of waste on the streets, and crowded tenements. All these factors facilitate the diffusion of disease, turning infections into epidemics claiming thousands of victims. Anthropometric evidence has tended to support this hypothesis, showing that rural inhabitants are generally taller than their contemporaries living in cities[22].

Argentina was in the 1920s a country with a few intermediate cities and a huge metropolis (Buenos Aires), the temporary residence of most of the immigrants that entered the country. Mass immigration generated situations of crowded tenements *(conventillos)* which facilitated the spread of infectious diseases. Big cities paid higher wages than the countryside and offered better chances for permanent employment. But the disease environment took part of these gains away. During the first decades of the century, tuber-

22. Nicholas and Steckel, 1991. Other scholars have shown the opposite. For central and southern Spain, Martínez-Carrión and Moreno-Lázaro (2007) have shown that urban heights were above rural heights in most districts.

culosis proved difficult to control. Male immigrants made prostitution a booming business in Buenos Aires and this facilitated the diffusion of venereal disease[23]. Which of the effects was stronger? Increases in income and employment or the risk of acquiring infectious diseases?

5.3. Human Capital

Immigrants and schools were perhaps the most notable changes in the social landscape of Argentina[24]. Immigrants brought with them important skills that improved productivity in a variety of economic activities. By 1914 immigrants occupied the majority of entrepreneurial positions in manufacturing and services. On the other hand, immigrants displaced the native-born from a series of occupations. Did European immigration reduced or enhanced the opportunities of lower-class native workers? Did this produce a visible impact on biological wellbeing? Similarly, the welfare implications of schooling present a double reading. The official policy of providing free, elementary education to school-age children elevated the educational standards of the workforce. On the other hand, as was recognized by physicians at the time, elementary schools were foci for the dissemination of disease. What effect proved more powerful?

5.4. Property Rights and Self-sufficiency

The configuration of property rights are known to affect income distribution as well as the distribution of nutrients and health among the population. Critical assessments of export-led development had pointed out to the skewed distribution of income generated by the presence of latifundia, insecure tenancy contracts, and exploitative labor relations. Admittedly, the relationship between property rights and nutrition is an indirect one. Property rights affect the distribution of income among different social actors, and this in turn translates into differential purchasing capacity. Self-sufficient peasant economies, on the other hand, might compensate their relative poverty with their easier access to nutrients.

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23. On the diffusion of prostitution and the fear of venereal disease in Buenos Aires, Guy (1991). On the health of Buenos Aires workers, Recalde (1997).
24. There is a vast literature on European immigration to Argentina. For a general survey, Devoto (2003); also Baily (1999) and Moya (1998).

5.5. Type of Economic Activity

Except for the areas that maintained traditional activities such as peasant farming, husbandry, and mining, major areas of the Argentine interior specialized in the production of new crops for national markets: cotton, sugar-cane, grapes and wine, tobacco, beef, mutton, etc. Did the type of economic activity influence biological wellbeing? Different combinations of technology, property rights and land concentration, are likely to generate distinct welfare effects. Certain economies produce food items whose appropriation is either tolerated by landowners or incorporated as part of labor contacts. Peasant and capitalist economies assign different valuation to the nutrition and welfare of its populations. The former tend to privilege the subsistence of the family unit over profit potential. The latter subsume nutritional objectives to the overall goal of attaining profits.

The wheat economy of Santa Fe, highly mechanized, with a combination of family and wage laborers, with small to medium plots, and with predicable tenancy contracts tended to generate a more even distribution of income that the sugar economy of Tucumán. The latter, with its *señores de ingenio* fixing the prices of cane, with land distributed through unreliable verbal contracts, with its system of coerced laborers produced quite skewed distributional results. A third type of economy, peasant production, tends to generate a small economic surplus and, consequently, low retributions to the factors of production. But this low income level does not generally engender much social inequality.

6. REGRESSION RESULTS

Regressions 1 to 3 (see Appendix) show the influence of transportation improvements on the regional distribution of heights. The availability of railway connection in the district had a positive effect on average stature. Railways increased the availability of cheap foodstuffs and expanded employment in «export» industries. Departments with access to the railroad network generated recruits 0.3 to 0.4 cm taller than average. The density of railway construction, measured by the number of stations per 50 square miles, had a much weaker effect on stature. When this density was measured in terms of stations per 1,000 inhabitants the sign of the coefficient turned negative. The intuitive explanation for this result is as follows: In regions already cultivated, the railroad opened distant markets for local production and brought needed subsistence goods at lower cost. Further construction of railway lines, on the other hand, brought about increased competition in product markets, specialization, relocation of resources, and intensified labor migrations that had a negative net effect on the welfare of the district.

Urban condition is positively associated with average heights (Regressions 3 to 5). Departments with a higher level or urbanization sent recruits that were taller than average. The reward for growing-up in an urban environment was 0.18 to 0.32 cm. This result goes against the «urban disamenities» thesis, suggesting that the type of urbanization that Argentina experienced before 1930 was compatible with improved nutrition and public health. Small and middle-sized cities generated more employment opportunities and provided a continuous and diversified food. Large cities, on the other hand, facilitate dissemination of infectious disease and produce levels of air and water pollution not present in rural areas. The dummies introduced to capture the effect of «big cities» (over 50,000 inhabitants), produced very small or negative coefficients, most of them non-significant. Apparently, «rewards» and «penalties» associated with big cities and provincial capitals tended to cancel each other.

Regressions 7 to 9 show that basic adult literacy was a significant variable, positively correlated with mean stature. It accounted for an increase of 0.3 to 0.3 centimeters in average. A combination of factors may explain this result[25]. Youths are taller in districts with greater adult literacy rates simply because their parents are better qualified to find salaried employment. In addition, departments with higher literacy can more readily absorb information about public sanitation that protects children's health. Our next finding was somewhat surprising. The degree of schooling in the district, measured by the proportion of children registered in schools, proved negatively correlated with the district's mean stature. One possible explanation is that, in areas with little or no sanitation reforms, children who attended school were subject to greater risk of infectious disease. Learning to read was a plus but going to school increased the risk of contagion. In addition, schooling might be an indicator of federal government policy in the interior. In order to compensate for past deficiencies, the federal government invested more heavily in schools in areas with poor nutrition and low health standards[26].

As expected, rates of general mortality and infant mortality, usually taken as proxies for the disease environment, were negatively correlated with heights (Regressions 10 to 12). Poor sanitary conditions affected the health of children and slowed down their growth. The more robust indicator, the district's infant mortality rate, showed a significantly negative correlation with stature. Its overall impact on «net nutrition» was about 0.2 to 0.4 cm. This correlation is easy to explain. Certain deadly diseases in early infancy, such as

25. It is not surprising to find a strong positive correlation between «net nutrition» and literacy, for we know that illiteracy is commonly used as a proxy for poverty.
26. This could be the effect of the Lainez law of 1905 that provided federal money for schools to the provinces.

gastro-enteritis, diarrhea, or bronchitis generated problems of malnutrition among survivors.

The presence of immigrants does not seem to have worsened the biological standards of the native population (Regressions 13 and 14). Average stature was higher in districts where immigrants settled, chiefly in the Humid Pampa. Also, mean stature was higher in departments where immigrants had greater success in becoming land-owners. These results should be interpreted carefully. The positive correlation between stature and the proportion of foreign-born population refers to environmental conditions, rather than to different economic achievements of foreigners and natives. Taller native recruits came from districts which attracted immigrants as wage workers or as property owners. These districts offered greater economic opportunities for native residents as well as foreigners[27].

Next, we considered variables associated with property rights. In particular, we tried to assess the impact of access to land-ownership and the degree of land concentration on the living conditions of conscripts from rural origins (Regressions 15 to 18). Departments with high proportion of farms operated by tenants, sharecroppers, squatters, and other non-proprietors showed lower average stature. Though the magnitude of this coefficient is low (0.1 to 0.2 cm), this variable is one of the most robust of the model. Land subdivision was also important. Districts with a greater share of *minifundios* (farm units under 25 hectares) were associated with poorer nutritional standards; its recruits were 0.4 to 0.5 cm shorter than average. The indicator designed to capture the effect of medium and large farms (proportion of agricultural units above 500 has) proved also significant[28]. Recruits coming from these districts were slightly taller than average. Over-divided land tended to coincide with areas of peasant, subsistence agriculture, while districts with the average size of farms were larger than 500 has were zones of modern farming techniques producing grain or beef for national and export markets.

Indicators for the type of economic activity (land uses) produced quite encouraging results (Regressions 19 to 21). In regions defined as «grain country», where the prevailing crops were wheat, corn, barley, oats, or linseed, the stature was higher than average. This seems intuitively right. These areas, most of them located in the humid pampas, were regions of high agricultural productivity, well-paid seasonal and permanent labor, and relatively egalitarian distribution of property (as compared with cattle or sheep-raising areas). In addition, these regions were the main beneficiaries of the export bonanza of the period

27. The welfare advantage captured in previous regressions by urbanization and literacy is now «explained» by immigrants' access had to property.
28. The average size of agricultural holdings proved not significant in relation to stature.

1900-1924. The proxy for cattle-raising districts («cattle country») proved non-significant due to the presence of mixed agriculture. Argentine ranchers tended to separate part of the land for cattle-ranching and subdivided and rented the rest to small-scale farmers[29]. In the opposite extreme to «grain country» were those areas that could be characterized as «peasant economies». Here family labor operated small farms (some of them uneconomically small), generally with insecure possession of the land, and with un-frequent contacts with distant markets. The main assets of these farms consisted in goats rather than on cattle. These areas showed heights that were consistently shorter than average.

Nutritional standards in «goat country» were obviously poorer than in «grain country». Recruits born in districts with peasant economies were 0.3 cm shorter than average. The same could be said about areas under the influence of some «industrial crop» *(cultivos industriales)*. The sugar industry located in the Argentine Northwest (Tucumán, Salta and Jujuy) is a case in point. Though a highly capitalistic and mechanized sector, the sugar industry reproduced situations of low wages, poverty, seasonal unemployment, and police repression. Native laborers (both Indian and Creole) recruited by *contratistas* worked under highly exploitative and unsafe conditions. Departments that grew sugar-cane had shorter average heights than average, but probably not much different from those born in peasant economies. The variable «milk country», signaling departments with a possible surplus of milk (according to the stock of milk cows per inhabitants reported to the census), proved not significant. Probably, an important proportion of milk production in rural areas went to supply urban areas, not benefiting directly the nutrition of those areas that produced the milk. It is also possible that milk-producing areas overlapped with other conditions (cattle areas, low infant mortality, high proportion of immigration, etc.) so that this effect is already captured by other variables.

Was Argentina in the 1920s a country divided into two in terms of nutritional and health standards? The introduction of regional dummies in regressions 18 and 22 tend to confirm Palacios' indictment against the *porteño* elite for keeping the «interior» in a situation of abandonment, poverty and malnutrition. After all other important quantifiable factors had been considered, recruits born in the Pampa region were 1.5 cm taller than those born outside the region. This estimation should be considered conservative in the light of other estimates published earlier. The Center region (Cordoba, San Luis and La Rioja) and Cuyo (Mendoza and San Juán) showed non-significant differences from the Pampa. Recruits born in the Northwest (the region that Palacio visited in 1943-44) were 2.7 cm shorter in average. Something similar could be said about the Northeast: these

29. Commonly, tenant farmers left the land ready for pasture at the end of their three-year contract. For this reason, it is difficult to identify «purely pastoral» regions within the Pampa region.

recruits were 1.5 cm shorter. Perhaps there were two Argentinas after all, but they do not seem to coincide too closely with Palacios' mental map.

With regard to the overall fit of this cross-section model, one thing is clear. The three most robust variables in explaining spatial differences in net-nutrition (at the level of departments) are: 1) being born in the Northwest or in the Northeast; 2) growing up in urban environments; and 3) having access to the railroad network; in this order. The first condition had a negative effect on average heights, while the other two tended to increase average stature. Low infant mortality is also correlated with higher adult stature in most of the regressions of the model, but this key indicator of disease risk is correlated with urbanization (condition 2). In addition, basic literacy continues to show a small but consistent positive effect on stature. Regression results do not improve much when we include variables reflecting land concentration and accessibility to land property to the model. Variables such as «minifundia», «large farms», and «foreign-owned real estate» take away some explanatory power from the dummies representing type of economic activity or land use (Regressions 19 and 20). Only «goat country» remains significant, indicating the strong difference of the peasant economies of the deep interior of Argentina in relation to the humid Pampa.

Similarly, when we include in the regressions our earlier indicators of transportation facilities, urbanization, literacy, and disease environment, the coefficients of the variables for type of economic activity cease to be significant (see regression 21). More robust factors such as literacy, infant mortality, access to railways, and degree of urbanization seem to capture better differences in biological welfare across districts. Yet still, there remain some factors not captured but our model. A more refined model is required to explain the net-nutrition difference between people born in the Pampa region (better) and those born in the Northwest or in the Northeast (worse). Railroad improvement, urbanization, literacy and infant mortality are not sufficient to describe the differential in biological well-being attained by these two areas.

7. CONCLUSIONS

Regression results show the importance of continued research on these hypotheses. Some indicators proved significant and robust. Among them are: urbanization, transportation improvements, land concentration, type of crop, and region of origin.

Urbanization had a net positive impact upon the biological welfare of young men recruited into the army. This evidence does not support the hypothesis of «urban dis-

amenities». The positive income and employment effect of cities seems to have prevailed over the negative effect of crowded tenements, epidemics, and bad quality food. The efforts made by hygienist reformers in changing the sanitary conditions of major cities may have facilitated this result. Before 1920, Buenos Aires city made important progress in terms of water drainage, sewage, garbage collection, and vaccination at schools. Moreover, during most of the mass immigration period, newcomers were medically inspected and quarantined before allowed into the country. Small and medium-sized cities, where much of the internal migration went before 1920, could offer employment and income without the cost of negative externalities.

Similarly, economic integration through railroad construction had a positive effect on the stature of Argentine recruits. We cannot say at this point if this was the effect of lower transportation costs or the effect of informational advantages associated with a more integrated national market. There are reasons to believe that further construction of railroad lines in the same department deteriorated living conditions. Schooling seems to have had an ambivalent effect on human welfare. While leveling differences of capabilities (in terms of literacy), schools became, in areas recently incorporated into the educational system, vehicles for the diffusion of disease. Similarly, the important question of whether immigrants crowded-out labor markets cannot be easily ascertained, as immigrants settle mostly in the grain belt, the richest and also the wealthiest area of the country.

Lack of access to property, even within the territory of «grain country», produced negative biological effects. Perhaps the traditional view that tenant farmers saved (for the future purchase of the land) at the cost of great privations to their families is not equivocal. Tenancy, sharecropping, and other short-term contracts produced less investment per hectare and less bargaining power at the time of fixing prices. Both factors, in addition to the use of child labor, imposed a heavy welfare cost on farmers' families. Land concentration and sub-division had also an effect on average heights. Small-scale holdings, usually below the minimum required for efficient production, were associated with lower men heights. The influence of this variable (Minifundia) cannot easily be separated from other characteristics of peasant economies. The same could be said about the importance of middle-sized and large farms: their presence was associated with higher standards of biological wellbeing.

More research is needed regarding the influence of different types of economies—and their food regimes—on net nutrition. In principle, results show that peasant production generated a deficiency of nutrients as compared with more market-oriented and capitalized agrarian economies. Conversely, grain cultivation, probably combined with cattle-raising, created conditions of better nutrition and health among the young. Sugar economies,

which combined both agrarian and industrial production, produced the opposite result: shorter stature and, consequently, lower standards of health and nutrition. Our intuitive understanding of the different income-distribution regimes associated with distinct types of production (sugar economies being more exploitative and less egalitarian than grain farming) appears to be confirmed by this evidence.

The results of this investigation into the question of regional disparities of biological welfare in Argentina are quite encouraging. Large differences in net nutrition separate the condition of living of the inhabitant of the Pampa region from that of his compatriot from the interior provinces. Provinces located far from Buenos Aires lagged behind the center of the export economy in terms that compare to the difference between a mature developed economy and an undeveloped one. In many cases, lower average height coincided with greater inequality within the interior provinces; in the Humid Pampa, the distribution of human welfare was more even[30].

These results demonstrate that stature can be used in evaluating regional differences in welfare. In the future, we need to compare the ranking of heights with other indicators of disease, mortality, income, unemployment and poverty to assess the overall the performance of average heights. The big question remains: are lower heights the result of injuries to health or of food deficiencies? Until we are able to estimate food surpluses by department and evaluate the different dietary regimes, we will not be able to answer this question properly. Nevertheless, our estimates have underscored the importance of the regional differences in net nutrition. In the 1920s, there were important differences in stature among provinces, among departments within each province, as well as across regions. The difference between the Pampa region and Salta-Jujuy was more significant that historians have so far acknowledged. These two regions may as well have belonged to two different countries.

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30. The position of the Patagonian provinces is remarkable: while one of them ranks amongst the first, the other three provinces are among the worst cases of malnutrition and inequality.

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APPENDIX

Regression Results (WLS)

Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Intercept	167.16*	165.35*	165.35*	164.4*	164.4*	164.5*	163.26*	162.0*	162.4*	169.9*	169.2*	164.8*
	-1,031	-705	-704	(631.5)	(635.1)	(631.3)	(272.3)	(263.5)	(270.4)	(601.3)	(300.3)	(256.7)
Railways / sq km	0.138*	0.073										
	(2.92)	(1.69)										
Railways / inhabitants	0.580	-0.12*	-0.120*	-0.10*		-0.09*		-0.09				
	(1.23)	(-2.56)	(-2.63)	(-2.19)		(-2.09)		(-1.66)				
Railway connection		0.463*	0.475*	0.39*	0.352*	0.385*		0.378*	0.306*			0.279*
		(9.91)	(10.26)	(8.45)	(8.31)	(8.33)		(6.84)	(6.51)			(6.42)
Urban				0.317*	0.317*	0.305*			0.182*			0.151*
				(6.92)	(7.14)	(6.7)			(3.38)			(3.02)
Provincial capital				-0.09	-0.094*			-0.03				
				(-1.93)	(-2.16)			(-0.67)				
Big city				0.002		-0.06						
				(0.35)		(-1.43)						
Schooling							-0.23*	-0.17*	-0.20*			-0.12*
							(-4.74)	(-3.57)	(-4.33)			(-2.8)
Basic literacy							0.491*	0.386*	0.306*			0.247*
							(9.96)	(7.89)	(5.63)			(4.83)
General mortality										-0.16*	-0.22*	-0.096*
										(-3.15)	(-4.04)	(-2.08)
Infant mortality (prop)											-0.095	
											(-1.77)	
Infant mortality (rate)										-0.40*		-0.28*
										(-8.9)		(6.1)
N=	443	443	443	444	444	444	323	323	323	344	334	323
Adj.R2=	0.02	0.20	0.19	0,26	0.26	0.26	53.7	35.0	47.15	44.8	11.1	47.0
F=	5.07	36.85	53.6	32.9	52.6	40.0	0.25	0.35	0.36	0.20	0.06	0.46

Weighted Least Squares

Source: Own database. Height data: López (1948). Other variables from National Population Census 1914, «Estadísticas Agrícolas 1922-1926», and «Anuario Estadístico Provincia de Buenos Aires, 1924».

T-statistic in parenthesis

* Significant at 99% of confidence

Regression Results (continues)

Independent Variable	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
Intercept	166.6*	165.2*	171.4*	171.5*	168.4*	168,4*	167.4*	170.8*	168.5*	169.2*
	(763.6)	(257.6)	(344.6)	(316.1)	(241.5)	-199,6	(851.5)	(357.9)	(175.1)	(233.5)
Minifundia (<25 ha)			-0.55*	-0.58*	-0.42*	-0,03*		-0.375*	-0.441*	-0.03*
			(-10.9)	(-11.03)	(-9.8)	(-8,21)		(-6.62)	(-7.98)	(-6.42)
Large farms (>500 ha)			0.261	-0.05	0.124*	0,02*		0.195*	0.16*	0.02*
			(4.7)	(-1.06)	(3.08)	-3,97		(3.52)	(3.65)	(4.2)
Average land-size (agric)				-0.04						
					(-0.73)					
Non-Owner			-0.16*	-0.13*	-0.22*	-0,04*		-0.163*	-0.24*	-0,02*
(tenant or sharecropper)			(-3.4)	(-2.71)	(-5.34)	(-6,02)		(-3.62)	(-5.56)	(-4,15)
Railway connection		0.241*			0.211*	1,6*			0.216*	1,56*
		(.5.5)			(5.43)	-5,18			(5.06)	(5.54)
Urban (scale 0-1)		0.092			0.197*	2,47*			0.196*	1.84*
		(1.79)			(4.47)	-4,13			(3.78)	(3.09)
Big city							0.114*		0.028	0.36
							(2.69)		(0.64)	(0.55)
Schooling (scale 0-1)		-0.07			-0.06	-0,69			-0.08	-0.25
		(-1.61)			(-1.54)	(-1,27)			(-1.87)	(-0.51)
Basic literacy		0.142*			0.213*	0,03*			0.20*	0,02
		(2.45)			(4.64)	-2,49			(3.8)	(1.80)
General mortality		-0.09*			-0.04					
		(-1.99)			(-0.89)					
Infant mortality (rate)		-0.25*			-0.24*	-0,03*			-0.093*	-0.01*
		(-5.4)			(-5.85)	(-2,36)			(-2.31)	(-5.15)
Capital Federal						0,45				
						-0,22				
Pampa Region						1,49*				
						-4,81				
Grain Country							0.263*	0.124*	0.36	
							(6.0)	(2.6)	(0.7)	
Cattle Country							0.063	0.005	0.044	
							(1.38)	(0.1)	(1.0)	
Goat Country							-0.34*	-0.30*	-0.08	0.11
							(-7.73)	(-7.13)	(-1.8)	(0.34)
Sugar-cane Country							-0.12*	-0.09*	-0.06	0.79
							(-2.91)	(-2.3)	(-1.4)	(1.81)
Milk Country							0.018	0.039	-0.01	-0.01
							(0.39)	(0.87)	(-0.27)	(-0.04)
Center Region										-0,44
										-(0.33)
Northwest										-2.70*
										(-7.13)
Cuyo										-0,40
										(-0.95)
Northeast										-1.55*
										(-3.58)
Immigrant population (%)	0.148*	0.045								
	(2.9)	(1.01)								
Land owned	0.106*	0.211*								
by foreigners (%)	(2.08)	(3.3)								
N=	445	323	445	346	323	311	445	445	445	445
F=	10.6	38.5	41.3	32.8	52.4	43.7	25.3	26.1	28.8	36.5
Adj. R2=	0.05	0.48	0.21	0.27	0.59	0.57	0.25	0.31	0.54	0.63

DEFINITION OF VARIABLES

Railways / sq km = number of railway stations per 50 square km (1925).
Railways / inhabitant = number of railway stations per 1,000 inhabitants (1925).
Railway connection = dummy variable for railway connection for each department (1925).
Urban = proportion of urban population in each department (scale 0-1).
Provincial capital = dummy variable (1 for capital city of a province, 0 otherwise).
Big city = dummy variable (1 for cities with 50,000 inhabitants or more, 0 otherwise).
Schooling = proportion of children 6 to 14 enrolled in schools (scale 0-1).
Basic literacy (adult) = percentage of voters who know how to read (not necessarily to write).
General mortality = general mortality rate, total deaths per 1,000 inhabitants.
Infant Mortality (prop) = proportion of child deaths (less than 3 year) to total deaths.
Infant Mortality (rate) = child deaths (less than 1 year-old) per 1,000 children born alive.
Land owned by foreigners = percentage of proprietors of real estate who are foreign-born (1914).
Minifundia (agric) = percentage of agricultural units (farms) less than 25 has (1914).
Large farms (agric) = percentage of agricultural units (farms) over 500 has (1914).
Average land-size (agric) = average size of agricultural units in has (1914).
Non-owners (%) = percentage of agricultural units (farms) operated by non-owners, i.e. tenants, sharecroppers or other, (1914).
Grain Country = dummy variable (1 if department shows more than 1.5 hectares per inhabitant cultivated with cereals, 0 otherwise), 1914.
Cattle Country = dummy variable (1 if department shows more than 3 heads of cattle per inhabitant, 0 otherwise), 1914.
Goat Country = dummy variable (1 if department shows more than 2 goats per inhabitant, 0 otherwise), 1914.
Sugar Country = dummy variable (1 if department shows more than 25 has cultivated with sugar cane or has a sugar «ingenio»), 1914 and 1925.
Milk Country = dummy variable (1 if department shows more than 0.5 milk cows per inhabitant, 0 otherwise), 1914.
Northwest = dummy variable (1 if department is located in Santiago del Estero, Tucumán, Catamarca, Salta or Jujuy; 0 otherwise).
Center Region = dummy variable (1 if department is located in San Luis or La Rioja; 0 otherwise).
Cuyo = dummy variable (1 if department located is in San Juan or Mendoza; 0 otherwise).
Pampa Region = dummy variable (1 if department is located in Buenos Aires, Santa Fe, Córdoba, Entre Ríos or La Pampa; 0 otherwise).
Northeast = dummy variable (1 if department is located in Corrientes, Misiones, Chaco or Formosa; 0 otherwise).