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HAMBRE Y MALNUTRICIÓN EN LA ESPAÑA DE FRANCO. UN BALANCE ANTROPOMÉTRICO**José M. Martínez Carrión[†] y Javier Puche[§]**

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RESUMEN

En este trabajo se examinan los efectos del hambre y de la malnutrición en los niveles de vida biológicos de los españoles durante la autarquía franquista. Con datos de estaturas adultas, principalmente de los hombres adolescentes disponibles en los registros del reclutamiento militar, se analiza la evolución de la nutrición neta. Presenta un balance de historia antropométrica que muestra la variabilidad de las alturas en diferentes partes de la geografía española. Los resultados ponen de manifiesto que el incremento de la altura de los adolescentes observado durante el primer tercio del siglo XX se truncó con la Guerra Civil (1936-39) y disminuyó en la década de 1940. El deterioro del estado nutricional fue más severo que en otros países europeos que sufrieron hambrunas durante la Segunda Guerra Mundial. La caída de la altura promedio de los reclutas se prolongó hasta 1947 y en algunas zonas rurales del interior hasta 1953. Se aprecian importantes diferencias regionales, dentro de un mismo territorio y por grupos socioeconómicos. Recientes estudios documentan un incremento de las brechas rural-urbano y de las desigualdades sociales, incluyendo diferencias socioeconómicas dentro de las grandes urbes, entre barrios ricos y pobres, que desvelan la magnitud de la crisis nutricional.

Palabras clave: estatura, estado nutricional, bienestar biológico, desigualdad, autarquía franquista, España.

ABSTRACT

This paper examines the effects of hunger and malnutrition on the biological standards of living of the Spanish during the Francoist autarky. With data on adult heights, mainly of adolescent men available in the military recruitment records, net nutrition is analysed. It presents a balance of anthropometric history that shows the variability of the heights in different parts of the Spanish geography. The increase in adolescent height observed during the first third of the 20th century was truncated during the Civil War (1936-39). Average height decreased in the 1940s. The deterioration in nutritional status was more severe than in other European countries who suffered famines during the World War II. The drop in the average height of the recruits lasted until 1947 and in some rural areas of the interior until 1953. There are important regional differences, within the same territory and by socioeconomic groups. Recent studies show an increase in rural-urban and social gaps, including differences within large cities, between rich and poor neighbourhoods, which reveal the magnitude of the nutritional crisis.

Keywords: height, nutritional status, biological well-being, inequality, Francoist autarky, Spain.

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FAMINE AND MALNUTRITION IN FRANCO'S SPAIN. AN ANTHROPOMETRIC BALANCE¹

1.- Introduction

The famine that prevailed in Franco's Spain through the 1940s has attracted new interest in the recent historiography². It is considered the worst food catastrophe in the twentieth century Spanish and one of the severest famines in Europe of this century. The post-war famine has also proved a highly controversial issue (on one hand, to determine the magnitude of the generalized shortage of food in this period; and on the other hand, to evaluate the level of efficiency of the food and welfare policies carried out by the Franco dictatorship; those policies were established to deal with situations of hunger and poverty), and specialists are beginning to discover its hidden costs and true scale.

For decades, historians have unanimously agreed on the devastating economic consequences of the autarkic policies pursued during the early years of the Franco regime. A host of studies reveal the reduction in agricultural and industrial production, in foreign trade and investment and, most of all, in per capita income and consumption³. They also demonstrate the deterioration in education levels and labour skills⁴. However, the debate remains on the effects that the greater economic depression exercised on standards of

¹ Funding: This paper has received financial support from the Ministry of Science, Innovation and Universities of Spain, project PID2020-113793GB-I00, PGC2018-095529-B-I00, the Ministry of Economy and Competitiveness of Spain, project HAR2016-76814-C2-2-P, the Ministry of Science and Innovation of Spain, project PID2019-109470GB-I00, Interreg-Sudoe project VINCI-SOE3/P2/F0917 (FEDER-European Union), the Government of Aragon, through the Research Group 'S55_20R', the European Regional Development Fund (FEDER) 'Building Europe from Aragon', and the Ministry of Science, Innovation and Universities of Spain, Research Network RED2018-102413-T.

² Miguel Ángel del Arco Blanco (ed.), *Los 'años del hambre'. Historia y memoria de la posguerra franquista* (Madrid: Marcial Pons, 2020). See also Carlos Barciela, 'Los años del hambre', in *España en crisis. Las grandes depresiones económicas, 1348-2012*, eds. Enrique Llopis and Jordi Maluquer de Motes (Barcelona: Pasado y Presente, 2013), 165-92.

³ On the turning point caused by the Civil War and Franco's autarky in the evolution of the macroeconomic magnitudes, see Leandro Prados de la Escosura and Blanca Sánchez-Alonso, *Economic Development in Spain, 1815-2017* (Oxford: Oxford University Press, 2020); Jordi Maluquer de Motes, *España en la economía mundial. Series largas para la economía española (1850-2015)* (Madrid: Instituto de Estudios Económicos, 2016) and Albert Carreras and Xavier Tafunell, *Entre el imperio y la globalización: Historia económica de la España contemporánea* (Barcelona: Crítica, 2018).

⁴ Clara Eugenia Núñez, 'El capital humano en el primer franquismo', in *Autarquía y mercado negro. El fracaso económico del primer franquismo*, ed. Carlos Barciela (Barcelona: Crítica, 2003), 27-53.

living, nutrition and health as well as their most important consequences on hunger, poverty and deprivation⁵.

This paper examines the effects of Francoist autarkic policy, the economic depression it produced and the effects on the nutritional levels of the Spanish population. It adopts a historiographic balance from anthropometric history perspective and uses adult height as the principal indicator of net nutrition. It also explores how diet and height varied across different parts of Spain and across different social classes. The study of the evolution and cycles of human height is one of the most significant fields of research in economic history⁶. For four decades, anthropometric history has developed on a global scale. Its principal objective is to analyse the impact of socio-economic processes, or the environmental transformations and conditions of inequality generated by these processes, on the size and measurements of the human body⁷. In Spain, anthropometric history has grown more prominent over the last decade through more than a hundred studies that cover the last three centuries. Studies of the effects of the Franco regime on biological standards of living have proliferated in recent years, particularly those discussing the impact of autarkic policy and the territorial and socio-economic dimensions of the famine. This paper reveals important findings drawn from data for adult height, mainly from men, found in military conscription records. Regarding the used source, it should be noted for instance that the Civil War (1936-9) was fought in both sides with troops recruited in a forced manner and under close disciplinary surveillance, based on the latest studies⁸. The mobilization of volunteers in both sides did not meet their demands. Moreover, there were almost unknown episodes of desertion, defection, or self-mutilation to avoid recruitment, which were more generalized phenomena than the estimations of historiography. The possible distortions caused by the war were dissipated with the beginning of the Franco dictatorship, which resumed the traditional forms of military recruitment (enlistment and measurement of young men when they were 21 years old). The results show that the reduction in adult height was severe and more prolonged over time than in other European countries during the famines of the Second World War. The deterioration of biological well-being reached its peak in the mid-1940s, extending across a good part of the country until 1953. Significant regional differences can be appreciated, and the territorial and socio-economic inequalities increased, revealing the magnitude of the nutritional crisis.

⁵ Vicente Pérez Moreda, David-Sven Reher and Alberto Sanz Gimeno, *La conquista de la salud. Mortalidad y modernización en la España contemporánea* (Madrid: Marcial Pons, 2015); Arco Blanco, *Los 'años del hambre'*.

⁶ John Komlos and Inas R. Kelly (eds), *The Oxford Handbook of Economics and Human Biology* (Oxford: Oxford University Press, 2016).

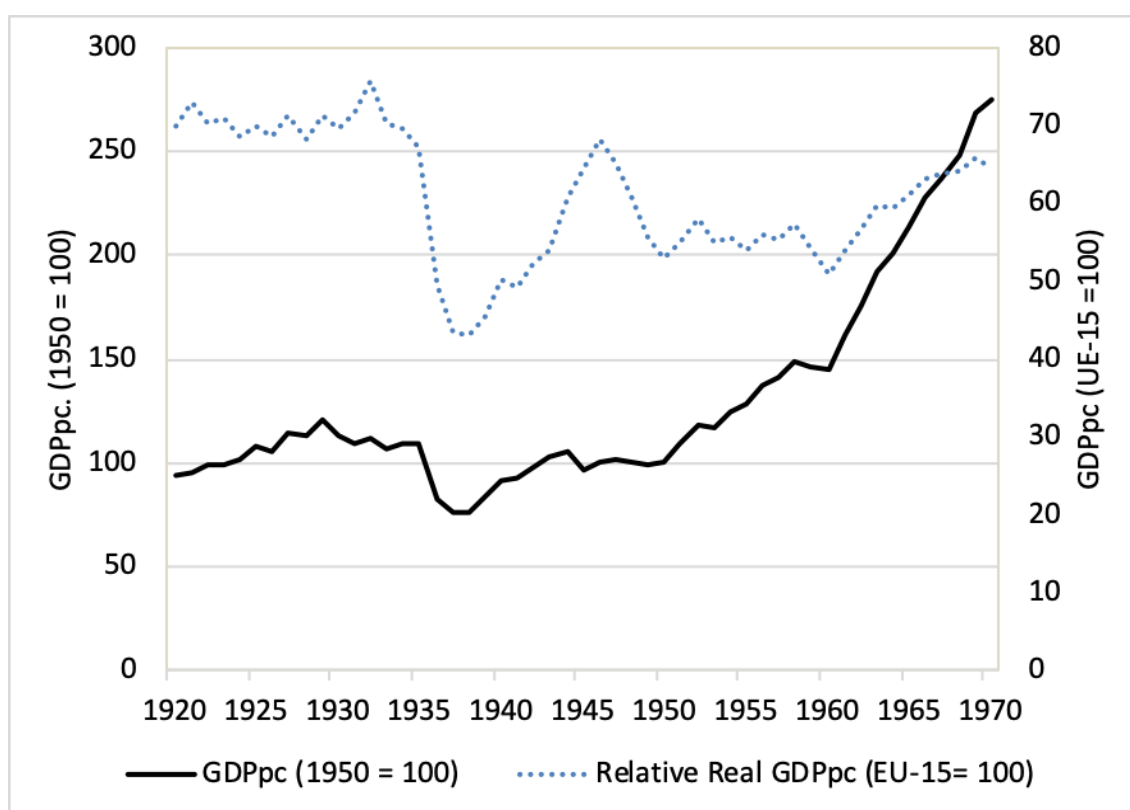
⁷ For recent overviews of anthropometric history and its principal debates on the cycles, see Richard H. Steckel, 'Anthropometrics', in *Handbook of Cliometrics*, eds. Claude Diebolt and Michael Hauptert (Berlin: Springer-Verlag, 2019), 1153–71.

⁸ James Matthews, *Soldados a la fuerza. Reclutamiento obligatorio durante la Guerra Civil 1936-1939* (Madrid: Alianza Editorial, 2013).

2.- The economic context of the famine and its effects on height

At the end of the Civil War (1936–9), Spain lay immersed in a profound economic depression that caused serious problems in the production and distribution of food. The principal indicator of wealth, GDP per capita, decreased considerably during the war years and experienced a prolonged slump until 1951, according to the estimates made by Leandro Prados de la Escosura (2016, 2017). The GDP and GDP per capita levels of 1935 were not reached again until 1952, and the 1929 levels were not reached until 1954 (Figure 1). Spaniards lost almost two decades in terms of their economic standard of living. Spain's relative real GDP per capita in a European comparative perspective lagged very far behind. After the collapse caused by the Civil War, the relative recovery of the Spanish economy between 1940 and 1945, shown in Figure 1, could be explained by the problems experienced in the main European economies born from their participation in the Second World War. Subsequently, in the 1950s, Spain's GDP per capita was at around 55 per cent of the average for Western Europe⁹.

Figure 1. GDP per capita in Spain in 1991 (1950 = 100), and Spain's relative real GDP per capita in a European comparative perspective (EU 15 = 100), 1920–70.

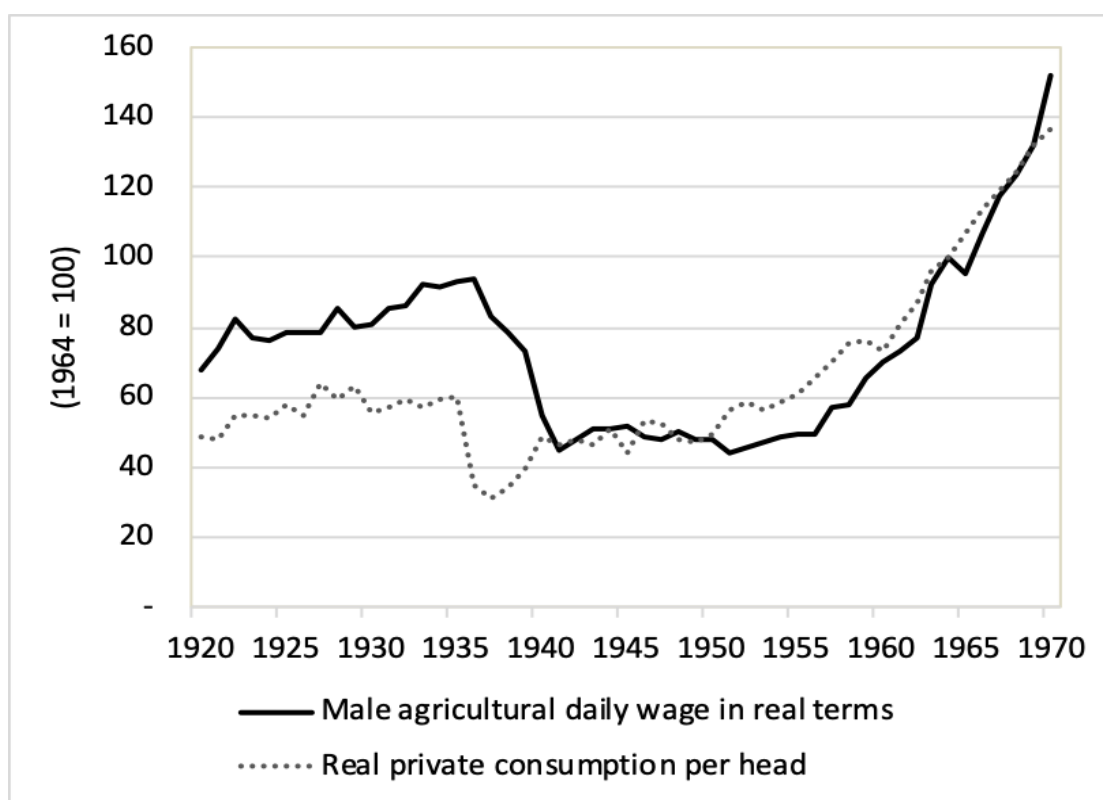


Source: GDP per capita in 1991 Geary-Khamis US\$, Leandro Prados de la Escosura, *Spanish Economic Growth, 1850–2015* (London: Palgrave Macmillan, 2017). The database, in its updated version until 2019, is freely accessible at <https://espacioinvestiga.org/bbdd-chne/>. Data on Spain's relative real GDP per capita (EU 15 = 100), Albert Carreras and Xavier Tafunell, *Entre el imperio y la globalización: Historia económica de la España contemporánea* (Barcelona: Crítica, 2018), pp. 463–6.

⁹ Carreras and Tafunell, *Entre el imperio y la globalización*, 35-7.

The principal economic indicators show a similar evolution in income. The gross formation of fixed capital, which we would normally call investments, fell spectacularly and recovered again in the mid-1950s. Real private consumption per capita dipped sharply and did not recover until 1956¹⁰. As a result of the steep rise in inflation prevailing since 1940, which reached a rate of 29.9 per cent in that year and 31.2 per cent in 1946¹¹, together with the meagre growth in nominal wages, the loss of purchasing power was tremendous. The real wage data estimated by Jordi Maluquer de Motes (2005) for agriculture are illustrative and reveal a deterioration in the standard of living for the agricultural population of almost 50 per cent during the autarkic period. In real terms, the wage levels of 1936 were not reached again until 1964 (Figure 2).

Figure 2. Male daily agriculture salary in real terms and real private consumption per capita (1964 = 100).



Source: Male daily agricultural salary in real terms. In Jordi Maluquer de Motes and Montserrat Llonch, ‘Trabajo y relaciones laborales’, *Estadísticas históricas de España*, cords. Albert Carreras and Xavier Tafunell (Bilbao: Fundación BBVA, 2005): Table 15.21, 1221. Real private consumption per capita in Leandro Prados de la Escosura, *Spanish Economic Growth, 1850–2015* (London: Palgrave Macmillan, 2017). <https://espacioinvestiga.org/bbdd-chne/>.

The persistence of the economic depression until the beginning of the 1950s was reflected in nutrition. The study by Demetrio Casado (technical secretary of Cáritas

¹⁰ Jordi Maluquer de Motes, *La economía española en perspectiva histórica* (Barcelona: Pasado & Presente, 2014), Apéndice A.3, 626–7.

¹¹ Jordi Maluquer de Motes, *La inflación en España. Un índice de precios de consumo, 1830-2012* (Madrid: Banco de España, 2013).

Nacional)¹², *Perfiles del hambre* (1967), highlighted, the nutritional problems that afflicted Spaniards and indicated that in Spain in the 1940s ‘there were widespread cases of hunger with their resulting effects of morbidity and mortality’¹³. Although the food problems ‘were not assessed globally in scientific and precise terms’, Casado’s analysis drew on abundant news articles and data on the nutritional problems observed in those years by many specialists. The historiography of science and medicine has highlighted the construction of a ‘hunger neurology’, revealing avitaminosis and the diseases of almost epidemic proportions suffered by the population between 1936 and 1947¹⁴. Considered as the first bromatological and food sociology research projects in Spain, particularly noteworthy are those by Francisco Grande Covián and his team from 1939¹⁵, Francisco Vivanco, Gregorio Varela and Olga Moreiras from the mid-1950s¹⁶ and those of Alfonso García Barbancho in around 1960¹⁷.

The great food depression of the 1940s is confirmed in the recent estimates of the consumption of energy and nutrients. All of the calculations highlight the scale of the nutritional crisis suffered by the Spanish population between 1936 and 1950. The recovery was slow and late (from around 1955), but was not complete until the end of the 1960s. The official estimates of national bodies (Ministry of Agriculture) and international organizations (FAO) and different groups of historians¹⁸ certify the impact of the extraordinary dimension of the food depression (Figure 3). The data are irrefutable: the reduction in the intake of calories, proteins and lipids per inhabitant per day was

¹² Caritas Española was an institution created in 1947 by different Catholic charity organizations and Acción Católica Española. Its objective was to provide charity and welfare and it became independent from Acción Católica in 1957.

¹³ Demetrio Casado, *Perfiles del hambre. Problemas sociales de la alimentación española* (Madrid: Ed. Cuadernos para el Diálogo, 1967).

¹⁴ María Isabel Cura and Rafael R. Huertas, *Alimentación y enfermedad en tiempos de hambre. España 1937-1947* (Madrid: CSIC, 2007). Josep Bernabeu and Josep L. Barona (eds), *Nutrición, Salud y Sociedad. España y Europa en los siglos XIX y XX* (València: Seminari d’Estudis sobre la Ciència/Universitat de València, 2011).

¹⁵ On the studies by Grande Covián, see Jesús Manuel Culebras, ‘Grande Covián y la malnutrición infantil en la Guerra Civil Española’, *Nutrición Hospitalaria* 30, no. 3 (2014): 695–8.

¹⁶ Gregorio Varela, Olga Moreiras-Varela and Concepción Vidal, ‘Niveles de nutrición en las diferentes regiones y estratos sociales’, *Anales de Bromatología* 17 (1965): 163–237; a systematic review can be found in Josep Bernabeu-Mestre, Ureña Alberola María T., Esplugues Pellicer Josep Xavier, Eva María Trescastro-López, María Eugenia Galiana-Sánchez and Isabel Castelló Botía, ‘Las ciencias de la nutrición en la España de la segunda mitad del siglo XX: estudio bibliométrico descriptivo de la revista *Anales de Bromatología* (1949-1993)’, *Nutrición Hospitalaria* 27, Suppl. 2 (2012): 18–25.

¹⁷ Alfonso García Barbancho, ‘Análisis de la alimentación española’, *Anales de economía* 66 (1960): 72–119; and 67 (1960): 271–363.

¹⁸ Xavier Cussó and Ramon Garrabou, ‘La transición nutricional en la España contemporánea: las variaciones en el consumo de pan, patatas y legumbres (1850-2000)’, *Investigaciones de Historia Económica* 7 (2007): 69–100; Josep Pujol and Xavier Cussó, ‘La transición nutricional en la Europa occidental, 1865-2000. Una nueva aproximación’, *Historia Social* 80 (2014): 133–55; Manuel González de Molina, David Soto Fernández, G. Guzmán Casado, Juan Infante Amate, E. Aguilera Fernández, J. Vila Traver and R. García Ruíz, *Historia de la Agricultura española desde una perspectiva biofísica, 1900-2010* (Madrid: Ministerio de Agricultura y Pesca, Alimentación y Medio Ambiente. Secretaría General Técnica, 2019).

alarming until 1947¹⁹. Milk and lactic products, animal proteins which are fundamental for children's growth, were scarce. These products did not constitute a principal element of the diet until the 1960s²⁰. Together with the supply problems, agricultural restrictions and macroeconomic conditions, there were also problems of demand: the low household incomes. However, even when the economy and consumption recovered at the beginning of the 1960s, the increase in the relative price of milk cancelled part of the income effect derived from the rapid economic growth. Consumers displayed a fairly passive response to their growing purchasing power. In 1961, the per capita consumption of milk was much lower than in Greece or Italy. Within the wider European context, Spain consumed more milk than only Portugal, and its consumption of lactic products was much lower than that of Western Europe²¹. Spain did not close the gap with the European consumption pattern of lactic products²² or the large differences found between the large cities and the small towns and between regions until the 1980s²³.

¹⁹ M^a Dolores Marrodán, Pilar Montero and Mohamed Cherkaoui, 'Transición nutricional en España durante la historia reciente', *Nutrición Clínica y Dietética Hospitalaria* 32, Suppl. 2 (2012): 55–64.

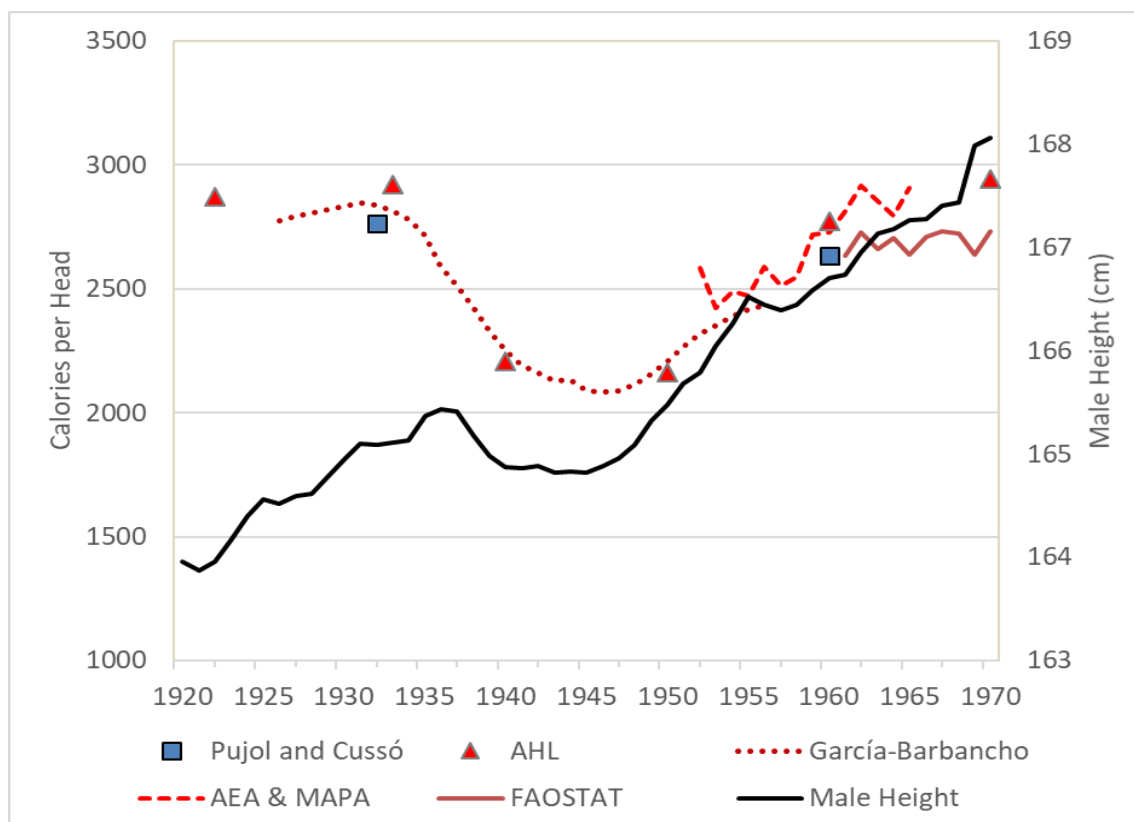
²⁰ Fernando Collantes, 'La evolución del consumo de productos lácteos en España, 1952-2007', *Revista de Historia Industrial* 55 (2014): 103–34.

²¹ Fernando Collantes, 'Nutritional transitions and the food system: expensive milk, selective lactophiles and diet change in Spain, 1950-65', *Historia Agraria* 73 (2017): 119–47.

²² Fernando Collantes, 'Más allá de los promedios: patrones de segmentación del consumo de productos lácteos en España, 1964-2006', *Investigaciones de Historia Económica* 11, no. 2 (2015): 103–15.

²³ Ismael Hernández Adell, Francisco Muñoz-Pradas and Josep Pujol-Andreu, 'A New Statistical Methodology for Evaluating the Diffusion of Milk in the Spanish Population: Consumer Groups and Milk Consumption, 1865–1981', *Investigaciones de Historia Económica* 15, no. 1 (2019): 23–37.

Figure 3. Calories available for consumption per capita per day and male height by draft date in Spain, 1920–70.



Source: Estimates for calories per capita per day are based on (a) Josep Pujol and Xavier Cussó, ‘La transición nutricional en la Europa occidental, 1865-2000. Una nueva aproximación’, *Historia Social* 80 (2014): 133–55; (b) AHL (Agroecosystems History Laboratory at the University Pablo de Olavide, Seville) and Manuel González de Molina, David Soto Fernández, G. Guzmán Casado, Juan Infante Amate, E. Aguilera Fernández, J. Vila Traver and R. García Ruíz, *Historia de la Agricultura española desde una perspectiva biofísica, 1900-2010* (Madrid: Ministerio de Agricultura y Pesca, Alimentación y Medio Ambiente. Secretaría General Técnica, 2019); (c) Alfonso García Barbancho, ‘Análisis de la alimentación española’, *Anales de Economía* 66 (1960a): 72–119; and 67 (1960b): 271–363; (d) *Anuario de Estadística Agraria*, Ministerio de Agricultura, Pesca y Alimentación (AEA-MAPA); (e) *FAO statistical database* (FAOSTAT). Male height: 1900–68, East-Levant Sample in José Miguel Martínez-Carrión and Javier Puche, ‘La evolución de la estatura en Francia y en España, 1770-2000. Balance historiográfico y nuevas evidencias’, *Dynamis* 31, 2 (2011): 153–76; from 1969 (Statistics INE – Ministry of Defence). The data were estimated using three-year centred moving averages.

Nutritional deficiencies prevailed until the end of the 1960s, despite the improvements in the standard of living at the beginning of this decade. Almost thirty scientific studies on the diet of the Spanish population published in ‘*Anales de Bromatología*’, between 1958 and 1966, and surveys published in other journals indicated the very low intake of calories and animal proteins and the deficit of vitamins, calcium and nicotinic acid. The results revealed significant nutritional inequality between social groups until the 1960s²⁴. We cannot say that there was institutional passivity towards the

²⁴ Varela, Moreiras and Vidal, ‘Niveles de nutrición en las diferentes regiones y estratos sociales’, 163–237; María Tormo-Santamaría, Eva María Trescastro-López, María Eugenia Galiana-Sánchez, Mercedes Pascual-Artiaga and Josep Bernabeu-Mestre, ‘Malnutrición y desigualdades en la España del desarrollismo: las encuestas rurales de alimentación y nutrición’, *Nutrición Hospitalaria* 35, Extra-5 (2018): 116–22.

deterioration of the nutritional status. Making a virtue out of necessity by optimizing the scarce resources was the objective of many families and institutions, focused on nutritional and gastronomic education²⁵. But the nutritional problems persisted into the 1950s and continued even in the following decade. In 1971, a substantial and well-evidenced report authored by Gregorio Varela, a prestigious nutritionist who was the first president of the Spanish Society of Nutrition created in 1978, raised the alarm about the situation: ‘The most absolute anarchy exists in this sector (nutrition). The great importance of nutrition has not been acknowledged by the national leadership and less so by the Government.’²⁶.

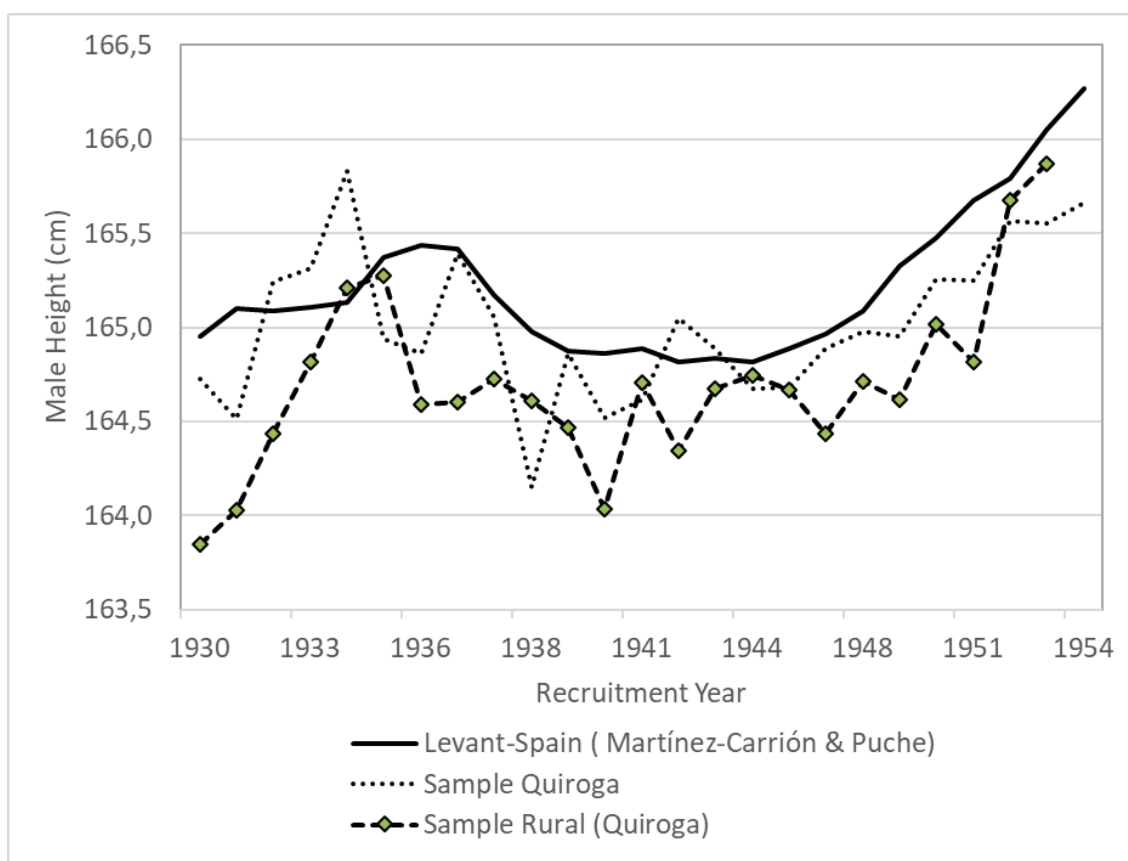
Within this historical context, the average height of Spaniards decreased²⁷. A consensus had emerged from a number of research projects carried out with different national and regional samples that the effects of the war and the post-war period were disastrous for the biological standard of living and the nutritional health of the majority of Spanish society. According to José Miguel Martínez-Carrión and Javier Puche, the average height of the conscripts of a wide sample of the Eastern Mediterranean region of Spain recorded a decrease of at least 1 centimetre (Figures 2 and 3). The highest average of 1936 was not reached again until the draft of 1950. For the country as a whole, and based on the sampling carried out by Gloria Quiroga on a national scale with data of conscripts, the highest height obtained in 1934 was not reached again until the mid-1950s. The estimates made by this author reveal a reduction of 1.5 centimetres between 1934 and 1938, in the epicentre of the Civil War, and a deterioration that lasted until 1946. The physical height of Spaniards, in general, decreased for at least a decade. We cannot say that the reduction in male height was spectacular, but the slump observed in the height of the conscripts from 1936 to 1947 reveals the nutritional deficiencies and the size of the Spanish famine during the years of the Civil War and, most of all, during Franco’s autarchy of the 1940s (Figure 4).

²⁵ This was visible in the attitude of the new institutions created in response to the nutritional crisis, see María Tormo-Santamaría and Josep Bernabeu-Mestre, ‘Making a Virtue of Necessity: Food Education and Gastronomy in the Spanish Civil War and Post-war Period (1936-1952)’, *International Journal of Gastronomy and Food Science* 100231 (2020), 2; Eva María Trescastro-López, Josep Bernabeu-Mestre and María Eugenia Galiana-Sánchez, ‘Nutrición y Salud Pública: políticas de alimentación escolar en la España contemporánea (1931-1978)’, *Asclepio* 65, no. 2 (2013): 26; Eva María Trescastro-López, ‘La educación en alimentación y nutrición en el medio escolar: el ejemplo del Programa EDALNU’, *Revista Española de Nutrición Humana y Dietética* 17, no. 2 (2013): 84–90.

²⁶ Gregorio Varela, Domingo García Rodríguez and Olga Moreiras, *La nutrición de los españoles. Diagnóstico y recomendaciones* (Madrid: Instituto de Estudios de Desarrollo Económico, 1971), 319.

²⁷ We have used the height series of the Spanish eastern coast, which is probably the most similar to the national average, see José Miguel Martínez-Carrión and Javier Puche, ‘La evolución de la estatura en Francia y en España, 1770-2000. Balance historiográfico y nuevas evidencias’, *Dynamis* 31, no. 2 (2011): 153–76. The most recent estimate of average height can be found in Antonio D. Cámara, José Miguel Martínez-Carrión, Javier Puche and Josep Maria Ramon-Muñoz, ‘Height and Inequality in Spain: A Long-Term Perspective’, *Revista de Historia Económica-Journal of Iberian and Latin American Economic History* 37, no. 2 (2019): 205–38.

Figure 4. Evolution of the average height of Spanish conscripts, 1930, 1954.



Source: Spain-Eastern Coast Series, see José Miguel Martínez-Carrión and Javier Puche, ‘La evolución de la estatura en Francia y en España, 1770-2000. Balance historiográfico y nuevas evidencias’, *Dynamis* 31, no. 2 (2010): 153–76; National sample, see Gloria Quiroga, ‘Estatura y condiciones de vida en el mundo rural español, 1893-1954’. *El nivel de vida en la España rural, siglos XVIII-XX*, ed. José Miguel Martínez-Carrión (Alicante: Universidad de Alicante, 2002), 461–95.

As average height is the result of net nutrition, its reduction between 1937 and 1941–50 stemmed from factors influencing growth during the adolescence (growth spurt) of the conscripts measured in the 1940s. During the Civil War and, most of all, in the immediate post-war period, poverty increased, income and consumption per capita decreased, the hours of the working day grew, principally in agriculture and construction²⁸, and certain environmental diseases spread, such as rickets, typhus, typhoid fever and tuberculosis²⁹. The interactive accumulation of all of these factors influenced the negative trend in height. There is an abundance of contemporary literature describing short, thin and sickly bodies that were physiologically weakened as a result of the nutritional deterioration and the poor living conditions that delayed child growth and corporal development at least until the 1950s³⁰.

²⁸ Leandro Prados de la Escosura, Spain’s Historical National Accounts: Expenditure and Output, 1850-2015, *Working Papers in Economic History*, WP 16-07 (Carlos III University of Madrid. Figuerola Institute of Social Sciences History, <http://hdl.handle.net/10016/16>, 2016).

²⁹ Moreda, Reher and Gimeno, *La conquista de la salud*; Cura and Huertas, *Alimentación y enfermedad en tiempos de hambre*.

³⁰ Casado, *Perfiles del hambre*, 96–7.

The specialists indicate that the average adult height reflects the influence of the environmental conditions experienced in childhood and adolescent puberty. The anthropometric data suggest that the physical growth in the adolescent spurt phase was delayed during the years of the war and the long post-war period. The reduction in height of almost 1 centimetre or more according to the different estimates indicates the impact of the nutritional deficiencies on the final adult height in these years. Although the environment in the first three years of life is a determinant for final average height, we maintain that the childhood environment in the 1920s (when the conscripts who were measured in the 1940s were born) could not have been so harmful for physical growth. On the contrary, the 1920s were a period of economic growth and improvements in human well-being. After the First World War and the influenza pandemic of 1918–20, the decrease in mortality resumed, particularly affecting the fall in child mortality. Furthermore, between 1920 and 1935, significant advances were made in public health and personal hygiene³¹. Therefore, a large part of the reduction in the height of the conscripts measured in the 1940s can be attributed to the context experienced in the years prior to the measurement of their heights. These conscripts experienced adolescence during the ‘hunger years’. The second stage of the fastest physical growth, the adolescent growth spurt in children between the ages of eleven and eighteen experienced negative effects from the beginning of puberty as it coincided with the hardships of the war and the post-war period.

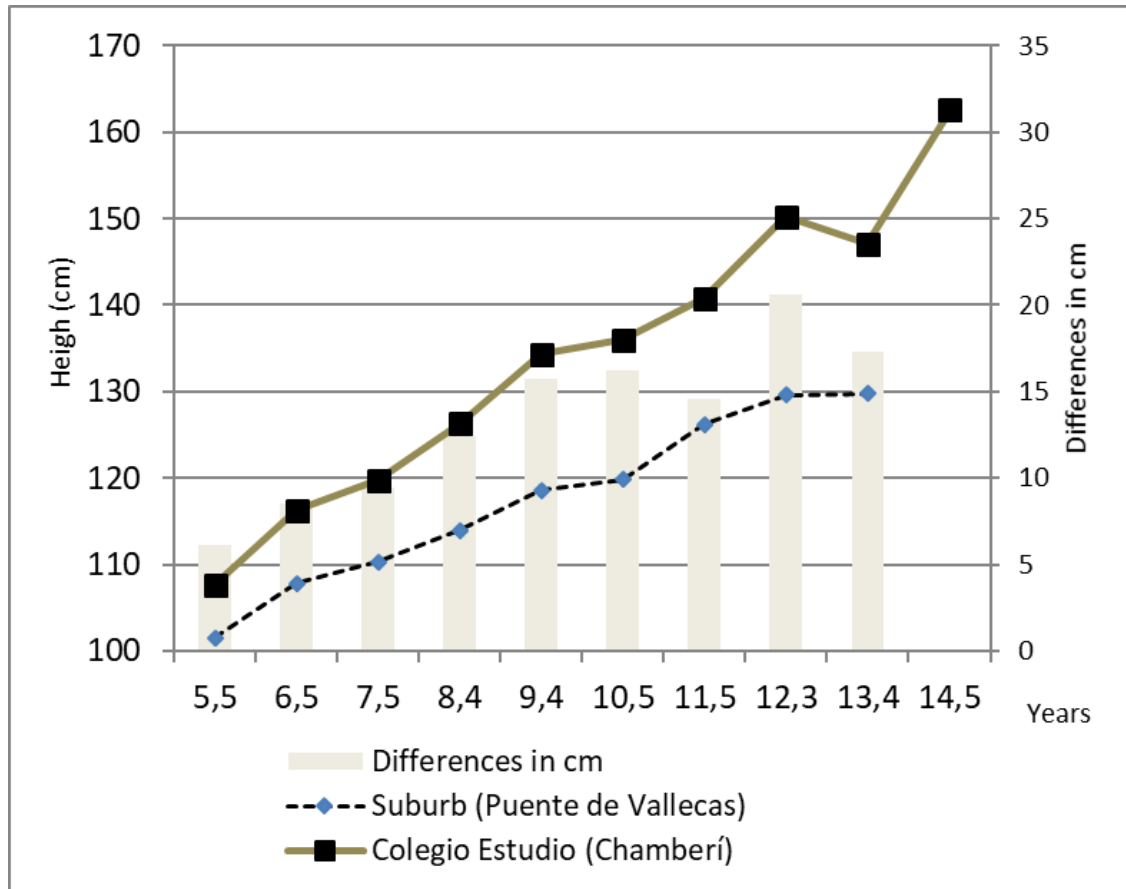
The worst points in the nutritional crisis were experienced during the first years of the post-war period. Not everybody suffered the costs of the war and post-war years. The unequal effects of the famine can be seen in Figure 5 which shows the differences in the heights of school children aged six to fourteen in different centres in Madrid. From the National Institute of Medical Research of the General Directorate of Health, where Francisco Grande Covián and his team worked, clinical trials were carried out among school-aged children in order to confirm the impact of the nutritional problems in the first years after the war. In this case, the heights of the children from a poor neighbourhood that had been hit hard by the Civil War, the Madrid suburb of Puente de Vallecas, were compared with those of the children from the Colegio de Estudio located in the neighbourhood of Chamberí, a wealthy district. Financed by the Rockefeller Foundation, the trial and its results revealed the deficiencies of B complex vitamins, causing the muscular cramps and muscle weakness suffered by the children from the poor neighbourhood. Malnutrition due to dietary deficiencies affected 75 per cent of the school-aged population of Puente de Vallecas while in the school in Chamberí it affected just 2 per cent³². The hunger-related neuropathies were described in many studies published in clinical medicine journals during the 1940s³³.

³¹ Moreda, Reher and Gimeno, *La conquista de la salud*.

³² Francisco Grande, ‘El desarrollo físico comparativo de dos grupos de niños en edad escolar y distinto nivel económico’, *Revista Clínica Española* 12 (1944): 155.

³³ Tormo Santamaría et al., ‘Malnutrición y desigualdades en la España del desarrollismo’, 116–22.

Figure 5. Comparison of heights of children of school age in different neighbourhoods of Madrid in 1942.



Source: Own elaboration based on Francisco Grande, J. R. of Carvallo and F. Jiménez García, ‘Alimentación y desarrollo infantil’, *Revista Clínica Española* 12, no. 1 (1944): 158.

What do we know about the height of women? The differences in adult height by sex (known as sexual dimorphism) can reflect a slight differential for boys and girls during their growth phase. Under conditions of environmental stress, such as significant deficits in terms of hygiene (health or food deprivation), the growth of girls is less affected than that of boys. It has been found that boys and girls have different degrees of eco-sensitivity³⁴. With data from the National Health Surveys by generational cohorts, recent studies on the Spanish case reveal that Spanish men born after approximately 1940 were able to benefit from institutionalized diets (during rationing or military service) in the early years of adulthood when their growth cycle had probably not yet finished. We know for certain that girls are less sensitive to environmental changes and that they finish their growth cycle earlier. Both of these factors could explain the lower increase in inter-generational height among Spanish women born during the 1940s and 1950s³⁵.

³⁴ Antonio D. Cámara, ‘Sobre la asociación entre dimorfismo sexual en estatura y estado nutricional de hombres y mujeres en el largo plazo’, *Nutrición Hospitalaria* 35, Extra. 5 (2018): 123–8.

³⁵ Antonio D. Cámara, ‘A Biosocial Approach to the Living Conditions: Intergenerational Changes of Stature Dimorphism in 20th-Century Spain’, *Annals of Human Biology* 43, no. 2 (2015): 168–78.

Socio-economic status also influenced height. Occupation, wealth, education, living and working conditions, among other determinants of the standard of living, were associated with different height gradients. Some studies have indicated the relationship between height and education through literacy. Social inequalities with respect to access to education are significant for the conscripts between 1930 and 1960. In the Valencia region, the educational divide widened among the cohorts between 1919 and 1943³⁶. In the south of Castile-La Mancha and in southeast Spain, the height of the illiterate conscripts fell spectacularly among the conscripts of the years between 1935 and 1939 and 1950 and 1954, born between 1914–18 and 1934–8, respectively³⁷.

During the ‘hunger years’, the social divide measured in terms of occupation and wealth widened. Inequality increased and resulted in increased differences in the heights of the different social classes. Following the HISCO-HISCLASS classification of professions, the average heights of day labourers, agricultural labourers and less qualified workers decreased, while the average heights of university students and highly qualified specialized workers or non-manual workers with a medium level of education suffered less or almost not at all. In parallel, inequality increased, particularly in the 1940s, which is evident in the increase in the coefficients of variation, a measure of dispersion conventionally used in inequality studies³⁸.

As a whole, the anthropometric results of the studies carried out among conscripted young men, and those conducted among schoolchildren in the 1940s, suggest that, in addition to the huge loss of economic well-being, Spaniards also suffered a reduction in biological well-being which prevailed until the beginning of the 1950s. The anthropometric findings show that the reduction in adult height in Spain was not so severe, but was more persistent over time than in other parts of Europe. Many European countries and regions suffered famines and severe food restrictions in the period around the Second World War³⁹. In Italy, the Netherlands and, most of all, Greece, there were deteriorations in the nutritional status, with significant reductions in adult height⁴⁰.

³⁶ José Miguel Martínez-Carrión and Javier Puche, ‘Alfabetización, bienestar biológico y desigualdad: la Comunidad valenciana, 1850-1970’, *Historia Agraria* 47 (2009): 167–86.

³⁷ José Miguel Martínez-Carrión and Juan José Pérez Castejón (2002), ‘Creciendo con desigualdad. El nivel de vida biológico en la España rural mediterránea desde 1840’, *El nivel de vida en la España rural, siglos XVIII-XX*, ed. José Miguel Martínez-Carrión (Alicante: Publicaciones de la Universidad de Alicante, 2002), cuadro 8, 454; José Cañabate Cabezuelos and José M. Martínez-Carrión, ‘Crisis nutricional y brecha social en la España de la autarquía. Un estudio de caso a partir de la talla adulta’, *Nutrición Hospitalaria* 35, No Extra. 5 (2018): 108–15.

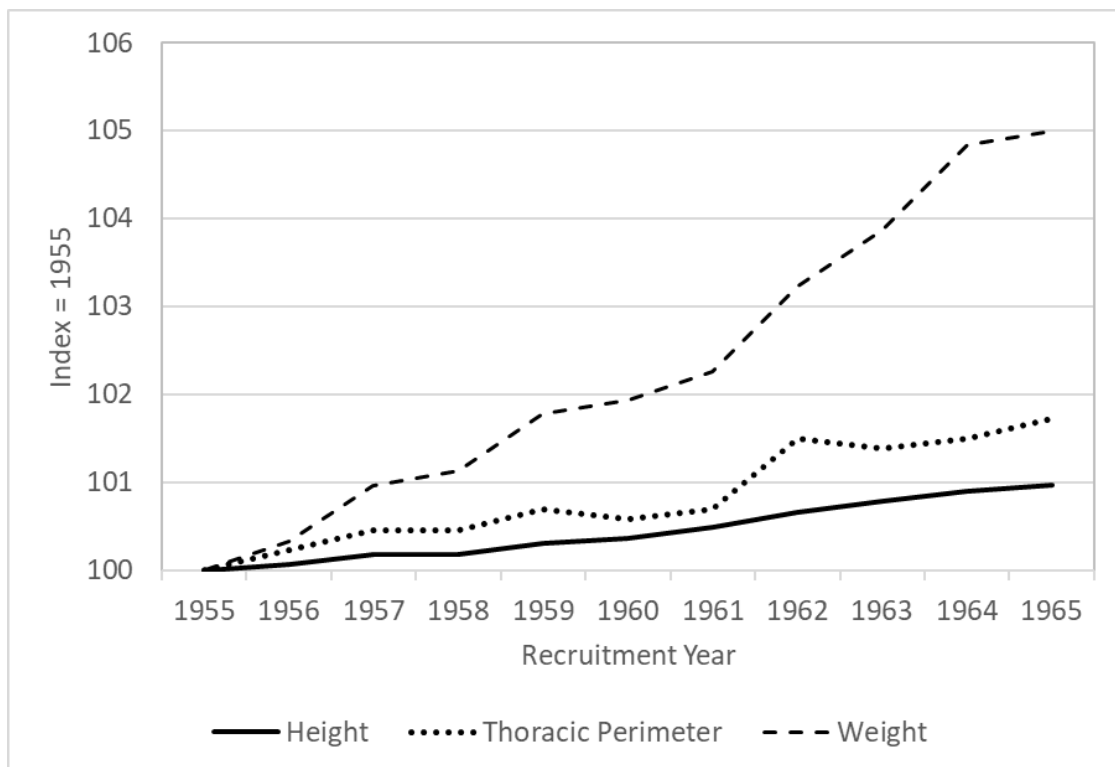
³⁸ María Isabel Ayuda and Javier Puche, ‘Determinants of Height and Biological Inequality in Mediterranean Spain, 1859-1967’, *Economics and Human Biology* 15, no. 1 (2014): 101–19; José Cañabate Cabezuelos and José Miguel Martínez-Carrión, ‘Poverty and Rural Height in Inland Spain during the Nutrition Transition’, *Historia Agraria* 71 (2017): 109–42.

³⁹ José Miguel Martínez-Carrión, ‘La talla de los europeos, 1700-2000. Ciclos, crecimiento y desigualdad’, *Investigaciones de Historia Económica-Economic History Research* 8, no. 3 (2012): 176–87.

⁴⁰ For Italy, see Javier Puche and Pedro M^a Pérez Castroviejo, ‘Estatura y salud nutricional en la Italia mussoliniana, 1922-1939’, *Ler História* 74 (2019): 161–85. Vittorio Daniele and Renato Ghezzi, ‘The Impact of World War II on Nutrition and Children’s Health in Italy’, *Investigaciones de Historia Económica* 15, no. 2 (2019): 119–31, <https://doi.org/10.1016/j.ihe.2017.09.002>. For the Netherlands, F. R. M. Portrait, T. F. van Wingerden and D. J. H. Deeg, ‘Early Life Undernutrition and Adult Height: The

Almost at the end of the autarkic period, in 1958, a medical and nutritional study of the armed forces carried out by the Interdepartmental Committee on Nutrition for National Defense, of the United States, revealed deficits in Vitamin A, riboflavin and proteins, although the military population did not exhibit serious deficiencies. The study also detected health inequalities among the personnel of the three armed forces and their geographical distribution: the least healthy due to a greater prevalence of infectious diseases were the soldiers of the army and those in the southern sub-plateau, coinciding with the least qualified and lowest income population⁴¹.

Figure 6. Anthropometric indicators in Spain, 1955–65 (Index 100 = 1955).



Source: Own elaboration based on data from the INE.

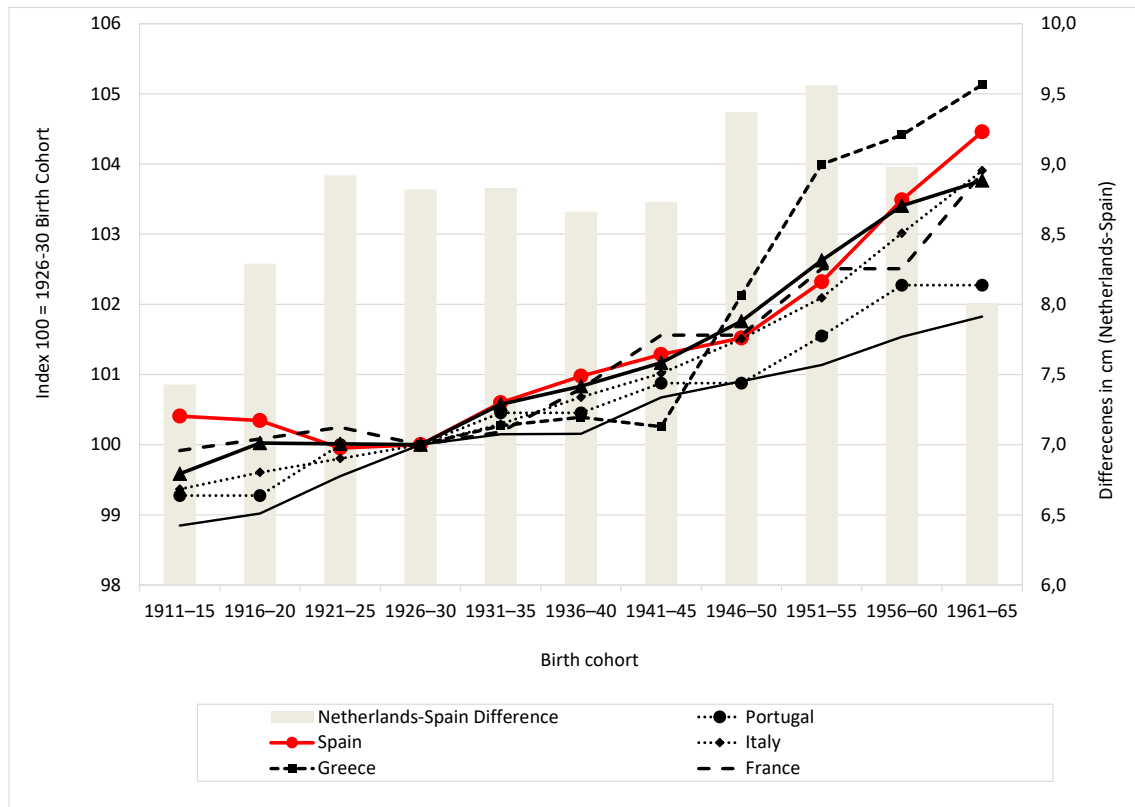
The recovery of the economy and biological well-being began tentatively in the mid- 1950s and decisively from 1959, just after the approval of the stabilization and economic liberalization plan. The anthropometric data available from the Spanish Statistical Office (INE) reveal a gradual improvement in height and, most of all, weight from 1955 (Figure 6). In contrast to height, which reflects the nutritional status in the years prior to measurement, weight and lung capacity increased more quickly. This

Dutch Famine of 1944–45’, *Economics & Human Biology* 27, Part B (2017): 339–48. For Greece, Anastasios Papadimitriou, ‘Growth and Development of Greek Children in the Twentieth Century’, in *Secular Growth Changes in Europe*, eds. Eva. B. Bodzsár and C. Susanne (Budapest: Eötvös University Press, 1998).

⁴¹ Pedro Fatjó, Francisco Muñoz-Pradas and Roser Nicolau, ‘Un estudio médico y nutricional de las fuerzas armadas españolas realizado en 1958 por el ICNND de EE.UU’, *Nutrición Hospitalaria* 35, Extra. 5 (2018): 91–8.

increase adjusted as the standards of living increased, and particularly the intake of energy and consumption of nutrients.

Figure 7. Average male height in Europe, cohorts from 1911–15 to 1961–5 (Index 100 = 1926-30 birth cohort).



Source: Timothy J. Hatton and E. B. Bray, 'Long Run Trends in the Heights of European Men, 19th-20th Centuries', *Economics and Human Biology* 8 (2010): 405–13.

After World War II, the economic recovery of the 1950s stimulated height growth in Europe. Western Europe experienced a veritable 'golden age', characterized by fabulous economic growth and a general increase in living standards⁴². Although Spain did not benefit from the Marshall Plan, the increase in the height of those born in the 1950-60s was remarkable. The change of course of Franco's policy, promoted by the Stabilization Plan of 1959, had a favourable impact on well-being and biological living standards. The strong increase in the height of Spaniards was due, in part, to the increase in living standards they experienced in their adolescent stage. However, also, due to the low starting level registered in the heights around 1950. Spain was among the countries with heights lowest in Europe and had deteriorated sharply in the 1940s, as recorded by cohorts born in the 1920s (Figure 7). These cohorts were stunted due to the effects of deprivation and starvation experienced during the last phase of growth, the adolescent spurt, in the 1940s. In any case, the increase in the average height of southern Europeans was extraordinary since the 1950s. The Spanish cohorts born between 1946 and 1950,

⁴² Dudley Baines, Neil Cummins and Max S. Schulze, 'Population and Living Standards, 1945-2005', in *The Cambridge Economic History of Modern Europe*, vol. 2. 1870 to the present. Stephen Broadberry and Kevin H. O'Rourke (Cambridge: Cambridge University Press, 2010), 390–420.

who were adolescents in the fast economic development phase of the 1960s, obtained the greatest increase in height per decade in the whole of Europe. Despite the strong growth spurt in terms of height recorded for Spaniards, the gap compared to the tallest Europeans remained. Compared to the stature of the Dutch, who were the tallest in Europe, the stature of the Spanish had distanced itself in the first half of the 20th century⁴³. Since 1950, the gap between the two populations has decreased, but it remained significant and greater than 8 cm between the 1961-65 cohorts.

3.- Exploring the regional disparities and territorial differences

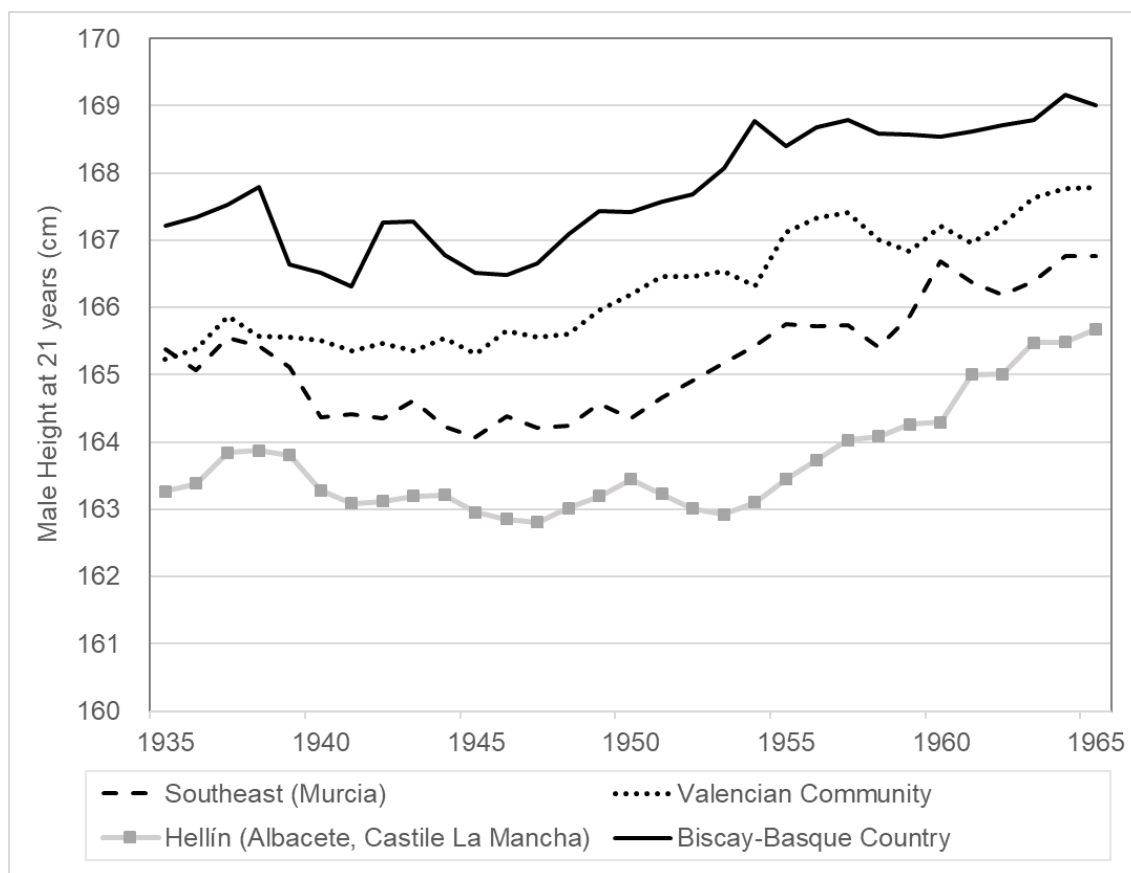
In recent years, our knowledge of territorial and socioeconomic inequalities has improved since anthropometric history⁴⁴. The height data from different Spanish regions reveal that the periods of nutritional deprivation were longer than we thought. In some cases, the deprivation lasted until the early 1950s. The reduction in biological well-being was recorded in a good part of Spain, as we can see in the stagnation of the average height until 1953. The anthropometric data suggest that the ‘hunger years’ lasted beyond the 1940s.

Figure 8 shows the strong contrasts in the biological standards of living between northern and southern Spain. Based on research with municipal data on military conscription, we can observe significant results for large population groups: the Basque and Catalanian conscripts were among the tallest in Spain, while those from Andalusia, Extremadura, Murcia and Castile-La Mancha recorded the shortest average heights. Despite the considerable differences in regional heights, the decrease in the nutritional status was particularly acute in the years of the Civil War and the post-war period, between 1937 and 1946. The populations in southeast Spain recorded the most significant reductions, together with those of Hellín in Castile-La Mancha and Vizcaya in the Basque Country. The Valencia region recorded a less intense anthropometric deterioration. In all of these regions, the increase in height that was recorded from the beginning of the twentieth century stopped during the Civil War of 1936–9. This marked a turning point in the health and nutritional status of the Spanish population.

⁴³ Timothy J. Hatton and E. B. Bray, ‘Long Run Trends in the Heights of European Men, 19th-20th Centuries’, *Economics and Human Biology* 8 (2010): 405–13; Martínez-Carrión, ‘La talla de los europeos, 1700-2000’, 176–87.

⁴⁴ José Miguel Martínez-Carrión, Javier Puche and Josep Maria Ramon-Muñoz, ‘Nutrición y desigualdad social en la España de Franco: evidencia antropométrica’, in *La dictadura franquista. La institucionalización d'un règim*, dirs. Antoni Segura, Andreu Mayayo and Teresa Abelló (Barcelona: Universitat de Barcelona, 2012), 171–84; Cabezuelos and Martínez-Carrión, ‘Crisis nutricional y brecha social en la España de la autarquía’, 108–15; Carlos Varea, Elena Sánchez-García, Barry Bogin, Luis Ríos, Bustar Gómez-Salinas, Alejandro López-Canorea and José Miguel Martínez-Carrión, ‘Disparities in Height and Urban Social Stratification in the First Half of the 20th Century in Madrid (Spain)’, *International Journal of Environmental Research and Public Health*, 16, 11 (2019): 2048.

Figure 8. Evolution of the average male height in four regional areas of Spain, by year of conscription (1935–65).



Source: Own elaboration based on data facilitated by (a) southeast Spain (Almería, Murcia and Alicante): José Miguel Martínez-Carrión and Juan José Pérez Castejón, ‘Creciendo con desigualdad. El nivel de vida biológico en la España rural mediterránea desde 1840’, in *El nivel de vida en la España rural, siglos XVIII-XX*, ed. José Miguel Martínez-Carrión (Alicante: Publicaciones de la Universidad de Alicante, 2002), 424–82; (b) Region of Valencia: Javier Puche, ‘Evolución de los niveles de vida biológicos en la Comunidad Valenciana, 1840-1948’, *Investigaciones de Historia Económica* 7, no. 3 (2011): 380–94; (c) Hellín (Albacete, Castilla-La Mancha): José Cañabate Cabezuelos and José Miguel Martínez-Carrión, ‘Poverty and Rural Height in Inland Spain during the Nutrition Transition’, *Historia Agraria* 71 (2017): 109–42; (d) Biscay–Basque Country: Pedro M. Pérez Castroviejo, ‘Biological Welfare during the Economic Development of the Basque Country: Biscay, 1850-2000’, *Revista de Historia Industrial* 64, no. 2 (2016): 183–12.

The data referring to the conscripts of 1947–8 provide information about the recovery in height. In the populations of southeast Spain, including Hellín in the province of Albacete, this recovery did not commence until the beginning of the following decade. In Murcia and Alicante, the height levels reached during the pre-war period, even in 1937, were not exceeded until 1959. According to the anthropometric data, the nutritional deficiencies could have lasted in the poorest rural areas until the mid-1950s. The data suggest that the rural world was hit harder than urban environments throughout Franco’s autarky.

The rural sample studied for a group of fourteen towns in Castile and Leon reveal a different evolution. The drop in height shows that the Republican (Franco’s opponents in the Civil War) areas were hit more severely. However in the Francoist area, from

Burgos to Zamora, the reduction in height was barely perceptible. With very low starting points, the average height for the whole of the sample stagnated between 1942 and 1951 and increased slightly throughout the 1950s. The increase became noteworthy only after 1960, a little over two centimetres in that decade⁴⁵. In contrast, the rural areas of the region experienced increases in height of a little over 4 centimetres, from 163.7 centimetres between 1942 and 1946 to 165.2 centimetres between 1947 and 1951 and 168.4 centimetres between 1952 and 1956⁴⁶. The data suggest that these were golden years for the agricultural sector in Castile and Leon, although the data could be biased due to the low number of observations of the sample at the end of the period analysed. It is argued that the accumulated stock of public infrastructure in the region of Castile and Leon was hardly damaged during the war which meant that it did not suffer many of the problems that other regions experienced. Furthermore, the ample provision of cereals and grains (principally wheat), which was the main food source, could have alleviated the famine and improved the nutritional status of part of the population, which, however, could have been suffered by certain population segments. In fact, the heights of salaried workers did not increase during the autarkic period as they were much more vulnerable to the rising inflation and food rationing. This contrasts with the height of the small rural landowners, which increased considerably⁴⁷.

The research carried out with anthropometric data from thirty-three municipalities in Extremadura shows an evolution in height that was slightly more satisfactory during the ‘hunger years’ than that observed in the Republican areas. Significant reductions cannot be observed, but the average height of the conscripts in Extremadura measured in 1936 was not recovered until the draft of 1948 (Figure 9). In this quasi-stagnation in the post-war period, the authors found differences between the heights of the conscripts of Cáceres and Badajoz, both provincial capitals. Being shorter, the former exhibited a poorer anthropometric performance than the latter. Cáceres, the poorest province of Extremadura, suffered a reduction of eight millimetres between 1944 and 1946. Breaking down the Extremadura sample into residential groups, we can observe a profound rural–urban divide throughout the twentieth century⁴⁸. During first autarkic years, the divide widened due to the decrease in height in the rural areas. Between 1940 and 1947 the differences in height in favour of the urban environment were more than two centimetres, although the urban conscripts suffered an anthropometric disruption around 1950-1.

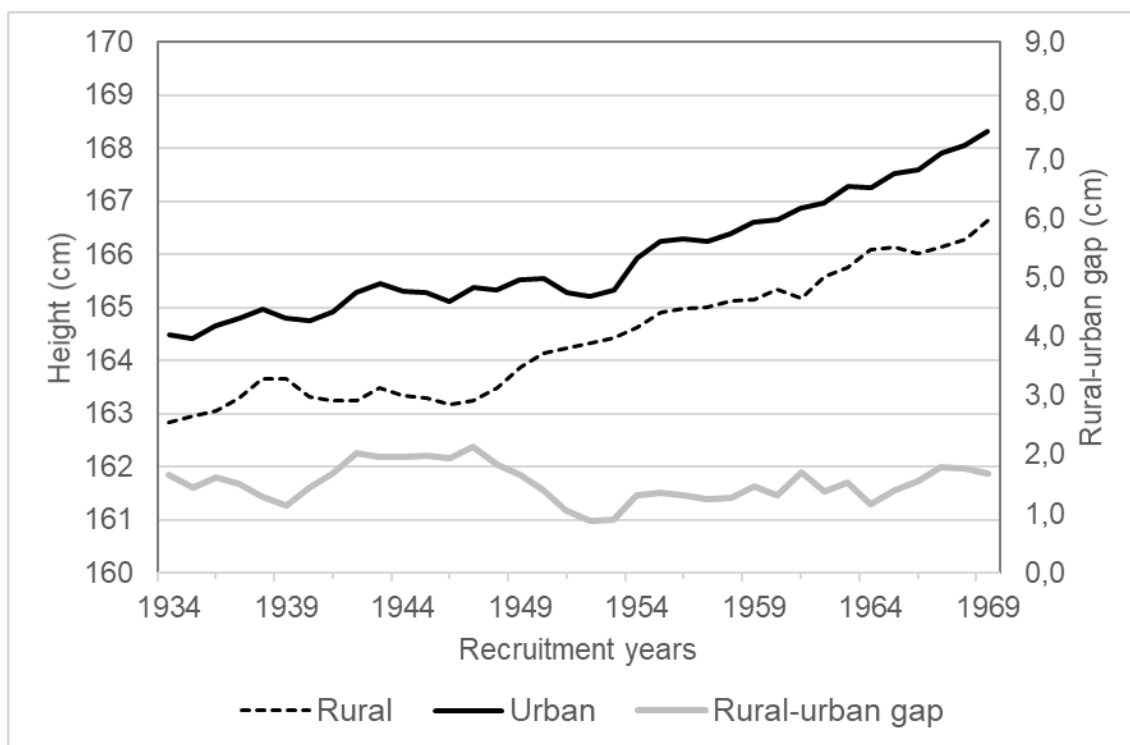
⁴⁵ Javier Moreno Lázaro and José Miguel Martínez-Carrión, ‘Secular trend in Castile and Leon (Spain): 1830-1990s’, *Revista Española de Antropología Física* 30 (2010): 1–12.

⁴⁶ Ricardo Hernández and Javier Moreno, ‘El nivel de vida en el medio rural de Castilla y León. Una constatación antropométrica, 1840-1970’, *Historia Agraria* 47 (2009): 143–66.

⁴⁷ *Ibid.*, graphic 8, 157.

⁴⁸ Antonio M. Linares Luján and Francisco M. Parejo-Moruno, ‘Las medidas del hambre. Guerra, autarquía y desnutrición en perspectiva antropométrica’, *Los ‘años del hambre’. Historia y memoria de la posguerra franquista*, ed. Miguel Ángel del Arco Blanco (Madrid: Marcial Pons, 2020), 293–316. See, Antonio M. Linares Luján and Francisco M. Parejo-Moruno, ‘Rural Height Penalty or Socioeconomic Penalization? The Nutritional Inequality in Backward Spain’, *International Journal Environmental Research Public Health*, 18,9 (2021), 4483.

Figure 9. Height of conscripts in Extremadura (thirty-three municipalities) according to rural or urban place of residence (conscripts of 1934–69). Three-year centred moving average (in centimetres).



Source: Antonio M. Linares Luján and Francisco M. Parejo-Moruno, ‘Las medidas del hambre. Guerra, autarquía y desnutrición en perspectiva antropométrica’, in *Los ‘años del hambre’ Historia y memoria de la posguerra franquista*, ed. Miguel Ángel del Arco Blanco (Madrid: Marcial Pons, 2020), 310.

One of the principal manifestations of the inequality in heights can be observed across different city neighbourhoods. In the large cities, as in the case of Madrid, neighbourhoods were usually stratified according to socio-economic status. As it was a major city undergoing a process of strong demographic growth due to immigration from the beginning of the 1940s, the study of height by neighbourhood constitutes an excellent analysis for determining the impact of the famine in rich and poor areas. Recent studies carried out by Carlos Varea's team on the city of Madrid, with data on the height of conscripts from 1936 to 1974, born between 1915 and 1953, analyses the urban spatial segregation and social stratification associated to the differences in height and also the impact of the different economic and political situations experienced by Franco's dictatorship⁴⁹.

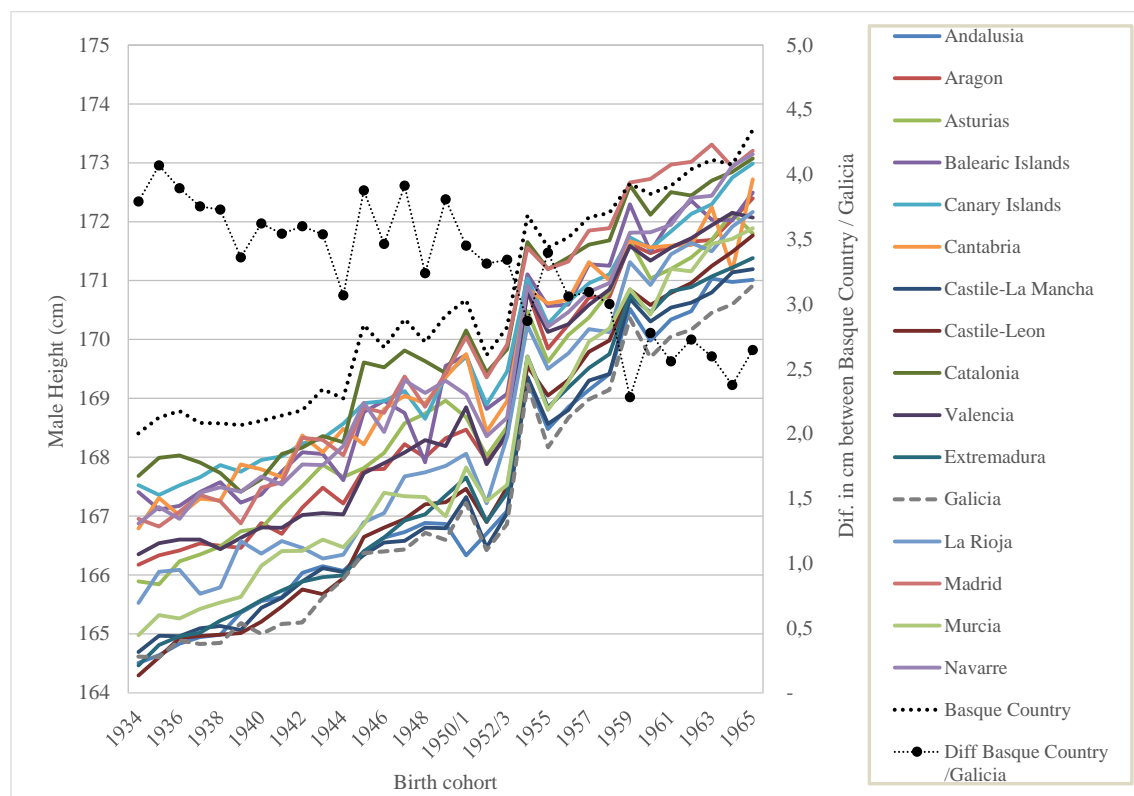
The results show that height increased significantly among the conscripts who lived in the middle and upper-class districts (5.85 centimetres) and the lower-class districts (6.75 centimetres)⁵⁰. In spite of the positive trend throughout the century in both

⁴⁹ Jose M Terán, E. Sánchez-García, J.M. Martínez-Carrión, Barry Bogin, C. Varea. ‘Use of joinpoint regressions to evaluate changes over time in conscript height’, *American Journal of Human Biology* (2021), e23572.

⁵⁰ Carlos Varea et al., ‘Disparities in Height and Urban Social Stratification in the First Half of the 20th Century in Madrid (Spain)’, 2048; Carlos Varea, José Manuel de Terán, Elena Sánchez-García, Haiqian

social groups, the height of the lower social classes fluctuated to a greater extent than that of the higher social classes. The stability of height among the rich is consistent with the greater economic stability and availability of resources of this social group (employment, housing, assets, wealth) and probably the privileges granted by the Franco regime, given the closeness of these classes to the economic and political power in the state capital. In contrast with the greater stability of the upper classes, we can observe a reduction in height of more than 1 centimetre among the conscripts from the poorest neighbourhoods, which was much more significant between 1944 and 1949. The nutritional inequality increased among the conscripts of 1942 and 1948 and, although it decreased in the following years, it increased again in the 1960s, but not so significantly as it had done in the ‘hunger years’ during the 1940s.

Figure 10. Average heights in the autonomous regions in Spain and differences in centimetres between the Basque Country and Galicia. Cohorts born between 1934 and 1965.



Source: INE, Gloria Quiroga, ‘*Medidas antropométricas y condiciones de vida en la España del siglo XX*’ (PhD Dissertation, Universidad de Alcalá de Henares, 2002).

The seriousness of the nutritional problem in the rural areas and poor neighbourhoods of the cities motivated the School Services of Food and Nutrition (SEAN) created in 1954 to promote the EDALNU Programme. Functioning since 1961, the programme benefited from the support of the Food and Agriculture Organization of the United Nations (FAO), and one of its objectives was the diffusion of milk supplements, which was decisive for the growth of Spanish schoolchildren. This fact was particularly relevant in the rural environment where there was a very low consumption of

Ma, Sergio López-Medel, Daniel Pérez-Cava and Luis Ríos, ‘Estaturas generacionales y residencia por distritos en la ciudad de Madrid durante el siglo XX’, *Nutrición Hospitalaria* 35 (2018): 83–90.

milk which was considered as a type of ‘food-medicine’, reserved for vulnerable groups, such as pregnant and breastfeeding women, the elderly and the infirm. Powdered milk began to be distributed in schools from 1959 and liquid milk from 1962. With the improvement in income and consumption per capita the standards of living and nutritional health increased. Height, which began a new growth process with greater impetus than in previous decades, affected all of the Spanish regions and a process of inter-regional convergence began (Figure 10)⁵¹. The differences between the Basque conscripts, the tallest, and the Galician conscripts, among the shortest, decreased among the cohorts born in 1934 and significantly from 1948. In spite of this, the tallest corresponded to the richest regions and the shortest to the poorest regions. The correlation between height and wealth measured by income per capita on a regional scale was high during the period⁵².

4.- Conclusions

This paper shows the effects of the nutritional crisis and the inequalities in the biological well-being caused by the famine associated with the autarkic policies of the early years of the Franco regime. With data on average height drawn from a series of anthropometric research projects carried out in recent years, the dimension of the deterioration of the nutritional status suffered by a large part of the population is reviewed. The results show that the reduction in adult height was severe and more prolonged over time than in other parts of Europe during the famines of the Second World War. The deterioration of biological well-being reached its height in 1947, but lasted in a good part of the country until 1953. The ‘hunger years’ persisted beyond the 1940s. Significant regional differences are appreciated. Data show that territorial and socio-economic inequalities increased, revealing the magnitude of the nutritional crisis for the poorest. The recovery of the nutritional state took place around 1955 and became decisive after the approval of the stabilization and economic liberalization plan of 1959, reflected in the beginning of a process of relative territorial convergence. Although at the end of the period interregional and social differences persisted. Future research must proceed in two directions. On the one hand, more data from different environments are required to study the scope of inequalities during the Franco regime. On the other, using more precise analysis techniques and methodologies that diagnose the chronology of malnutrition and its differential impact, in line with recent studies⁵³.

⁵¹ José Miguel Martínez-Carrión and Ramón María-Dolores, ‘Regional Inequality and Convergence in Southern Europe: Evidence from Height in Italy and Spain, 1850-2000’, *Revista de Economía Aplicada* 74, XXV (2017): 75–103.

⁵² Casado, *Perfiles del hambre*, 181.

⁵³ JM Terán et al. ‘Use of joinpoint regressions to evaluate changes over time in conscript height’, *American Journal of Human Biology* (2021); e23572. Antonio D. Cámara, Javier Puche, JM Martínez-Carrión, ‘Assessing the effects of autarkic policies on the biological well-being: analysis of deviations in cohort male height in the Valencian Community (Spain) during francoist regime’, *Social Science & Medicine*, 273 (2021), 113771.