COLONIAL ORIGINS OF INEQUALITY IN HISPANIC AMERICA? SOME REFLECTIONS BASED ON NEW EMPIRICAL EVIDENCE *

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ABSTRACT

This paper attempts to contribute to the ongoing debate on the historical roots of the high economic inequality of contemporary Iberian America. Our approach, which is basically empirical, departs from the mainstream scholarship. We show new data on wages and heights in several viceroyalties that (1) suggest relatively medium-to-high levels of material welfare among the commoners in Bourbon Hispanic America; and (2) allow us to build indexes of economic inequality. An international comparison of those indexes casts some doubts on the widely accepted view that Viceroyal America's economy was exclusively based on extremely unequal or extractive

institutions, as it has been popularized by the influential works by Engerman and Sokoloff and Acemoglu *et al*.

JEL Code: I39, J30, N30, N36

Keywords: anthropometrics, colonialism, inequality, wages, Hispanic American economic history

RESUMEN

Este trabajo pretende contribuir al debate sobre las causas históricas de la alta desigualdad económica en la Iberoamérica contemporánea y lo hace en forma básicamente empírica, lo que es bastante inusual. En él se muestran nuevos datos sobre salarios y estaturas de varios virreinatos que: (1) sugieren niveles de bienestar material relativamente medios o altos para grupos no privilegiados de la Hispanoamérica borbónica; y (2) permiten la construcción de índices de desigualdad económica. La comparación internacional de esos índices arroja dudas sobre la verosimilitud del ampliamente extendido supuesto de que la economía de la América española se basada exclusivamente en instituciones extremadamente desiguales o extractivas, que ha sido popularizada por los influyentes trabajos de Engerman y Sokoloff y Acemoglu *et al*.

Palabras clave: antropometría, colonialismo, desigualdad, salarios, historia económica de Hispanoamérica

1. INTRODUCTION

Economic inequality in contemporary Iberian America has become a fashionable topic. And not without good reason, since it is, along with Sub-Saharan Africa, the most unequal region in the world (López and Perry 2008). For *The Economist*, «*Inequality is as Latin American as good dance music and magical-realist fiction*»[1]. Has economic inequality been, as the *danzón*, which was already danced by late 18th century in the Caribbean, conspicuously Iberian American since colonial times? Or did it appear, as the literary magical realism did, much more recently? Very likely, most economist and economic historians would answer the first question affirmatively.

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[1] http://www.economist.com/world/americas/displayStory.cfm?story_id=2193852. Site visited on 15 March 2009.

On the contrary, our provisional answer, based on the evidence presented in this paper, is sceptical. Moreover, it is our contention that the empirical foundations, in particular those of a quantitative character, of the popular idea that Iberian American economic inequality has colonial origins are rather unconvincing. Sometimes they are simply non-existent at all[2].

The hypothesis that not only high inequality but also low growth in Iberian America are deeply rooted in colonial times has been defended in a series of brilliant, influential and, to a large extent, convergent works by Engerman and Sokoloff (1994, 2002, 2005) and Acemoglu *et al.* (2002).[3] On the basis of the alleged existence of either «extractive» institutions or institutions producing extreme economic inequality, the Iberian colonial legacy is blamed for the creation of a «*reversal of fortune*» among European colonies in the Americas — the poorest one ca. 1,500 (i.e. the United States) became richer while the initially richest ones (i.e. Mexican and Inca empires) became poorer — or of an adverse development path that differs sharply from the one followed by the United States. Many authors have been more or less influenced by this neo-institutional interpretation of economic development in Iberian America and other parts of the world since 1500 — that is, Cogneau (2003), Angeles (2007), Baker *et al.* (2008), Bruhn and Gallego (2008) and Frankema (2009).

The problem with this successful way of approaching the historical roots of inequality in Iberian America is that it has established a basically anti-empirical way of reasoning. In fact, it has become a commonplace to start with some reference to the colonial origins of the contemporary uneven regional distribution of assets, income and human capital. Just mentioning some words that carry strong negative connotations (*mita*, *encomienda* and *hacienda*, mainly) or referring to those authors who mention them (Engerman and Sokoloff and Acemoglu, Johnson and Robinson) is taken as a valid proof of the centuries-long existence of extractive institutions and of extreme economic inequality. No attempt is made to analyse the real impact across time and space of these institutions.

Thus, it is possible to consider mining as an extractive or extremely unequal institution is spite of the fact that, according to von Humboldt (1822): (1) «*The labour of a miner is entirely free throughout the whole kingdom of New Spain; and no Indian or Mestizoe can be forced to dedicate themselves to the working of mines*»[4]; and (2) «*The Mexican miners is the best paid of all miners*»[5]. von Humboldt's testimony is confirmed by many sources. As to the first point, Ladd (1992) claims that von Humboldt was

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[2] The need for «*far more evidence*» on Iberian American historical economic inequality has been pointed out by Williamson (2008).

[3] An evaluation of these works can be seen in Austin (2008) and Dobado (2009).

[4] von Humboldt (1822, vol. 3, p. 246).

[5] Ibidem.

right: «*ya para las décadas de 1750 y 1760 la mayoría de la fuerza de trabajo de las minas de plata era libre*» (p. 54). In the same vein, Brading (1983) states that: «*en la minería mexicana en su conjunto, el papel del trabajador forzado indígena disminuyó hasta ser insignificante durante el curso del siglo XVIII*» (p. 202). Velasco (1989) minimizes the importance of coerced labour in the late Bourbon Mexico mines and points at the wage differential as the main factor behind the inflow of free workers into the expanding mining sector. Northern mining centres were populated by free immigrants who felt the attraction of higher living standards (Swann 1990). The mobility and the high wages of miners are also highlighted by Brading (1983). The disregard shown for these sources might explain why the early appearance of a genuine market for free, mobile and well-paid labour in most of the New Spain's mining centres have passed largely unnoticed by the neo-institutionalists[6].

It is true that in an unknown number of mining centres some forms of coerced labour were circumstantially permitted (Brading 1983; Velasco 1989; Ladd 1992; von Mentz 1998; Sánchez Santiró 2002). However, their effective contribution to the total supply of labour for mining is not generally well-determined. At least in one case, that of Conde de Regla in 1764, it was insignificant (Velasco 1989, p. 580). In this respect, Brading's (1983) claim that many mining camps in New Spain looked similar «*to the British ports of the same period*» may turn out relevant to the discussion on the persistence of some forms of compulsion on labour in particular parts and moments of a basically free market.

Comments by von Humboldt on miners' wages seem also to be reliable. They find supportive evidence in Dobado and García (2009). Their estimates of the purchasing power in terms of grain and meat of the wages of skilled and unskilled Guanajuato miners by early 19th century are surprisingly high by international standards (see section 2).

Free miners were also very important in the case of mining in the Andes, even in Potosí, where *mita* has stood for centuries as a genuine instance of coerced labour. By early 17th century, almost half of the indigenous labour force employed in silver production was free (Bakewell 1989)[7]. Still more complex is the picture of the labour market in Potosí shown by Assadourian (1987): at the very most, between one-quarter and one-third of the total labour force in the town was coerced (*mitayos*), while

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[6] That wages in the mining sector of New Spain were high is a well-established fact in the specialized literature: «*En el primer siglo del período colonial, la despoblación hizo que los trabajadores fueran escasos y abrió el camino no sólo para la introducción de un sistema salarial, sino también para el pago de de salarios lo suficientemente elevados (o con incentivos agregados) como para atraer a los trabajadores*» (Garner 1992, pp. 113-114).

[7] The conversion of the nominal wages offered by Bakewell (1989) and Tandeter (1992, 1999) into silver grams shows that both *mitayos* and, especially, free miners had daily earnings higher than those of most labourers in Europe.

the rest was free. In the mining sector, the shares were roughly the same. By late 18th century, the number of free Indians working in the Potosí's flourishing mining sector slightly exceeded that of *mitayos*, while the latter and their families constituted a minority — around a quarter — of the town's population (Tandeter 1992). On the other hand, anti-empirical approaches forget that one thing was the quota of men legally established and quite another was that the size of the effective flow of mitayos from the indigenous communities into mining centers. They also disregard the fact that the gap between the former and the later tended to increase over time (Garavaglia and Marchena 2005). Besides, it also neglects the important fact that *mita* never existed at all in some main Andean mining centres — that is, Oruro and Lower Peru — and therefore paying wages was the only mechanism in place for attracting labour (Bakewell 2004; Garavaglia and Marchena 2005). Free labour played an important role in the gold mining boom of the late colonial period in Colombia, Ecuador and Chile (Garavaglia and Marchena 2005). More generally, free markets for labour, which ought to be included among those institutions defined by Acemoglu *et al*. (2002), as «institutions of private property», did not exist in pre-Columbian America.

Mining is also defined as a «bad» institution by Bruhn and Gallego (2008)[8]. However, according to Esteva, quoted in Miño Grijalva (2001), in 18th century New Spain, one-third of the population of the mining centres was classified as «Spanish». This share is double that of «Spaniards» in the total population by early 19th century[9]. Besides, it is simply not true that labour institutions and production technology in colonial mining were similar to those prevailing in agricultural plantations. Furthermore, was mining technology any less «repressive» in contemporary Europe? It is doubtful. In the same vein, the positive effect of mining on economic growth through the division of labour and regional markets integration is overlooked (see Dobado and Marrero, forthcoming).

No less surprising is the superficial treatment by some authors of such a complex issue as that of the changing and diverse agrarian institutions in colonial Iberian America and their varied influence on inequality. Not a single figure on real land distribution in any of the many different territories that formed the several viceroyalties during its centuries-long existence is offered (see Frankema 2009). Neither may it be found any comment on

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[8] «*We claim that some of these activities were «bad» since they tended to create extractive institutions and encouraged fewer Europeans to settle in the area due to the fact that the production technology was inherently repressive. These activities are plantation agriculture involving slavery and other forms of coerced labor (sugar, cotton, rice, and tobacco) and mining*» (Bruhn and Gallego 2008, p. 1).

[9] In Guanajuato, the main mining town in 18th century New Spain, the share of those classified as «whites» or «Spanish» in the male active population almost reaches 40 per cent. In Potosí, 16 per cent of the population was formed by «blanco» in 1779. This ratio is probably higher than that of whites to the total population in Upper Peru.

the existence of other, very distinct, not less important indeed, agrarian institutions (community-owned land, small and medium size farms, share-cropping, markets for free labour, etc.) and on the subtleties of their continuous interactions with each other in the long run.

With regard to New Spain, Miño's challenging view is unequivocal[10]. Similarly, this author claims that conventional opinions on the working conditions prevailing in the *haciendas* might be mistaken[11]. Quite surprisingly, ca. 1800, almost 4,500 «*pueblos de indios*» had legal entity status and collectively owned substantial portions of not necessarily unfertile land (Tanck 1999, 2005)[12]. In fact, many «*pueblos de indios*» seem to be experiencing something not very far from a sort of golden age (Tanck 1999). In any case, they coexisted not only with a few gigantic *haciendas* but also with other intermediate agrarian institutions (ranchos, small and medium holdings). This is clear in Bulmer-Thomas's (1994) description of the «initial conditions» of the agrarian sector after independence[13]. The importance of collective ownership of land has been more generally emphasized by Coatsworth (2005)[14].

Baskes' (2005) revisionist view on *repartimientos de bienes* in late colonial Oaxaca has not been taken into account either. From his new approach, this institution, generally judged as «*devised to extract wealth from native communities*», is presented as an instrument that reduced transaction costs and facilitated the access of Indians to the international markets through the exports of cochineal dye.

In sum, we share Coatsworth's unequivocal claim on the issue under discussion:

> «… *what little quantitative evidence there is does not suggest that ownership of land, or other assets for that matter, was more concentrated in Latin America than in the United States*» (Coatsworth 2008, p. 553).

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[10] «*el sistema no basó su funcionamiento en la explotación generalizada de los indígenas. Pero lo más notable es la fuerte presencia de ranchos y pequeñas propiedades, hecho que pone en entredicho la idea señorial de los grandes dominios territoriales*» (Miño Grijalva 2001, p. 20).

[11] «*El mundo del trabajador dentro de la hacienda estuvo lejos de la explotación inmisericorde dibujada por los ideólogos revolucionarios y la historiografía de denuncia*» (Miño Grijalva 2001, p. 226).

[12] From his study of the judicial actions in the Toluca Valley between 1700 and 1820, Miño Grijalva (2001) concludes that «*ese mundo polarizado* (*haciendas'* expansion at the expenses of the Indian villages) *que se ha querido imponer no parece sustentarse más*» (p. 143).

[13] «*Domestic agriculture centered on the hacienda, the small farm (known in Mexico as a rancho), and — in some countries — Indian communal lands*» (Bulmer-Thomas 1994, p. 40).

[14] «*Unlike Western Europe, Latin America's colonial elites did not monopolize land ownership. Throughout Mesoamerica and the Andes, indigenous villages and villagers occupied most of the arable lands; European estates clustered in the commercially more profitable areas near cities and towns and along major trade routes but left vast areas of the landscape in indigenous hands*» (Coatsworth 2005, p. 139).

Inspired by Coatsworth's criticism to Engerman and Sokoloff's thesis, our study follows a basically empirical approach[15]. We study wages and height in some viceroyalties (New Spain, New Granada, Peru and Río de la Plata) during the late Bourbon period from an international comparative perspective. To the best of our knowledge, this is first time that these two variables, closely interconnected and related to economic inequality, have been jointly analysed for the case of colonial Hispanic American.

Milanovic *et al*. (2008) have shown some fragmentary evidence about18[th] and 19th centuries Iberian America as a particular case within their pioneering study on ancient inequality. Based mostly on social tables and tax census data, this original work presents Gini coefficients for twenty-seven pre-industrial societies ranging from early 1st century Rome to British India in 1947 and includes New Spain by late 18th century. As predicted by conventional assumptions, Bourbon Mexico appears to be extremely unequal: its Gini coefficient is highest in the sample (63.5 per cent). This result would confirm mainstream visions while being apparently consistent with von Humboldt's view: «*México es el país de la desigualdad*» (von Humboldt 1822:1991, p. 168).

However, there are some problems. Surprisingly, New Spain's Gini is practically equal to that of Holland in 1732 (63 per cent). Moreover, the interpretation by Milanovic *et al*. (2008) of Bishop Abad y Queipo's oversimplified picture of the socio-economic stratification in late Bourbon Mexico is not unquestionable and, in any case, yields an upper bound. Moreover, somewhat disturbing is the fact that New Spain turns out to be so unequal that it is the only case in the sample of pre-industrial societies used by those authors, which lies beyond the curve («inequality possibility frontier») representing the maximum feasible economic inequality. Besides, von Humboldt's remarks should not be always taken necessarily as *prima facie* evidence. On the one hand, his reference to inequality is complex since it includes other dimensions as well (geography, population density, urbanization, etc.; von Humboldt 1822:1991, pp. 68-69). Thus, it resists an unequivocal interpretation. On the other hand, his comments are sometimes at odds with the idea of a uniquely unequal New Spain, especially when compared with some parts of Europe (von Humboldt 1822:1991, pp. 66-67). Thus, Bourbon Mexico might well not be the only land of economic inequality after all. In this respect, in his re-examination of inequality in Iberian American over the past five centuries, Williamson (2009) criticizes the assumption that it has always been relatively unequal by international

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[15] «*The Engerman and Sokoloff thesis, while plausible, is almost certainly wrong. (…) Most of the Spanish colonies were not slave colonies and, however rich or poor, there is no solid evidence to suggest unusually high levels of concentration of landownership. (…) landownership (and wealth more generally) was not more concentrated in Latin America than in the thirteen British colonies (or industrializing Britain itself). (…) The concentration of wealth and elite institutional power that Engerman and Sokoloff attributed to colonial factor endowments did, in fact, arise in Latin America but much later*» (Coatsworth 2005, pp. 139-140).

standards and defends its «normality» since the pre-Columbian era to the «belle époque».

Apart from this introduction, this paper contains four sections. In section 2, evidence on nominal and real wages by early 19th century is presented. Section 3 deals with height in the 18th century. Indexes of economic inequality built on ratios relating GDP *per capita* to real (grain) wages and height are shown in section 4. Some final remarks appear in section 5. Sources of data and methods of estimation are described in Appendix 1 on wages and Appendix 2 on height.

2 NOMINAL AND REAL WAGES

In Dobado and García (2009),[16] abundant evidence on nominal and real (grain and meat) wages of both skilled and unskilled workers for a number of towns in the Americas, Asia and Europe from early 18th to early 19th centuries is presented. Since baskets of goods properly representing the consumption patterns of Bourbon American workers other than that of Leticia Arroyo for Arequipa (see http://gpih.ucdavis.edu/files/Peru_18th_c_basket.xls) do not exist, we are unable to use appropriate cost-of-living indices. Therefore, we use estimates of wages in terms of grain (an ordinary good) and of meat (a superior good) as proxies for real wages. In this paper, we focus on the two first decades of the 19th century.

Circa 1803, nominal wages of miners in Guanajuato and New Spain were clearly higher than those of other skilled urban workers in our sample (London, Amsterdam, Antwerp, Strasbourg, Istanbul, Gdansk, Leipzig and Milan) and of miners in Spain (see Dobado and García 2009). Philadelphia artisans are the only exception. However, it might be objected that the finding of high nominal wages in late Bourbon Mexico was expectable, as it was by far the main world producer of silver. Were they also high in terms of grain? Yes, they were too. Grain wages of New Spain miners were only lower than those of skilled workers in the United States[17]. When real wages in terms of a superior good, such as meat, are estimated, differences in favour of Bourbon Mexico become enormous. Meat wages of New Spain miners were not only clearly above those of Western Europe (London, Amsterdam and Antwerp included), but also higher than those in the United States in

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[16] Many of our data on nominal and real wages are the result of other authors' impressive work. We are grateful to them. Leticia Arroyo, Amílcar Challú and Robert Allen deserve a special mention. We would also like to acknowledge two institutions, the Global Price and Income History Group (http://gpih.ucdavis.edu/) and the International Institute of Social History (http://www.iisg.nl/hpw/data.php), for facilitating our research. In particular, Leticia Arroyo and, especially, Amílcar Challú have made possible the expansion of our sample of wages and prices in Bourbon America.

[17] Grain wage is the purchasing power of a daily nominal wage in terms of litres of the most common grain in the respective consumption basket of the working classes. For more details, see Appendix 1 in Dobado and García (2009).

FIGURE 1
NOMINAL WAGES OF LABOURERS, 1800-1820
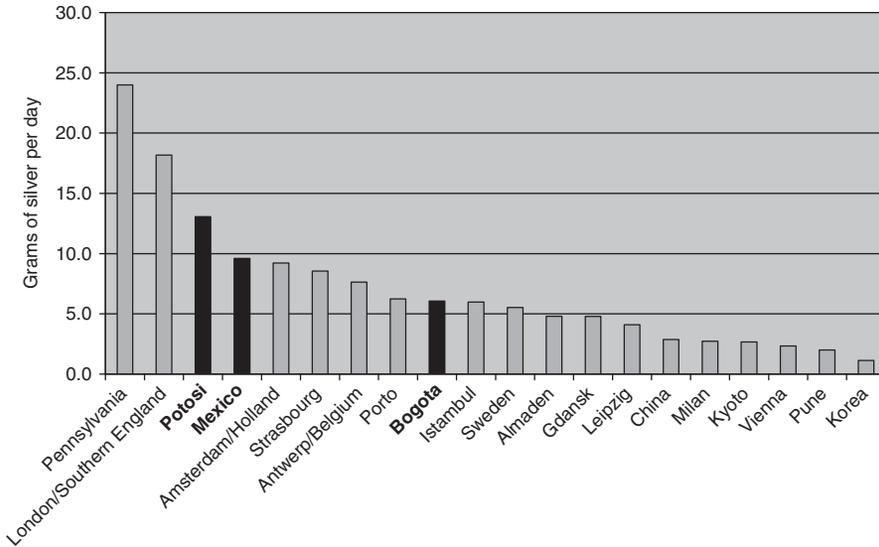
Source: See Appendix 1.

some cases[18]. The easy access to animal proteins — in contrast with Europe and Asia — in Bourbon Mexico was partially due to the comparatively low prices of beef, which in turn responds to the favourable factor endowments for extensive cattle-raising in the Northern regions of the viceroyalty. The prices of other superior goods (sugar and cocoa) might also be comparatively cheap for late colonial Mexico consumers.

Thus, Bourbon Mexico miners do not seem to be the epitome of extreme exploitation. High wages are rather incompatible than not with extractive institutions. Why should then mining be considered more «extractive» in New Spain than in England or in other parts of Europe?

In Figure 1, nominal wages of generally urban labourers in 1800-1820 are depicted[19]. Again, the high level of nominal wages in Hispanic America relative to other parts of the world might be considered expectable. More

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[18] Meat wage is the purchasing power of a daily nominal wage in terms of kilograms of beef. For more details, see Appendix 1 in Dobado and García (2009).

[19] Nominal wages are the average of available data for the period 1800-1820. More details are given in Appendix 1.

FIGURE 2
GRAIN WAGES OF LABOURERS, 1800-1820
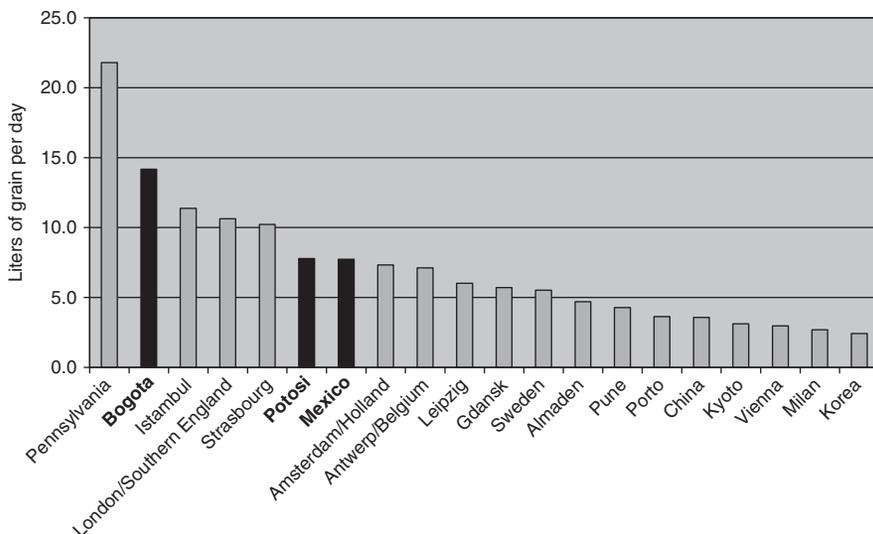
Source: See Appendix 1.

surprising is to realize that they were also high in terms of grain (see Figure 2) and, especially, of meat (see Figure 3)[20].

Certainly, the early 19th century was not a favourable period for low-income consumers in Europe. However, it was probably even worse in Hispanic America where some of the conflicts surrounding the process of independence were especially violent and long lasting. Consequently, they had important negative effects on the demand for labour and on the supply of basic goods. In any case, the picture shown by available evidence on grain and meat wages from 1800 to 1820 is that of living standards of late Bourbon America labourers being much closer to — or even higher than in some cases – those of the United States and most developed countries in Western Europe than to those of poorer Central and Mediterranean Europe — including Iberian metropolis — and, especially, of Asia. Thus, while New Spain miners clearly belonged to the upper world class of labourers, Bourbon America's unskilled workers were far from being at the bottom of the international distribution of wage earners' fortunes. This is all but surprising since, contrary to neo-institutionalist assumptions, what characterizes labour markets in Bourbon America is the relative scarcity

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[20] We assume that consumption of meat in Europe was low albeit higher than in Asia (Bassino and Ma 2005; Allen *et al*. 2007).

FIGURE 3
MEAT WAGES OF LABOURERS, 1800-1820
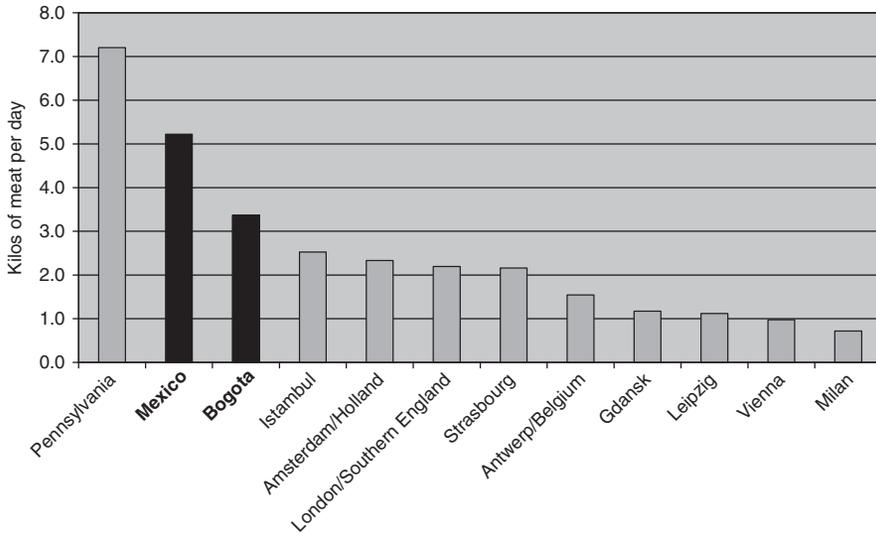
Source: See Appendix 1.

of this factor and not the opposite. According to Bulmer-Thomas (1994), there was «*a traditional labour shortage, from which many colonial activities had suffered*» (Bulmer-Thomas 1994, p. 30)[21].

Finding medium-to-high relative real wages in Bourbon America might be interpreted as an indication that labour productivity could not be significantly lower there than in most late pre-industrial European countries. This inference does not seem to be implausible under reasonable suppositions: a similar number of working days per year; similar differences in productivity between wage earners and other segments of the labouring classes — that is, peasants. The proximity in productivity levels might have implications for estimates of GDP *per capita*. It suggests that an upward revision of estimates by Coatsworth (2008) and Maddison (2009) would not be unjustified.

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[21] Regarding the especial case of New Spain — with a supposedly dense indigenous population upon which establishing unequal or extractive institutions was easy — this idea is shared by Garner: «*Aun después de que la población comenzó acrecer en la segunda mitad del siglo XVII, era sabido que los empresarios mineros, por ejemplo, se quejaban de la escasez de mano de obra que les obligaba a pagar sueldos altos o a agregar otros premios a fin de atraer y mantener a los trabajadores. En la primera mitad del siglo XVIII, los hacendados seguían quejándose de de la escasez de trabajadores y de los sueldos altos*» (Garner 1992, p. 114).

Naturally, much more evidence confirming our findings is needed. On the other hand, extending our rather optimistic tentative conclusions about the material welfare of wage earners to other unprivileged sections of the Bourbon American society is a risky business. We should know much more about the living conditions of other segments of the commoners — that is, peasants. Notwithstanding, until further research proves otherwise, we provisionally accept that our findings on real wages in Bourbon America are as representative of the commoners' living conditions as in other parts of the world.

3. HEIGHT IN BOURBON MEXICO AND VENEZUELA

In this section, we present new quantitative evidence on height in Bourbon Mexico and Venezuela. Studying physical stature from an international comparative perspective plays a double role in our research; it is interesting in itself and serves as a relevant check of our findings on wages. If our sample is representative — nothing suggests the opposite — what we have found is that height in late colonial Hispanic America are comparable to those in Europe in spite of its allegedly lower GDP *per capita*. These findings are consistent with those obtained through the examination of wages in which they do not confirm the widespread idea of an especially unequal colonial society in Hispanic America (see section 4).

As a result of the growing popularity of anthropometrics after some decades of existence, Iberian America started to appear in a picture in which numerous social groups, countries and periods were already present from much longer (i.e. Komlos and Baten 2004; Steckel 1995, 2008, 2009). Thus, studies on heights in Argentina, Brazil, Colombia, Mexico and Puerto Rico during the 19th and 20th centuries are available[22]. However, anthropometric research into colonial Hispanic America is very scarce — that is, Challú (2009) on Bourbon Central Mexico and Salvatore (1998) and Salvatore and Baten (1998) on the late viceroyalty of the Río de la Plata). Therefore, it is necessary to widen the time and space dimensions of the colonial Hispanic American sample of height. We try to contribute to that goal by offering new data on 18th century Mexico and Venezuela. Working with military sources (*filiaciones* and other documents of the conscripts to the colonial militias), we have been able to build a database of almost 6000 observations[23]. Data include generations born from the 1730s to the 1780s in the Northern and Southern regions of the viceroyalty of New Spain (modern-day Mexico and the South-Western USA) and in Maracaibo (nowadays Venezuela).

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[22] See Martínez-Carrión (2009) for a recent review of the literature on historical Anthropometrics in Spain, Portugal and Latin America.

[23] Representativeness of the database is greater than in the case of a professional army since militias were formed through universal adult male conscription of which only those suffering from serious physical handicaps or below the minimum height requirement, the public servants and the high skilled professionals were excepted (Marchena 1992).

FIGURE 4

AVERAGE HEIGHTS OF COHORTS BORN IN THE 1750S
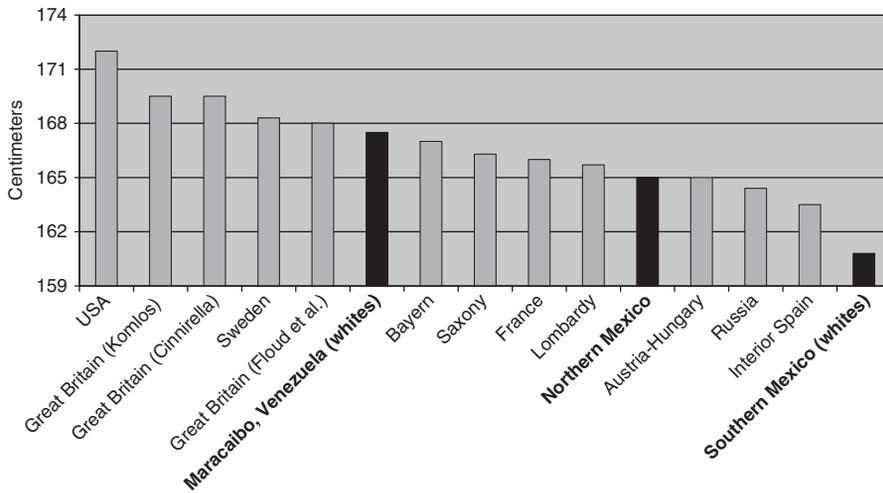
Source: See Appendix 2.

The main results of our study of this database are shown in Dobado and García (2009). In Figure 4, an international comparison of height is shown[24].

Height of militiamen, most of them working in mining and cattle raising, from the scarcely populated Northern New Spain regions were similar to those of contemporary Europeans. It implies that they were probably taller than many Asians. «*Blancos*» (whites) from Maracaibo were even rather taller. In Central Mexico, according either to Challú (2009) or to our less — because of the small size of our sample for that region — significant results, heights would be in the lower range of the available international sample. On the contrary, «*blancos*» from Southern New Spain were clearly the shortest in Figure 4. However, their average height is not unknown in some European regions and during certain periods of the 18th and 19th centuries[25]. However, our estimates for Southern Mexico might be somewhat downward biased[26]. In any case, our findings are not surprising as they are consistent with those from Challú (2009) for 18th century Central New Spain and from López-Alonso

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[24] *Pardos* (mulatoes) have not been included in the sample since we try to make a comparison as ethnically homogeneous as possible in order to reduce the possible bias due to genetic differences.

[25] As to the cases of France, Austria–Hungary, Italy, Portugal, Russia and Spain, see Heyberger (2005), Komlos (1989), Breschi and Pozzi (eds.) (2007), Baten *et al*. (2009b), Mironov (2005), respectively.

[26] See Dobado and García (2009) for a discussion of the reasons explaining the possible downward bias.

and Porras (2007) and Carson (2005, 2007) for México and South-Western United States in the 19th century. On the other hand, differences in height across regions seem to have been very persistent since a North-East stature gradient has also been found in Pre-Hispanic Mesoamerica (Márquez *et al*. 2005) and in México during the 19th and 20th centuries (López-Alonso and Porras 2007; Vélez-Grajales 2009).

The study of height offers an interesting direct measure of economic inequality: the racial gap. The difference in height between «*blancos*» and «*pardos*» is perceptible by mid-18th century in Southern Mexico (less than 3 centimetres) and in Maracaibo (around 1.5 centimetres). However, it tended to decrease in both cases from the 1730s to the 1780s (Dobado and García 2009). In Southern Mexico, the gap narrows from about 4 centimetres to practically null. Moreover, the gap we find is significantly smaller than the one observed among the different social classes in some European countries (Komlos 2007). The racial gap in Maracaibo is similar to that existing between black slaves and free whites in the United States by the same period (Margo and Steckel 1983; Steckel 1986) and higher than that estimated for Brazil and Lima in the 19th century by Baten *et al*. (2009a). To summarize, improvable as they are, our provisional estimates on the average height of Mexicans and Venezuelans of the Bourbon period are basically similar to those of Europeans, while the racial gap is comparatively small and decreasing. These findings may be interpreted as evidence against the idea of an especially unequal Bourbon Hispanic America.

4. WAGES, HEIGHTS AND GDP *PER CAPITA*

In this section, we present indexes of economic inequality in late Bourbon America. These indexes consist of the ratio of GDP *per capita* in 1820 to grain wages in 1800-1820 and of the ratios of GDP *per capita* in 1700 and 1720 to height by mid-18th century.

In considering the ratio of GDP *per capita* to grain wages, especially those of unskilled workers as a proxy for economic inequality, we draw on the pioneering work by Williamson (1999, 2002). In fact, what we do is trying to adapt his methodology, followed by Prados de la Escosura (2007a) as well, to the limited quantitative information existing for the Bourbon period. In our ad hoc Williamson index of inequality, we use Maddison (2009) estimates of GDP *per capita* in 1820 and our own estimates of grain wages in 1800-1820. Our rationale is as follows: estimates of, or the educated guesses on, GDP *per capita* for Hispanic America by early 19th century are lower than in most Western countries; then, finding real wages of unskilled workers in colonial Hispanic America, which are similar to those in Europe indicates that, at the very least, economic inequality in New Spain, New Granada and Upper Peru should not be considered high by Western standards at the end of the Bourbon period (see Figure 5).

FIGURE 5
RATIOS OF GDPS *PER CAPITA* IN 1820 TO GRAIN WAGES (1800-1820)
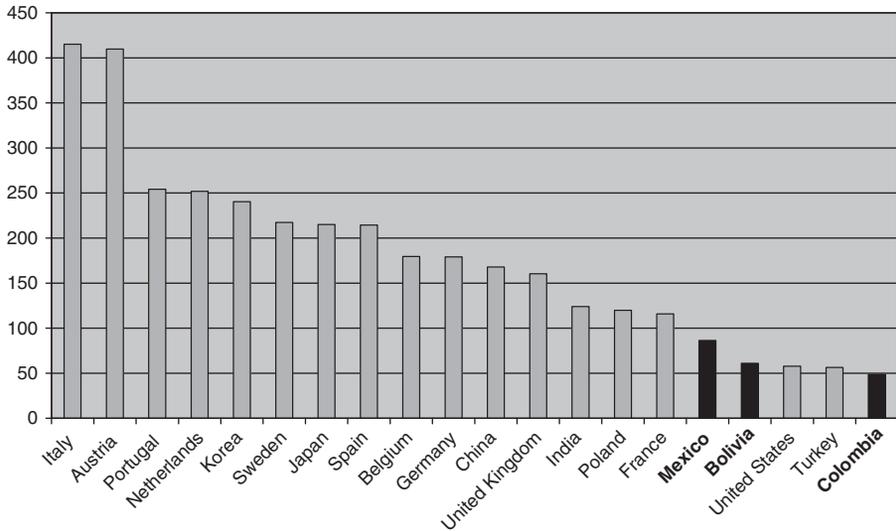
Source: Appendix 1.

Rather, the contrary seems to be true. The Hispanic American values of our ad hoc Williamson inequality index are lower than in Europe. These results are clearly at odds with conventional wisdom on this issue and in particular with neo-instituionalist assumptions. That this measure of inequality turns out to be higher in Asia as well is also in contradiction with Milanovic *et al*. (2008).

Certainly, using a less crude way of calculating real wages would offer somewhat different results. Missing data for some years might also be altering the ratio corresponding to some countries. However, a shift from low to high levels of Williamson's economic inequality is rather unlikely than not. Besides, if instead of using grain prices as deflator of nominal wages we use those of meat — or a combination of the two — the ratio of GDP *per capita* to real wages for Bolivia, Colombia and Mexico would be lower and consequently, by construction, our ad hoc version of the Williamson's economic inequality would decrease. In any case, whatever the change, if reasonable, in the inputs used for calculation of this measure of economic inequality, a very different picture to that shown in Figure 5 seems rather implausible. Therefore, it is our provisional conclusion that late Bourbon America does not stand at the top of the international ranking of the Williamson's economic inequality index. If alternative, somewhat lower, estimates of Hispanic American countries GDP

per capita in 1820 provided by Coatsworth (2008) and Prados de la Escosura (2007b) are used instead of Maddison's, our ad hoc version of the Williamson's economic inequality indexes shows values that are even slightly more favourable for Colombia and Mexico.

Figure 5 deserves some additional comments. On the one hand, differences between countries in our ad hoc version of Williamson's economic inequality index are enormous, — that is, roughly a factor of eight between the two at the top and the two at the bottom. Within Hispanic America, the differences are not minor either, even though the three countries in the sample share relatively low degrees of inequality — that is, Mexico and Bolivia vs. Colombia. Are these differences due only to similar disparities in economic inequality? Do other factors intervene? In any case, the high variability in ratio of GDP *per capita* to grain wages deserves closer scrutiny. On the other hand, it is also striking that small differences in GDP *per capita* estimates coexist with big differences in nominal (grams of silver) and grain wages — that is, Bolivia vs. Japan. Again, this counterintuitive result seems worth being explored as well.

We have also explored the potential of an additional and complementary approach to the study of economic inequality when direct evidence on income distribution is doubtfully reliable or is non-existent, as it usually happens in early modern societies. As mentioned before, the anthropometric literature has been producing substantial arguments and evidence supporting the notion that height are very sensitive to economic inequality (Steckel 1995, 2005, 2009). On the basis of the above-mentioned literature, which causally links economic equality and average height, our reasoning is similar to the one previously presented with regard to real wages. It is our assumption that, *ceteris paribus*, for a certain level of GDP *per capita*, the higher the average height in a given country, the lesser economic inequality might be expected. In other words, finding height in Bourbon Mexico or Venezuela comparable to those in presumably more developed countries would cast serious doubt on the plausibility of mainstream assumptions on the colonial roots of economic inequality in Iberian America.

Thus, we present a first exploration of a methodology that, to the best of our knowledge, has not been used before empirically. This methodological novelty simply consists in calculating ratios of GDP *per capita* to average height for as many countries as possible. These ratios might constitute an alternative index of economic inequality. The underlying rationale is not only fairly intuitive but also consistent with the currently available evidence on some developed countries (Bilger 2004). In Figure 6, the ratio of GDP *per capita* in 1700 and 1820 to average height of cohorts of those born in 1750-1760 calculated for a sample of European and American countries is shown.

In 1700 as well as in 1820, the ratios of both Northern and Southern Mexico and, particularly, Venezuela are significantly lower than those of Europe. If this tentative index of economic inequality makes any sense, the inference is clear: those Hispanic American for which we have so far found

FIGURE 6
RATIOS OF GDP *PER CAPITA* TO MID-18TH CENTURY AVERAGE HEIGHTS
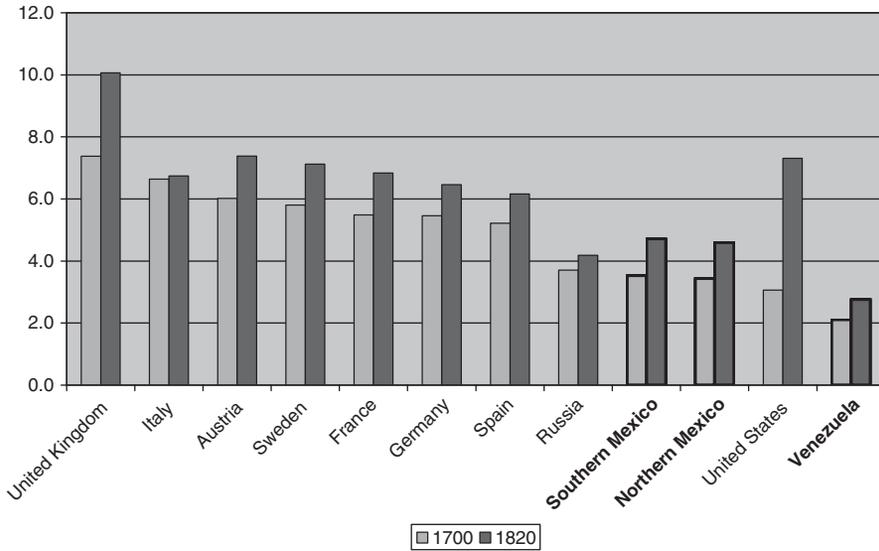
Source: See Appendix 2.

original sources for height do not seem to be among the most unequal societies of the 18th and early 19th centuries. Again, rather the opposite is true. We find basic consistency between the two indexes of inequality presented here especially reassuring.

5. FINAL REMARKS

(1) Much more empirical research is needed to widen the — so far too small — quantitative information on which most claims about viceroyal America's economic inequality are commonly based. The gap between strong assumptions and weak — or inexistent at all — empirical evidence should urgently be closed. Otherwise, the economic conditions prevailing in the American territories of the Spanish monarchy and their consequences on economic development could not be properly assessed. The importance of the issue goes far beyond academic debate.

(2) In this paper, we present an ad hoc version of the Williamson's inequality index (the ratio of GDP *per capita* in 1820 to grain wages in 1800-1820) and our own inequality index (the ratio of GDP *per capita*

in 1700 and 1820 to average height in 1750-1760) for a sample of American, Asian and European countries.

(3) In our interpretation, the limited available evidence does not support the idea that Bourbon America was an especially unequal society from an international comparative perspective.

(4) Those views on the viceroyal period and its economic long-term legacy based on assumptions about extractive, unequal or bad institutions that appeared shortly after 1500 should offer more convincing empirical evidence.

REFERENCES

ACEMOGLU, D.; JOHNSON, S., and ROBINSON, J. (2002): «Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution». *Quarterly Journal of Economics* 117, pp. 1231-1294.

A'HEARN, B. A. (2003): «Anthropometric Evidence on Living Standards in Northern Italy, 1730-1860». *The Journal of Economic History* 63(2), pp. 351-381.

A'HEARN, B. A., and KOMLOS, J. (2003): «Improvements in Maximum Likelihood Estimators of Truncated Normal Samples with Prior Knowledge of σ. A Simulation Based Study with Application to Historical Height Samples». *Unpublished Working Paper*, Germany, University of Munich.

ALLEN, R. C.; BASSINO, J. P.; DEBIN, M.; MOLL-MURATA, C., and VAN ZANDEN, J. L. (2007): «Wages, Prices, and Living Standards in China, 1738-1925: in comparison with Europe, Japan, and India». *Discussion Paper Series* no. 316. Oxford University, Department of Economics.

ANGELES, L. (2007): «Income Inequality and Colonialism». *European Economic Review* 51, pp. 1155-1176.

ASSADOURIAN, C. S. (1987): «La producción de la Mercancía Dinero en la Formación del Mercado Interno Colonial», in Florescano, E. (comp.), *Ensayos Sobre el Desarrollo Económico de México y América Latina, 1500-1975*. México: Fondo de Cultura Económica, pp. 223-292.

AUSTIN, G. (2008): «The 'Reversal of Fortune' Thesis and the Compression of History: Perspectives from African and Comparative Economic History». *Journal of International Development* 20(8), pp. 996-1027.

BAKER, M. J.; BRUNNSCHWEILER, C. N., and BULTE, E. H. (2008): «Did History Breed Inequality? Endowments and Modern Income Distribution». *Working Paper* no. 08/86, CER-ETH, Zurich.

BAKEWELL, P. (1989): *Mineros de la Montaña Roja*. Madrid: Alianza Editorial.

BAKEWELL, P. (2004): *A History of Latin America*. Malden, Mass.: Blackwell.

BASKES, J. (2005): «Colonial Institutions and Cross-Cultural Trade: *Repartimiento* Credit and Indigenous Production of Cochineal in Eighteenth-Century Oaxaca, Mexico». *The Journal of Economic History* 65(1), pp. 186-210.

BASSINO, J. P., and MA, D. (2005): «Japanese Unskilled Wages in International Perspective, 1741-1913». *GPIH Working Paper* no. 2.

BATEN, J. (2001): «Climate, Grain Production, and Nutritional Status in Southern Germany During the XVIIIth Century». *Journal of European Economic History* 30, pp. 9-47.

BATEN, J.; PELGER, I., and TWRDEK, L. (2009a): «The Anthropometric History of Argentina, Brazil and Peru during the 19th and Early 20th Century». *Economics and Human Biology* 7, pp. 319-333.

BATEN, J.; REIS, J., and STOLZ, Y. (2009b): «The Biological Standard of Living in Portugal 1720-1980. When and Why did the Portuguese Become the Shortest in Europe?». Paper Presented at XVth World Economic History Congress-Session E6, Utrecht.

BILGER, B. (2004): «The Height Gap. Why Europeans Are Getting Taller and Taller and Americans Aren't». *The New Yorker*, available at http://www.newyorker.com/archive/2004/04/05/040405fa_fact

BRADING, D. A. (1983): *Mineros y Comerciantes en el México Borbónico, 1763-1810*. México: Fondo de Cultura Económico.

BRESCHI, M., and POZZI, L. (eds) (2007): *Salute, Malattia e Sopravvivenza in Italia Fra '800 e '900*. Udine: Forum.

BRUHN, M., and GALLEGO, F. A. (2008): «Good, Bad, an Ugly Colonial Activities: Studying Development across the Americas». *Policy Research Working Paper* no. 4641, The World Bank.

BULMER-THOMAS, V. (1994): *The Economic History of Latin America since Independence*. Cambridge: Cambridge University Press.

BURZIO, H. F. (1956-1958): *Diccionario de la Moneda Hispanoamericana*, vol. 2. Santiago de Chile: Fondo Histórico y Bibliográfico José Toribio Medina.

CARSON, S. A. (2005): «The Biological Standard of Living in 19th Century Mexico and the American West». *Economics and Human Biology* 3, pp. 405-419.

CARSON, S. A. (2007): «Mexican Body Mass Index Values in the late-19th-Century American West». *Economics and Human Biology* 5, pp. 37-47.

CHALLÚ, A. (2007): «Grain Markets, Food Suply Policies and Living Standards in Late Colonial México». Harvard University, PhD dissertation.

CHALLÚ, A. (2009): «Agricultural Crisis and Biological Well-Being in Mexico, 1730-1835». *Historia Agraria* 47(April 2009), pp. 21-44.

CINNIRELLA, F. (2008a): «On the Road to Industrialization: Nutritional Status in Saxony, 1690-1850». *Cliometrica* 2(3), pp. 229-257.

CINNIRELLA, F. (2008b): «Optimist or Pessimists?: A Reconsideration of Nutritional Status in Britain, 1740-1865». *European Review of Economic History* 12(3), pp. 325-354.

COATSWORTH, J. H. (2005): «Structures, Endowments, and Institutions in the Economic History of Latin America». *Latin American Research Review* 40(3), pp. 126-144.

COATSWORTH, J. H. (2008): «Inequality, Institutions and Economic Growth in Latin America». *Journal of Latin American Studies* 40, pp. 545-569.

COGNEAU, D. (2003): «Colonisation, School and Development in Africa». DT 2003/01, DIAL.

DOBADO, R. (1989): «El Trabajo en la Minas de Almadén, 1750-1855». Madrid: Universidad Complutense, PhD dissertation, available at http://eprints.ucm.es/8735/1/DOBADO2.pdf

DOBADO, R. (2009): «Herencia Colonial y Desarrollo Económico en Iberoamérica: Una Crítica a la «Nueva Ortodoxia» », in E. Llopis and C. Marichal (eds), *Obstáculos al Crecimiento Económico en Iberoamérica y España, 1790-1850*. México-Madrid: Instituto José Luís Mora and Marcial Pons, pp. 253-291.

DOBADO, R., and GARCÍA, H. (2009): «Neither So Low Nor So Short! Wages and Heights in Eighteenth and Early Nineteenth Centuries Colonial Latin America». Paper Presented at the Mini Conference A Comparative Approach to Inequality and Development: Latin America and Europe, Madrid. Available at http://www.uc3m.es/portal/page/portal/instituto_figuerola/investigacion/programas/programa1/conferencia/programme/Neither_so_low_not_so_short!.pdf

DOBADO, R., and MARRERO, G. (2010): «The Role of the Imperial State in the Mining-Led Growth of Bourbon Mexico's Economy». Forthcoming in *The Economic History Review*.

ENGERMAN, S. L., and SOKOLOFF, K. L. (1994): «Factor Endowments: Institutions, and Differential Paths of Growth Among New World Economies: A View from Economic Historians of the United States». *NBER Working Paper* no. h0066.

ENGERMAN, S. L., and SOKOLOFF, K. L. (2002): «Factor Endowments, Inequality, and Paths of Development Among New World Economics». *NBER Working Paper* no. w9259.

ENGERMAN, S. L., and SOKOLOFF, K. L. (2005): «Colonialism, Inequality, and Long-Run Paths of Development». *NBER Working Paper* no. w11057.

FLORESCANO, E. (1986): *Precios Del Maíz y Crisis Agrícolas en México*. México: Ediciones Era.

FLOUD, R.; WACHTER, K. W., and GREGORY, A. (1990): *Height, Health and History: Nutritional Status in the United Kingdom, 1750-1980*. Cambridge: Cambridge University Press.

FRANKEMA, E. H. P. (2009): *Has Latin America Always Been Unequal?* Leiden: Brill.

GARAVAGLIA, J. C., and MARCHENA, J. (2005): *América Latina de los Orígenes a la Independencia*, vol. 2. Barcelona: Crítica.

GARCÍA MONTERO, H. (2010): «Estatura y niveles de vida en la España de finales del Antiguo Régimen. El caso de la España Interior». Paper presented at the II Annual Meeting of the AEHE (Spanish Economic History Association), Madrid.

GARNER, R. L. (1985): «Price Trends in Eighteenth-Century Mexico». *Hispanic American Historical Review* 65, pp. 292-295, reproduced in Van Young (1992), pp. 108-110.

GARNER, R. L. (1992): «Precios y Salarios en México», in Johnson y Tandeter (comps), *Economías coloniales. Precios y Salarios en América Latina, siglo XVIII*. México: Fondo de Cultura Económica, pp. 81-118.

HEINTEL, M.; SANDBERG, L. S., and STECKEL, R. H. (1998): «Swedish Historical Heights Revisited: New Estimation Techniques and Results», in J. Komlos and J. Baten (eds), *The Biological Standard of Living in Comparative Perspective*. Stuttgart: Franz Steiner Verlag, pp. 449-458.

HEYBERGER, L. (2005): *La Révolution Des Corps*. Strasbourg: Presses Universitaires de Strasbourg.

KOMLOS, J. (1989): *Nutrition and Economic Development in the Eighteenth-Century Habsburg Monarchy: An Anthropometric History*. Princeton, N.J.: Princeton University Press.

KOMLOS, J. (1993): «The Secular Trend in the Biological in the United Kingdom». *Economic History Review* 46(1), pp. 115-144.

KOMLOS, J. (2004): «How to (and How Not to) Analyze Deficient Height Samples». *Historical Methods* 37(4), pp. 160-173.

KOMLOS, J. (2007): «On English Pygmies and Giants: The Physical Stature of English Youth in the late 19th and Early 19th Centuries». *Research in Economic History* 25, pp. 149-168.

KOMLOS, J., and KIM, J. H. (1990): «Estimating Trends in Historical Heights». *Historical Methods* 23, pp. 116-121.

KOMLOS, J.; HAU, M., and BOURGUINAT, N. (2003): «An Anthropometric History of Early-Modern France». *European Review of Economic History* 7, pp. 159-189.

KOMLOS, J., and BATEN, J. (2004): «Looking Backward and Looking Forward». *Social Science History* 28(2), pp. 191-210.

LADD, D. M. (1992): *Génesis y Desarrollo de Una Huelga*. Mexico: Alianza Editorial.

LÓPEZ, J. H., and PERRY, G. (2008), «Inequality in Latin America: Determinants and Consequences». *Policy Research Working Paper* no. 4504. Washington, D.C.: The World Bank.

LÓPEZ-ALONSO, M., and PORRAS, R. (2007): «Las Altas y Bajas Del Crecimiento Económico Mexicano», in R. Dobado, A. Gómez and G. Márquez (eds), *México y España, Historias económicas semejantes?*. México: Fondo de Cultura Económica, pp. 651-672.

MADDISON, A. (2009): *Statistics on World Population, GDP and Per Capita GDP, 1-2006 AD*, available at http://www.ggdc.net/maddison/

MARCHENA, J. (1992): *Ejército y Milicias en el Mundo Colonial Americano*. Colección Armas y América: Madrid, Ed. Mapfre.

MARGO, R., and STECKEL, R. H. (1983): «Heights of Native-Born Whites During the Antebellum Period». *Journal of Economic History* 43(1), pp. 167-174.

MÁRQUEZ, L.; MCCAA, R.; STOREY, R., and DEL ANGEL, A. (2005): «Health and Nutrition in Pre-Hispanic Mesoamerica», in R. H. Steckel and J. C. Rose (eds), *The Backbone of History*. Cambridge: Cambridge University Press, pp. 307-338.

MARTÍNEZ-CARRIÓN, J. M. (2009): «La Historia Antropométrica y la historiografía iberoamericana». *Historia Agraria* 47(April), pp. 3-10.

MILANOVIC, B.; LINDERT, P. H., and WILLIAMSON, J. G. (2008): «Ancient Inequality», revised (June) version of «Measuring Ancient Inequality». *NBER Working Paper* no. 13550.

MIÑO GRIJALVA, M. (2001): *El Mundo Novohispano. Población, Ciudades y Economía, Siglos XVII y XVIII*. México: El Colegio de México-Fondo de Cultura Económica.

MIRONOV, B. (2005): «The Burden of Grandeur: Physical and Economic Well-Being of the Russian Population in the Eighteenth century», in R. C. Allen, T. Bengtsson and M. Dribe (eds), *Living Standards in the Past*. Oxford: Oxford University Press, pp. 255-277.

PRADOS DE LA ESCOSURA, L. (2007a): «Inequality and Poverty in Latin America. A Long-Run Exploration», in T. J. Hatton, K. H. O'Rourke and A. M. Taylor (eds), *The New Comparative Economic History*. Cambridge: The MIT Press, pp. 291-315.

PRADOS DE LA ESCOSURA, L. (2007b): «Lost Decades? Independence and Latin America's Falling Behind, 1820-1870». *Working Papers in Economic History* no. 07-18, Universidad Carlos III de Madrid.

QUIROZ, E. (2005): *Entre el Lujo y la Subsistencia. Mercado, Abastecimiento y Precios de la Carne en la Ciudad de México, 1750-1812*. México: El Colegio de México.

SALVATORE, R. (1998): «Heights and Welfare in Late-Colonial and Post-Indepenence Argentina», in J. Komlos and J. Baten (eds), *The Biological Standard of Living in Comparative Perspective*. Stuttgart: Franz Steiner Verlag, pp. 97-121.

SALVATORE, R. D., and BATEN, J. (1998): «A Most Difficult Case of Estimation: Argentinian Heights, 1770-1840», in Komlos and Baten (eds), *The Biological Standard of Living in Comparative Perspective*. Stuttgart: Franz Steiner Verlag, pp. 90-96.

SÁNCHEZ SANTIRÓ, E. (2002): «Plata y Privilegios: el Real de Minas de Huautla, 1709-1821». *Estudios de Historia Novohispana* 1, pp. 85-123.

SOKOLOFF, K. L., and VILLAFLOR, G. (1982): «The Early Achievement of Modern Stature in America». *Social Science history* 6(4), pp. 453-481.

STECKEL, R. H. (1986): «A Peculiar Population: The Nutrition, Health, and Mortality of American Slaves from Childhood to Maturity». *The Journal of Economic History* 46(3), pp. 721-741.

STECKEL, R. H. (1995): «Stature and the Standard of Living». *Journal of Economic Literature* 33(4), pp. 1903-1940.

STECKEL, R. H. (2005): «Health and Nutrition in Pre-Columbian America: The Skeletal Evidence». *The Journal of Interdisciplinary History* XXXVI(I), pp. 1-32.

STECKEL, R. H. (2008): «Biological Measures of the Standard of Living». *Journal of Economic Perspectives* 22(1), pp. 129-152.

STECKEL, R. H. (2009): «Heights and Human Welfare: Recent Developments and New Directions». *Explorations in Economic History* 46(1), pp. 1-23.

SWANN, M. M. (1990): «Migration, Mobility, and the Mining Towns in Northern Mexico», in D. J. Robinson (ed.), *Migration in Colonial Spanish America*. Cambridge: Cambridge University Press, pp. 143-181.

TANCK, D. (1999): *Pueblos de Indios y Educación en el México Colonial, 1750-1821*. Mexico: El Colegio de México.

TANCK, D. (2005): *Atlas Ilustrado de los Pueblos de Indios. Nueva España, 1800*. Mexico: Fomento Cultural Banamex.

TANDETER, E. (1992): *Coacción y Mercado. La Minería de la Plata en el Potosí Colonial, 1692-1826*. Cuzco: Centro de Estudios Regionales Andinos «Bartolomé de las Casas».

TANDETER, E. (1999): «Los Trabajadores Mineros y el Mercado», in M. Menegus (coord.), *Dos Décadas de Investigación en Historia Económica Comparada en América Latina*». Mexico: El Colegio de México, pp. 363-380.

VELASCO, C. (1989): «Los Trabajadores Mineros en la Nueva España, 1750-1810», in E. Cardenas (comp.), *Historia Económica de México*. Mexico: FCE, pp. 563-589.

VÉLEZ-GRAJALES, R. (2009): «The Biological Standard of Living in Mexico (c. 1953-1982): Concentration of Urban Population and Inter-Regional Inequality». Paper Presented at the Mini-Conference A Comparative Approach to Inequality and Development: Latin America and Europe, Madrid, May 8-9.

VON HUMBOLDT, A. (1822): *Political Essay on the Kingdom of New Spain*, 4 vols. London: Longman, Hurst.

VON HUMBOLDT, A. (1822:1991): *Ensayo Político Sobre el Reino de Nueva España*. México: Editorial Porrúa.

VON MENTZ, B. (1998): «Coyuntura minera y protesta campesina en el centro de Nueva España en el siglo XVIII», in I. Herrera (ed.), *La Minería Mexicana de la Colonia al Siglo XX*. Mexico: Instituto Mora.

WILLIAMSON, J. G. (1999): «Real Wage Inequality and Globalization in Latin America before 1940». *Revista de Historia Económica* XVII(special issue), pp. 101-142.

WILLIAMSON, J. G. (2002): «Land, Labor, and Globalization in the Third World, 1870-1940». *Journal of Economic History* 62(1), pp. 55-85.

WILLIAMSON, J. G. (2008): «History without Evidence: Latin America Inequality since 1491». *Paper Presented at the Mini-Conference A Comparative Approach to Inequality and Development: Latin America and Europe*, Madrid.

WILLIAMSON, J. G. (2009): «Five Centuries of Latin American Inequality». *NBER Working Paper* no. 15305.

APPENDIX 1:   SOURCES AND METHODS OF NOMINAL AND REAL WAGE ESTIMATES

Figure 1: Wages in Amsterdam/Holland, Antwerp/Belgium, Gdansk, Leipzig, London/Southern England, Milan, Strasbourg, Sweden and Vienna from the web page of the International Institute of Social History (http://www.iisg.nl/hpw/data.php). Wages in Bogota, China, Istanbul, Korea, Pennsylvania, Potosi and Pune from the web page of the Global Price and Income History Group (http://gpih.ucdavis.edu/Datafilelist.htm). Wages in Almadén from Dobado (1989), in Kyoto from Basino and Ma (2005) and in Mexico from Challú (2007). Daily wages in grams of silver:

Almadén: Labourer, average of 1800-1820. Amsterdam/Holland: *Opperman*, average of 1800-1820. Antwerp/Belgium: mason's labourer, summer, average of 1800, 1813 and 1816-1820. Bogota: low-skilled worker, average of 1800-1808. China: Beijing rural wages, average of 1807-1808, 1812-1813 and

1816-1820. Gdansk: unskilled worker, 1800-1812. Istanbul: unskilled construction worker, 1800, 1802, 1805, 1807, 1809, 1814 and 1817-1820. Kyoto: unskilled labourers, average of 1800-1820. Leipzig: building labourer, average of 1800-1820. London: building labourer, average of 1800-1820. Mexico: building labourer, average of 1800, 1802-1811, 1814 and 1816-1818. Milan: labourer, average of 1800-1804 and 1808-1820. Pennsylvania: labourer, average of 1800-1819. Porto: agricultural wage, average of 1800-1820. Potosi: unskilled workers, average of 1806, 1808, 1812 and 1813. Pune: average of Indian soldier in the British army and of domestic servant monthly wage divided into 30 days; average of 1805-1820. Strasbourg: labourer, average of 1801-1820. Sweden: labour, male agricultural, average of 1816-1820. Vienna: building labourer, average of 1800-1820.

Figure 2: Grain prices in Amsterdam/Holland, Antwerp/Belgium, Leipzig, London/Southern England, Milan, Porto, Strasbourg, Sweden and Vienna from the International Institute (http://www.iisg.nl/hpw/data.php). Prices of grain in Bogota, China, Istanbul, Korea, Pennsylvania Potosi and Pune from the web page of the Global Price and Income History Group (http://gpih.ucdavis.edu/Datafilelist.htm). Grain prices in Almadén from Dobado (1989), in Kyoto from Bassino and Ma (2005) and in Mexico from Garner (1985). Conversion rates of weight vs. volume units: wheat, 0.772 kilogram per litre; corn, 0.901 kilogram per litre; rice, 0.579 kilogram per litre (http://gpih.ucdavis.edu/Converting.htm). Except for Mexico, where the equivalence used is 55.5 litres per *fanega* following Florescano (1986). New Spain *reales* converted into grams of silver a rate of 3.03 grams per real Burzio (1956-1958). For nominal wages, see Figure 1. Grain prices in grams of silver per litre:

Almadén: 1800, 1802-1808, 1810-1814 and 1816-1820; grain (wheat) wage average of 1800, 1802-1808, 1810-1814 and 1816-1820. Antwerp/Belgium: 1800-1820; grain (wheat) wage is the average of 1800, 1813 and 1816-1820. Amsterdam/Holland: Utrecht/Groningen, 1800-1801 and 1804-1819; grain (wheat) wage is the average of 1800-1801 and 1804-1819. Bogota: 1801-1804; grain (corn) wage is the average of 1801-1804. China: Averages of 1801-1810 and of 1811-1820; grain (rice) wage is the average of 1807-1808, 1812-1813 and 1816-1820. Gdansk: 1800-1815; grain (wheat) wage is the average of 1800-1812. Istanbul: 1801, 1803-1805, 1807-1808, 1810, 1812-1816 and 1820; grain (wheat) wage is the average of 1805, 1807, 1814 and 1820. Korea: 1800-1817 and 1819-1820; grain wage (rice) is the average of 1800-1801, 1803, 1805, 1809, 1816 and 1819. Kyoto: 1800-1820; grain (rice) wage is the average of 1800-1820. Leipzig: 1800-1810; grain (wheat) wage is the average of 1800-1810. London/Southern England: 1800-1820; grain (wheat) wage is the average of 1800-1820. Mexico: 1800-1817; grain (corn) wage is the average of 1801, 1802-1811, 1814 and 1816-1817. Milan: 1800-1804 and 1808-1820; grain (wheat) wage is the average of 1800-1804 and 1808-1820. Pennsylvania: 1800-1820; grain (wheat) wage is the average of 1800-1820. Porto: 1800-1820; grain (wheat) wage is the average of 1800-1820;

Potosi: 1806-1808, 1810 and 1811; grain (wheat) wage is the average of 1806, 1808 and 1812-1813. Pune: 1810/11-1820-1821; grain (rice) wage is the average of 1811-1820. Strasbourg: 1800-1820; grain (wheat) wage is the average of 1801-1820. Sweden: 1816-1820; grain (wheat) wage is the average of 1816-1820. Vienna: 1800-1820; grain (wheat) wage is the average of 1800-1820.

Figure 3: Meat prices and wages in Amsterdam/Holland, Antwerp/Belgium, Leipzig, London/Southern England, Istanbul, Milan, Strasbourg and Vienna from the web page of the International Institute of Social History (http://www.iisg.nl/hpw/data.php). Meat prices in Bogota and Pennsylvania from the web page of the Global Price and Income History Group (http://gpih.ucdavis.edu/Datafilelist.htm) and in Mexico from Quiroz (2005). For nominal wages, see Figure 1. Prices in grams of silver per kilo:

Amsterdam/Holland: 1800 and 1811-1820; meat wage is the average of 1800 and 1811-1820. Antwerp/Belgium: 1817-1819; meat (beef) wage is the average of 1817-1819. Bogota: 1801-1804, 1806 and 1808-1809; meat (beef) wage is the average of 1801-1804, 1806 and 1808. Gdansk: 1801-1815; meat (beef) wage is the average of 1801-1812. Istanbul: 1814-1820; meat (mutton) wage is the average of 1814 and 1817-1820. Leipzig: 1800-1810; meat (beef) wage is the average of 1800-1810. London/Southern England: 1800-1820; meat (beef) wage is the average of 1800-1820. Mexico**:** 1800-1805 and 1807-1811; meat (beef) wage is the average of 1800, 1802-1805 and 1807-1811. Milan: 1800-1804 and 1808-1820; meat (veal) wage is the average of 1800-1804 and 1808-1820. Pennsylvania: 1800-1820; meat (beef) wage is the average of 1800-1819. Strasbourg: 1800-1820; meat (beef) wage is the average of 1801-1820. Vienna: 1800-1820; meat (beef) wage is the average of 1800-1820.

Figure 5: Sources and methods for estimating grain wages as in Figure 2; GDP *per capita* in 1820 from Maddison's web page (http://www.ggdc.net/maddison/). GDP *per capita* in 1990 international dollars for 1820 of the countries considered divided by the respective average grain wage of 1800-1820 in the towns, regions or countries for which data exit. Thus, Amsterdam/Holland grain wage is associated to GDP *per capita* of the Netherlands, Kyoto to Japan, Potosi to Bolivia, etc. GDP *per capita* of Poland in 1820 is the Eastern European average. GDP *per capita* of Bolivia and Colombia are the Latin American average.

APPENDIX 2: SOURCES AND METHODS OF PHYSICAL STATURES ESTIMATES

Figure 4: Our estimation of the average height in Bourbon Mexico and Venezuela has followed the methodology suggested by Komlos (2004). Thus, we first exclude all individuals whose age lies outside the range of 23-50

years, since they might either still continue growing — those under 23 years — or start to lose height because of aging — those over 50 years. Second, we have drawn the histograms using the original measures (see Dobado and García (2009) for further details) in order to verify whether the height distributions of the military units approach a normal distribution, which it is needed for a proper selection of the truncation points. Third, we have applied the method proposed by Komlos and Kim (1990) to estimate the average height of the whole distribution. Although Komlos and Kim's method is intended to obtain the trend of series, it may also be used to estimate the average height of a population by assuming a constant standard deviation of 6.86 centimetres (Komlos and Kim 1990, p. 120). This method yields results similar to those of the RTML (restricted truncated maximum likelihood) by A'Hearn and Komlos (2003).

Sources of height are: The United States: Sokoloff and Villaflor (1982); Great Britain: Floud *et al*. (1990), Komlos (1993) and Cinnirella (2008b); Sweden: Heintel *et al*. (1998), Bavaria: Baten (2001); Saxony: Cinnirella (2008a); France: Komlos *et al*. (2003); Lombardy: A'Hearn (2003); Austria — Hungary: Komlos (1989); Russia: Mironov (2005); Interior Spain: García Montero (2009); Bourbon Mexico and Venezuela: Archivo General de Simancas, Simancas, Valladolid, Spain, Secretaría del Despacho de la Guerra, files 7299-2, 7299-3, 7299-4, 7299-5, 7299-6, 7198-18, 7198-2, 7028-7, 7029-1, 7034-1, 7027-12, 7026-1, 7048-5, 6991-2, 7025-2, 7047-9, 7047-10, 7047-11, 7047-13, 7047-14, 7047-15, 7047-16, 7047-17, 7047-18, 7047-19, 7047-20, 7047-21, 7047-22, 7047-23, 7047-24, 7047-25, 7047-27, 7047-29, 7048-2, 7048-3, 7048-4, 7048-6, 7048-7.

Figure 6: GDP *per capita* in 1700 and 1820 from Maddison's web page (http://www.ggdc.net/maddison/). Sources of height may be seen in Figure 4. For all countries in the sample, GDP *per capita* in 1700 and 1820 is divided by the average height of cohorts born in 1750-1760, except Interior Spain (1767-1770).