

**Neither so low nor so short! Wages and Heights in Eighteenth and Early  
Nineteenth Centuries Colonial Latin America**

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## 1. Introduction

Inequality in Latin America has become a fashionable topic. And not without good reason, since Latin America, along with Sub-Saharan Africa, is the most unequal region of the world [López and Perry (2008)].

The search for “*inequality in Latin America*” in Google yields almost 100,000 results as for mid April this year.<sup>2</sup> One of them is particularly telling about contemporary perceptions on the issue: “*Inequality is as Latin American as good dance music and magical-realist fiction.*”<sup>3</sup> As the *danzón*, which was danced at least since late eighteenth century in the Caribbean, has inequality been conspicuously Latin American from colonial times? Or did it appear, as the literary magical-realism, much more recently? Very likely, most economist and economic historians would nowadays answer affirmatively to the first question. This was clearly also the case of the *dependencia* school some decades ago.

However, the empirical foundations, in particular those of quantitative character, of the popular idea that Latin American inequality has colonial origins are rather unconvincing, to say the less. In this respect, we agree with Grier (1999) in that “*much of the work on colonialism has been theoretical or anecdotal*”<sup>4</sup>. The contrast between the strength of some propositions regarding the particular case of colonialism in Latin America and the evidence supporting them is very often striking. The need for “*far more evidence*” on Latin American inequality has also been pointed out by Williamson (2008).<sup>5</sup>

Therefore, the main objective of this work in progress is basically empirical. We attempt at contributing to the reduction of the gap between: a) very general assumptions on colonialism in Latin America and its long-term economic consequences; and b) the availability of reliable quantitative information upon which research on colonial economic history should be based. We limit our attempt to the significant case of wages and heights in Bourbon Latin America and to the inferences that they suggest in terms of approaching inequality in eighteenth and early nineteenth centuries from an international comparative perspective.

On the contrary, inequality in post-colonial Latin America has been the object of serious empirical analysis by economic historians for some time already –i. e.

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<sup>2</sup> Less restrictive searches produce many more hits. A search for *Latin America inequality* produces more than one million hits.

<sup>3</sup> [http://www.economist.com/world/americas/displayStory.cfm?story\\_id=2193852](http://www.economist.com/world/americas/displayStory.cfm?story_id=2193852).

<sup>4</sup> Grier, 1999, p. 317.

<sup>5</sup> The title of Williamson’s work, “History without Evidence: Latin American Inequality since 1491”, is an honest recognition by the author of the weakness of the empirical evidence on which most statements on early modern inequality in Latin America are based.

Williamson (1999), Bértola (2005), Bértola and Williamson (2006), Prados (2007) and Bértola et al. (2008).

Lately, the interest of empirically studying inequality in colonial Latin America has been reinforced. A growing and increasingly influential body of literature posits that the main contemporary Latin American economic problems (low growth and extreme inequality) are deeply rooted in colonial times. On the basis of the alleged existence of either “extractive” institutions [Acemoglu, Johnson and Robinson (2002)] or institutions producing extreme inequality [Engerman and Sokoloff (1994, 2002 and 2005)], the Spanish colonial legacy is blamed for the creation of a “*reversal of fortune*” among European colonies in the Americas –the poorest one circa 1500 (i. e. the USA) became richer while the initially richest ones (i.e. Mexica and Inca empires) got poorer- or of an adverse development path that differs sharply from the one followed by the United States.<sup>6</sup> Many authors have been more or less influenced by this neo-institutional interpretation of economic development in Latin America and other parts of the world since 1500 –i. e. Cogneau (2003), Frankema (2006), Angeles (2006), Baker et al. (2008), Bruhn and Gallego (2008). All these interesting ideas, albeit lacking, in our opinion, of solid empirical support, deserve to be examined in the light of the available evidence.

It is also worth checking some results from the pioneering work on ancient inequality by Milanovic, Lindert and Williamson (2008) in which late colonial New Spain is shown as the most unequal society in the sample. New Spain turns out to be so unequal that its estimated inequality is significantly greater than the maximum implied by the “inequality possibility frontier”, an illuminating concept that those authors introduce.

In this work in progress we do not present any ambitious interpretation of the causes and consequences of inequality in colonial Latin America. Our attempt is much more limited and empirical. Using, *faute de mieux*, real wages and heights as proxies for inequality, we offer substantial evidence supporting the notion that late colonial Latin America was not an especially uneven society when compared with other parts of the world. If real wages and heights may also be considered acceptable indicators of living standards and economic development, the picture of Bourbon Latin America

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<sup>6</sup> This set of propositions, termed as “new orthodoxy” by Dobado (forthcoming, a) is exerting an increasing intellectual influence as can be seen, for example, in Helpman (2004) or in Easterly (2006), among many others. Of greater practical importance is, perhaps, the fact that the World Bank has adhered to this “new orthodoxy” in several of its latest publications: De Ferranti et al. (2004), the *Report on World Development 2006* and Perry et al. (2006), López and Perry (2008).

becomes less pessimistic than the one usually assumed by most economists and economic historians.

In doing so we follow Coatsworth's (2008) empirically based revisionism on comparative colonial Latin America's inequality:

*"..., 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".<sup>7</sup>*

The additional empirical evidence shown here by us reinforces Coatsworth's (2008) revisionist claim. It is also in line with Williamson's (2008) contention that, from a wide international comparative perspective on inequality, *"there is little that is unusual in pre-industrial Latin America"*.<sup>8</sup>

Thus, it seems that an approach to the empirical study of colonial Latin America's inequality based upon the hypothesis of normality [Dobado (forthcoming, b)] deserves to be explored further. Underlying our research, this hypothesis responds to the Occam's razor philosophical principle of exploring first the simplest hypothesis: Why should colonial Latin America be very different to most of other pre-industrial economies?

Apart from this introduction, this working paper contains four sections. In Section 2, evidence on nominal and real wages collected from various sources is presented. Section 3 deals with heights. Indexes of inequality built on ratios relating GDP per capita to real (grain) wages and heights are shown. Some final remarks appear in Section 5. Sources of the many figures included in this working paper should be mentioned in detail in Appendix 1. We are sorry to say that we have failed in fulfilling the deadline. Naturally, however, sources are available under request to the authors. Sources of data and technical aspects on heights are depicted in Appendix 2

## **2. Nominal and real wages**

In this section we present evidence on nominal and real wages. As there are not yet baskets of goods properly representing the consumption patterns of colonial Latin American workers other than that of Leticia Arroyo for Arequipa<sup>9</sup>, we are unable of using appropriate cost of living indices. Therefore, we deflate nominal wages by

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<sup>7</sup> Coatsworth, 2008, p. 553.

<sup>8</sup> Williamson, 2008, p. 2.

<sup>9</sup> See [http://gpih.ucdavis.edu/files/Peru\\_18th\\_c\\_basket.xls](http://gpih.ucdavis.edu/files/Peru_18th_c_basket.xls).

prices of grain (corn and wheat) and meat in order to estimate wages in terms of an ordinary good (grain) and of a superior good (meat). Thus, we obtain two proxies of real wages which in turn may proxy for inequality.

Many of our data on nominal and real wages are the result of other authors' impressive work to whom we are grateful. Leticia Arroyo, Amílcar Challú and Robert Allen deserve a special mention. We also like to recognize that two institutions the Global Price and Income History Group<sup>10</sup> (hereafter GPIHG) and the International Institute of Social History<sup>11</sup> (hereafter IISH) have enormously facilitated our work and permitted to widen the original scope of this research. In particular, Leticia Arroyo and Amílcar Challú<sup>12</sup> have made possible that our sample of colonial Latin American nominal and real wages include data for Bogotá (capital town of the Viceroyalty of New Granada), for Potosí (famous mining town in Upper Peru) and for several cities in the Viceroyalty of New Spain, such as its capital town (Mexico), Guadalajara, Puebla and San Luis Potosí

In considering wages, especially those of unskilled workers as a proxy for inequality, we mainly draw from Williamson (2002). To some extent, we also try to adapt Prados's (2007) work to the more limited quantitative information existing for the colonial period. Our rationale is as follows: estimates of, or the educated guesses on, GDP per capita in the Spanish colonies in America by early nineteenth century are lower than in most Western countries; then, finding real wages of unskilled workers in colonial Latin America which similar to those in Europe indicates that, at the very least, inequality in New Spain, New Granada and Upper Peru was not especially higher by end of the colonial period. In fact, what we find is higher real (grain and, especially, meat) wages in Bourbon Latin America than the European average and similar trends towards stagnant or decreasing living standards throughout late eighteenth and early nineteenth centuries.

These results might be surprising to many. And not only to those defending the idea that colonial Latin America economies were based on low wages since institutions behind the labour supply for mining and other productive activities were extractive, unequal or bad. That could also be the case of some economic historians of the colonial period in Mexico that: a) have never adopted a comparative approach to determine the size of wages relative to other parts of the world; or b) interpret the perceived downward trend of real wages in late Bourbon Latin America as a peculiarity

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<sup>10</sup> <http://gpih.ucdavis.edu/>.

<sup>11</sup> <http://www.iisg.nl/hpw/data.php>.

<sup>12</sup> Dobado is especially grateful to Challú's intellectual generosity. It permitted him to use his unpublished data even before Challú successfully defended his doctoral dissertation at Harvard University.

which indicates the crisis of the colonial system. In this regard, probably the main methodological objective of this research consists in emphasising the advantages of the so far rather infrequent comparative approach, other than with the USA, when dealing with the analysis of basic economic features of colonial Latin America.

Medium to high relative real wages suggest that labour productivity and living standards could be neither too low nor too different to those in most of late pre-industrial Europe. This inference does not appear implausible under reasonable economic assumptions and neither is contradictory with our hypothesis of normality regarding colonial Latin America in general and New Spain in particular.

Only if future research demonstrates that the number of working days per year of miners and unskilled labourers in colonial Latin America were significantly lower or the difference between wage-earners and other segments of the commoners –i.e. peasants- higher than in other parts of the world, inferences from our findings on wages in terms of inequality should be appropriately revised. In any case, as for now, we believe that they hold true. Frankly speaking, we are the first ones surprised by the clarity and robustness of our findings.

## **2.1. Wages circa 1803**

Our quantitative examination of wages in colonial Latin America starts by offering a comparison between nominal and real (grain and meat) wages of skilled workers in Europe and North America and of miners in New Spain in 1803 or in the surrounding years. Nominal wages are expressed in silver grams per day. In an attempt to capture the level of real wage, we convert nominal wages into grain and meat wages through dividing by the prices of these two goods, which have been previously calculated, when needed, in terms of grams of silver per kilo. Thus we obtain the maximum quantities of grain or meat that could be bought if the whole nominal wage were spent in each of these two goods. This procedure for determining the purchasing power of nominal wages, albeit not fully satisfactory, is justified, as mentioned above, by the lack of consumption baskets for late colonial Latin America. In any case, it offers a proxy of real wages in terms of either a normal good or a superior good within the consumption patterns of the commoners in preindustrial economies. The choice of 1803 simply responds to the fact that it is the year for which good quantitative data on wages paid in La Valencia, the biggest mine in late colonial Mexico, exist. Using only one year, be it 1803 or another one, for comparative

purposes is not optimal, but, in spite of it, the static picture that emerges is clear and consistent with the dynamic one presented in the next subsection.

We are especially interested in showing information on miners' wages as these workers are very often presented as being the epitome of colonial exploitation [Engerman and Sokoloff (1994, 2002 and 2005); Acemoglu et al. (2002)]. This idea is clearly at odds with the firsthand testimony given by Humboldt after his visit to New Spain in 1803-1804: "*The Mexican miner is the best paid of all miners; he gains at the least from 25 to 30 francs per week of six days*"<sup>13</sup>. Ward, also a reliable on-the-field observer, claimed shortly after that Mexican independence that "*the ordinary wages of a miner are high.*"<sup>14</sup> Most specialists in Mexican colonial mining history seem to be very close to Humboldt's view on the issue [i. e. Brading (1983)<sup>15</sup>, Velasco (1989)<sup>16</sup>, Swann (1990)<sup>17</sup> and Ladd (1992)<sup>18</sup>].

Figure 1 depicts nominal wages of urban skilled workers, mostly in the building trades, and of miners in New Spain (three levels of qualification in Guanajuato and two general estimates by Humboldt (1822:1991) and Garner (1993)) and in Almadén (Spain). It does not seem that nominal wages of miners by early nineteenth century were low by international standards. On the contrary, they are higher than those of skilled workers in most developed European countries. Most likely they were even higher than what is revealed in Figure 1 as, on top of their nominal wages, some miners were generally paid additional "*partidos*" –variable quantities of silver mineral– that may be quite significant according to Velasco (1989)<sup>19</sup> and Ladd (1992)<sup>20</sup>. However, it might be objected that the finding of high nominal wages in late Bourbon

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<sup>13</sup> Humboldt, 1822, p. 248. The conversion from francs into silver at the early nineteenth century rate (<http://www.iisg.nl/hpw/data.php>) yields 112,5 to 135 grams.

<sup>14</sup> Ward, 1828, vol. II, p. 146.

<sup>15</sup> "*Los trabajadores mineros de México, lejos de haber sido los peones oprimidos que la leyenda nos presenta, constituían una fuerza laboral libre, bien pagada y geográficamente móvil que en muchos casos era prácticamente socia de los patrones.*" Brading, 1983, p. 201.

<sup>16</sup> "... *la mayoría de los trabajadores eran libres, en el sentido de que no eran obligados a trabajar en explotaciones mineras o en plantas de refinación; iban a éstas atraídos, en general, por percepciones económicas considerablemente más altas que las usuales en las labores agrícolas.*" Velasco, 1989, p. 582.

<sup>17</sup> "..., *these labourers were comparatively well paid*". Swann, 1990, p. 145.

<sup>18</sup> According to this author, the amount of goods that a miner could buy in Central Mexico by the 1760's with a fraction of his wage was enormous in comparison with Europe and Asia: "*Cada trabajador que bajaba recibía el mismo salario: cuatro reales (cincuenta centavos) [12.4 grams of silver] por turno de 12 horas. Con un real se podía comprar una lengua de res, medio kilogramo de lana, 800 gramos de cordero, o dos y medio kilogramos de res o ternera. Con tres reales podía comprar 12 kilogramos de velas, sebo o carbón.*" Ladd, 1992, p. 34. For the sake of comparison, in the basket of goods suggested by Allen (2001) for eighteenth century Europe, candles and meat are valued at 4.98 and 2.21 grams of silver per kilo, respectively.

<sup>19</sup> "..., *el partido hizo posible que algunos trabajadores firmaran para cumplir con sólo tres o cuatro turnos a la semana y con eso tenían suficiente para vivir.*" Ladd, 1992, p. 37.

<sup>20</sup> "*Para los barreteros, el partido representaba la parte fundamental de sus ingresos*". Velasco, 1989, p. 585.

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 –see Figure 2. As it may be seen, grain wages of New Spain miners are lower only than those of skilled workers in the USA. Grain-purchasing power of miners' nominal wages does not seem to be negatively affected by an especially high level of grain prices. When we calculate wages in terms of a superior good as meat, differences in favour of Bourbon Mexico become enormous –see Figure 3.

Thus, differences in meat wages are quite substantial. Access to animal proteins was much easier for New Spain miners than for skilled workers in most economically developed Europe. The high purchasing capacity of miners' wages in terms of meat in Bourbon Mexico was partially due to the comparatively low prices of beef, which in turn responds to the favorable factor endowments for extensive cattle raising in Northern regions of the colony. Prices of other superior goods might also be comparatively cheap for late colonial Mexico consumers. At least that is the case of sugar. This good, which is not included by Allen (2001) in the European basket of goods, generally cost in eighteenth century New Spain less than 5,4 grams of silver per kilo –Figure 1 in Crespo (1995)- while the secular average price is 8,2 grams of silver per kilo in London and Southern England<sup>21</sup>.

More research needs to be done in order to put the colonial Mexico miners living standards in the international map that is being drawn by recent scholarship –i. e. Van Zanden (1999), Allen (2001, 2007), Özmucur and Pamuk (2002), Allen et al. (2007). However, what seems clear after this examination of nominal and real (grain and meat) wages is that miners in late Bourbon Mexico were far from being the coerced, immobile and poorly paid labor force created by those supposedly extractive, unequal or bad colonial institutions that are so often assumed in the literature. But it is not only the Mexican case which is in need of being reconsidered in the light of historical evidence such as the one offered by Bakewell (2004) regarding Andean mining labor relations in colonial times.<sup>22</sup> They seem to have been less coercive and much more complex than what the *World Development Report 2006*, following the

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<sup>21</sup> <http://www.nuff.ox.ac.uk/users/allen/studer/london.xls>. The average of discontinuous data on sugar prices in Massachusetts for 1753-1799 is 6,1 grams of silver per kilo. ([http://gpih.ucdavis.edu/files/Massachusetts\\_1630-1883.xls](http://gpih.ucdavis.edu/files/Massachusetts_1630-1883.xls)).

<sup>22</sup> “After their year in the in the town [Potosi], many men, ..., apparently preferred to stay on as worker in mining, refining, or something else,... Others moved out to of the town to nearby alleys, apparently as subsistence farmers or workers on chacras. The boom at Oruro after 1600 was another lure to Indians who had learned mining and refining in Potosi after being taken there by the mita. In fact, Oruro drew off mita men on their way to Potosi. They worked there as contracted wage laborers, since the authorities made hardly any mita allocation to Oruro. The other lesser mining centers that rose and fell in the Potosi district after 1600 were similarly mita-less, and had only the attraction of wages to secure workers –some from Potosi, some from native towns.” Bakewell, 2004, p. 240.



mainstream assumptions, claims.<sup>23</sup> In eighteenth century Potosi, most mining labor force consisted of free workers while in Lower Peru (Bolivia) mita never existed at all [Garavaglia and Marchena (2005)]. Therefore, it would not be surprising to find higher than expected wages in the Andes too. The legal daily wage established by the colonial authorities for the mitayos in Potosi by early nineteenth century was 4 reales (12,12 grams of silver).<sup>24</sup> As we will soon see, this nominal wage, higher than those of most skilled workers in Europe, has also a very high purchasing power in terms of grain at least.

Following in accordance with the rationale underlying this empirical research on colonial inequality –see Introduction- we now focus our attention on unskilled workers. Therefore this subsection continues with the examination of nominal and real (grain and meat) wages of unskilled workers, mostly urban in building, except otherwise mentioned, circa 1803. Figure 4 shows nominal wages of unskilled workers in a wide sample of countries, including Bolivia and Colombia.

Neither of the Spanish colonies in America is among the parts of the world with the lowest nominal wages. Most of cases in the colonial Latin America subsample are among the central third of the range of values. In some cases, those of unskilled workers in Potosí and of construction workers in Mexico are very close or similar to the highest ones. Again, in order to check whether this relatively medium or high level of nominal wages is due to the supposed abundance of silver in colonies such as New Spain or Upper Peru, we calculate real wages in terms of ordinary (grains) and superior (meat) goods –see Figure 5 and Figure 6.

Either in terms of grain or, especially, of meat, the level of wages in colonial Mexico and Colombia are much higher than in Europe and Asia. In fact, in some cases, they are even higher than in the USA. The comparatively big purchasing power of late colonial Latin America nominal wages in terms of meat is a somewhat surprising finding. However, at least for the Mexican case, it is indisputable after the research on meat consumption in the capital city of New Spain conducted by Quiroz (2005).<sup>25</sup> While

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<sup>23</sup> “the mita (from the quechua world mit’a, meaning “turn”) became a central institution until independence,...”. World Bank, 2006, p. 111.

<sup>24</sup> Tandeter, 1999, p. 369. This author shares the revisionist view on Andean mining institutions by Bakewell: “El conjunto de fuentes del siglo XVIII permite confoirmar la validez de esa aproximación al problema.” Tandeter, 1999, p. 369.

<sup>25</sup> “En 1791 Humboldt estimó el consumo global de carne de la ciudad (...) en 26 000 000 de lb y un consumo per cápita de 189 lb anuales, es decir 255 gr diarios por habitante. En la época, este autor se sorprende de sus propios cálculos y señala que en México se consumía más carne que en París, donde sólo se alcanzaban las 163 lb anuales (79 kg) por habitante. Este cálculo no deja de llamar la atención si se considera que París era la ciudad privilegiada de Francia aun antes de la Revolución, cuando el consumo medio en toda la nación sólo era de 48.5 lb, es decir 23.5 kg, cantidad que para muchos comentaristas era aun generosa.” Quiroz, 2005, p. 44.

in Europe, eating meat by late eighteenth and early nineteenth centuries was not frequent among the commoners, this was far from being the case in Mexico: *“se ha comprobado el arraigo entre los habitantes de la capital de comer carne en forma bastante más abundante de lo que se acostumbraba en ese siglo en Europa. Incluso al grado de romper preceptos religiosos”*<sup>26</sup>. This seems to have been also the case in Guadalajara and the rest of the colony, especially in the Northern regions. The possibility of consuming meat for ordinary wages earners in Bogotá was also well above that in most developed European countries.<sup>27</sup>

Summarising the results presented so far, the conventional, pessimistic, assumptions on wages and living standards of miners and unskilled workers in late colonial Latin America do not seem to receive full empirical support. It is rather the optimistic alternative on the issue the one which is based on the available evidence.

## **2.2. Wages throughout the eighteenth and early nineteenth centuries**

Our empirical research proceeds by offering a dynamic, comparative, perspective on nominal and real (grain and meat) wages of unskilled workers which are those especially relevant regarding the rationale underlying our ad hoc version of the Williamson’s inequality. We use wages in England and Milan, which may be considered, respectively, the upper and lower bounds of the range of variation in Western Europe, as terms of comparison. We assume, following Allen et al. (2007) that real wages in England were not only higher than in the rest of Europe but also than in the rest of the world (North America excluded).

Figure 7 shows a long-term picture of unskilled building workers nominal wages in Bourbon Mexico, England and Milan. In all available cases, nominal wages in Bourbon Mexico are clearly higher than in Milan. Until the 1760’s they are also higher than in England. Afterwards, as a result of the strong growing trend that starts in the 1770’s, nominal wages in England finally run ahead those in late colonial Mexico. As in Milan, nominal wages in Bourbon Mexico exhibit a basically long-term stagnant evolution. Only at the very end of the colonial period they show some dynamics, which

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<sup>26</sup> Ibidem, p. 335.

<sup>27</sup> In Allen et al. (2007), the European “barebone basket” around 1750 includes 5 kilos of meat and/or fish per person/year whereas the subsistence level is estimated in 3 kilos in China. In a “respectable basket” meat and/or fish would reach 25 kilos per person/year –accompanied by other sources of proteins- in Europe and 31 kilos in China. By mid eighteenth century a laborer’s daily wage could buy more, and even much more, than six kilos of meat in Mexico and around five in Bogota.

might probably be related to the abnormal circumstances surrounding the turmoil caused by the upheaval (*Insurgencia*) that began in 1810.

Nominal wages in Bogota and Potosi in eighteenth and early nineteenth centuries were not lower than in Europe –see Figure 8. In fact, nominal wages in Potosí, albeit showing a slight downwards secular trend, probably interrupted only circa the pre-independence years, were consistently higher than in England and, especially, in Milan.

Our sample of late Latin America nominal wages in eighteenth and early nineteenth centuries is also well above those of India, China and Japan –see Allen (2007) and Allen et al. (2007). Given that differences between England and the rest of Europe were not minor, it can be properly said that only nominal wages of unskilled workers in the USA were clearly higher than in Latin America during the last decades of the Bourbon period.

Being Potosí and New Spain important producers of silver, it might be argued that their comparative high level of nominal wages was expectable. However, this circumstance does not apply to Bogotá, or at least not to the same extent. In any case, again, as in our static analysis of the previous subsection, we try to control for any possible monetary effects on prices that might decrease the purchasing power of nominal wages in colonial Latin America through deflating them with grain and meat prices.

Grain wages in New Spain were substantially higher than in Milan during the whole period considered –see Figure 9. Generally, except during some especially intense agricultural crisis -i. e. 1785-1786 and after 1810-, they also exceed to those in England –see Figure 9. Relative grain wages are shown in Figure 10. Bourbon Mexico grain wages relative to England grew during the second third of the eighteenth century and fell afterwards. In the early 1810's they were close to their historical minimum level of the 1730's. The evolution of New Spain's grain wages relative to Milan is not very different and was also influenced at the beginning of the nineteenth century by the circumstances surrounding 1810.

Meat wages reached a peak in New Spain in the 1760's and 1770's –see Figure 11. By then, the difference with England or Milan was simply amazing. It was substantially reduced afterwards, particularly from 1808 on. In any case, in spite of the reduction associated with the agrarian crisis in immediate pre and post 1810 years, relative meat wages were at its worst in New Spain almost twice and four times higher than in England and Milan, respectively –see Figure 12.

Bourbon Mexico was not the only challenging case for those who assume low wages as a result of extractive, unequal or bad colonial institutions. Grain and meat

wages in Bogota were also much higher than in England and Milan –see Figure 13. However, meat wages relative to England and Milan were significantly lower in the second half of the period under consideration. Grain wages relative to England basically fluctuate around the very long-term average with no signs of deterioration while grain wages relative to Milan show a clear growing trend since the 1760's on – see Figure 14.

In Potosí, to many the epitome of colonial exploitation in America, grain wages, were not generally lower than in England and Milan either –see Figure 15. Grain wages relative to England and Milan show a rather growing trend during the second half of the eighteenth century –see Figure 16.

It is our contention that the dynamic comparison of wages presented in this subsection also gives room for optimism rather than pessimism regarding the level and the evolution of nominal and real (grain and meat) wages in late colonial Latin America when compared the rest of the world (North America excepted). Certainly, real wages in Bourbon Mexico and Colombia share the same falling trend that is observed –albeit with variable intensity- practically all known cases within the Northern Hemisphere (North America included –i. e. Adams (1986) for Maryland) during late eighteenth and early nineteenth century. However, this fact reinforces the “hypothesis of normality” that we defend in our approach to the study of colonial Latin America economic conditions. Since these conditions were powerfully influenced by the relative abundance of land and other natural resources and the relative scarcity of labour, it should not come as a surprise to find that colonial Latin America’s economy –or at least significant parts of it- does not seem to have been based on low wages. By implication, if wages were not so low, it is very likely that institutions behind the labour market were not as extractive, unequal or bad as usually claimed either.

#### **4. Heights in Bourbon Mexico and Venezuela**

In this section we present information on heights in Bourbon Mexico and Venezuela. This information is totally new since it comes from a source that had not been exploited yet. We use it as an additional approach to the study of inequality in late colonial Latin America. In the scheme of this research, the comparative study of statures plays a double role: it is interesting in itself and serves as a relevant check of our findings on wages.

The rationale behind using heights in our analysis empirical driven is that they are very sensitive to inequality. This sensitivity has often been claimed by an abundant anthropometric literature [i. e. Komlos (1985), Floud et al., (1990), Nicholas and Steckel (1991), Steckel (1995)]. An inverse relationship between economic inequality and average height has been pointed out by Steckel (1983). Besides, heights complement the information on welfare and living standard offered by more conventional economic indicators, such as GDP per capita –particularly in the pre-statistical era-, real wages, etc. [Steckel (2008)].

Our reasoning here is similar to the above-mentioned one regarding real wages of unskilled workers: *ceteris paribus*, for a certain level of GDP per capita, the higher the average height in a given country, the more equality might be presumed. In other words, finding comparable heights in late colonial Latin America to those in allegedly more developed countries would cast serious doubt on the plausibility of mainstream assumptions on early modern inequality in the region. And, if our sample is representative –nothing suggests the opposite-, what we have found is that heights in late colonial Latin America are comparable to those in Europe in spite of its lower GDP per capita. These results 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 Latin America.

As a result of the growing popularity of Anthropometrics after some decades of existence, Latin America started to appear in a picture in which numerous social groups, countries and periods were already present [Komlos and Baten (2004), Steckel (2009)]. Studies on heights in Argentina, Colombia, Mexico and Puerto Rico during the nineteenth and twentieth centuries are available<sup>28</sup>. However, anthropometric research on colonial Latin America is scarce. To the best of our knowledge, only Challú (2009), for Central Bourbon Mexico, and Salvatore (1998), for the late Viceroyalty of the Rio de la Plata and early independent Argentina, have dealt so far with heights in the colonial period. Thus, it is necessary to widen the time and space dimensions of the colonial Latin American sample of heights (is necessary) to fill the gap in information with other parts of the world. We try to contribute to that goal by offering new data on Bourbon Mexico and Venezuela. Working with Spanish military sources –*filiações* and other documents of the conscripts to the colonial militias, we have been able to build a data base of almost 6000 observations -see Appendix 2<sup>29</sup>. Data include generations born

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<sup>28</sup> See Martínez Carrión (2009) for a recent review of the literature on historical Anthropometrics in Spain, Portugal and Latin America.

<sup>29</sup> Representativeness of the data base 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, public servants and high

from the 1730's to the 1780's in Northern and Southern regions of the Viceroyalty of New Spain (modern day Mexico and the South-western USA) and in Maracaibo (nowadays Venezuela) –see Table 1.

Results in Table 2 for Northern Mexico whites –the category white is probably more socio-economic and cultural than racial- do not show a decrease in average heights over the period under consideration. That is not case for Southern Mexico whites, whose average heights experience some fall, as it happens with those of Central Mexico that Challú (2009) observes, in particular from the 1790's to the 1830's. However, the trend of those of Southern *pardos* (mulattos and mestizos) is somewhat upwards –see Table 3. Neither decreases the average height of whites and *pardos* from Maracaibo.

In Figure 17 an international comparison of heights is shown.<sup>30</sup> Heights 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 probably were taller than many Eastern Asians. Whites from Maracaibo are even rather tall by Western standards of the period. In Central Mexico, according either to Challú (2009) or to our less significant results, heights would be in the lower range of the available international sample. On the contrary, whites from Southern New Spain were clearly the shortest in Figure 17. However, their average height is not unknown in some European regions, especially by late eighteenth century Europe. Besides, it is doubtful that the sample of whites and *pardos* is genetically homogeneous to that of Northern New Spain. An additional reason why results for Southern New Spain might be downward biased is that heights of the militiamen are closer to the European standards in the only case in which original data do not present a serious problem of heaping on the minimum height requirement (the *Batallón de Infantería de Castilla*, formed by whites from Yucatán). This possible bias is reinforced by the fact that officers' heights were never recorded while only seldom those of the sub-officers. Finally, most skilled workers were excluded from conscription. Thus, our estimate might be rather considered the lower bound of Southern New Spain heights. In any case, a North-East stature gradient has also been found in Pre-Hispanic Mesoamerica [Márquez et al. (2005)] and in Mexico from late nineteenth to mid twentieth centuries [López-Alonso and Porrás (2007)].

An additional measure of inequality is the racial gap: the difference in heights between whites and *pardos* –see Table 3. As it may be seen, some racial gap existed,

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skilled professionals were excepted. See Marchena (1992, a and b) for an study on the origins, evolution and composition of these militias.

<sup>30</sup> *Pardos* have not been included in order to make a comparison as homogeneous as possible that avoids possible bias due to genetic differences.

albeit it tended to decrease in either Southern Mexico or Maracaibo for the cohorts born from the 1730's to the 1780's. Moreover, the gap we find is significantly smaller than the one observed between different social classes in some European countries.

To summarize, improvable as they are, data on average heights of colonial Mexicans and Venezuelans are basically similar to those of Europeans, while the racial gap is comparatively small and decreasing, which may be interpreted as evidence against the idea of an especially unequal late colonial Latin America. On the contrary, our results support the hypothesis of normality.

If average heights are a good proxy for welfare and equality, a speculative inference drawn from the limited evidence available on pre-colonial Mesoamerica bio-archaeological indicators [Márquez et al. (2005)] might likely make sense. According to Marquez et al. (2005), two generalizations have been produced by previous research on statures in Pre-Hispanic Mesoamerica: *“first, the existence of a northeast to southwest gradient in average stature, ...; and second a trend toward diminishing height over time.”*<sup>31</sup> Leaving aside the Mayan Area, whose geography in Márquez et al. (2005) is much wider than in our Southern New Spain sample (modern day states of Campeche and Yucatán), the centuries-long trend toward diminishing heights seem to have been interrupted sometime during the colonial period: eighteenth century inhabitants of Central Mexico were taller than in most of the Pre-Hispanic history of Mesoamerica. Whether this hypothesis will prove correct is to be seen. If it were confirmed, explanations will need to be found. Neither a higher productivity of the colonial economy nor a lesser inequality in the post-1521 society should be overlooked. As to the first point, we agree with Coatsworth (2008) in that the introduction of new crops and, especially, new animals, facilitated by the demographic catastrophe of aboriginal population, brought about substantial gains in the productivity of the domestic-use agricultural sector in Mesoamerica during the first century of the Spanish rule. Those gains might well have been more long-lasting than claimed by Coatsworth (2008), especially in Northern Mexico. And they probably were even bigger than assumed if the symptoms of crisis in the economy of the late Mexica Empire (overpopulation, famines, extra-mortality, etc.) which are mentioned by Knight (2002) and Semo (2006) are taken into account. On the one hand, living conditions in Post-classic Central Mesoamerica were harsh even if only *“because the Basin of Mexico is not an easy environment to live in with the pre-Hispanic technology.”*<sup>32</sup> Additionally, income distribution patterns within the Mexica Empire do not seem to justify Williamson's (2008) assertion that the *“less rapacious indigenous elite”* was replaced

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<sup>31</sup> Márquez et al., 2005, p. 320.

<sup>32</sup> Ibidem, p. 336.

with a “more rapacious European elite”<sup>33</sup>. Some qualitative evidence suggests that this was not necessarily the case. According to Knight (2002), by early sixteenth century:

*“population growth, stimulated by ‘explosive’ immigration created severe pressures and sporadic famines, during which ‘members of the lower classes suffered horribly and died in great numbers’, most recently in 1504-6. (...) These pressures were aggravated, not alleviated, by the skewed distribution of goods which underlie the imperial political economy. Anáhuac fed off resentful provinces; the elite of Anáhuac were gorged on tribute; the poor periodically starved.”*<sup>34</sup>

Steckel’s (2005) view on health and nutrition in Pre-Columbian America is rather pessimistic and may help to see the colonial period under a new, more evidence-based, light<sup>35</sup>. Of particular relevance for our speculative argument here is that:

*“..., high rates of degenerative joint disease in the cities points to work effort, which drains net nutrition, as a significant culprit. The monumental architecture and the rituals associated with it in pre-Columbian cities of Mexico and the Yucatan region were emblems of a highly stratified society. Monuments were built by masses of labourers with simple tools, without the help of draft animals. Inequality in access to food and housing likely compounded the biological stress created by hard work.”*<sup>36</sup>

In our interpretation, data, scarce as they are, and inferences from the anthropometric approach to human material wellbeing in Latin America from a very long-term perspective do not seem to support either most of the usual perceptions on the effects of colonialism. In particular, the notions of a “reversal of fortune” after 1500 and of an increase in the concentration of assets and income that made of colonial Latin America a unique case from which nowadays extreme inequality in the region directly derives are in need of reconsideration.

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<sup>33</sup> Williamson, 2008, p. 20.

<sup>34</sup> Knight, 2002, p. 189.

<sup>35</sup> “This article and other work in anthropometric history suggest that the poor nutrition of many native populations, including those rapidly conquered, has been overlooked.” Steckel, 2005, p. 29.

<sup>36</sup> Ibidem, p. 28.



## 5. Wages, heights and GDP per capita.

In this section we present indexes of inequality using grain wages –an attempt to adapt the Williamson’s index of inequality to the available data in this research- and heights. Figure 18 shows the ratio of GDP per capita in 1820 estimated by Maddison to grains wages for several countries in America, Asia and Europe. As it may be, Latin American countries at the end of the colonial period are characterized by having very low indexes in terms of this ad hoc version of the Williamson’s inequality that we built. Certainly, using a less crude way of calculating real wages would offer somewhat different results. Problems with data used may also be altering the ratio corresponding to some countries. However, it is unlikely that the Spanish colonies in America change from low levels of Williamson’s inequality to high or very high levels. Besides, if instead of using grain prices as deflator for real wages we use meat prices the ratio of GDP per capita to real wages for Bolivia, Colombia and Mexico would be higher and by construction the Williamson’s inequality would decrease. In any case, whatever the change, if reasonable, in the inputs used for calculation of this measure of inequality, a very different picture to that shown in Figure 18 seems rather implausible. Therefore, our conclusion that late colonial Latin America does not stand at the top of the Williamson’s inequality ranking holds.

A slightly different approach to the empirical assessment of inequality under the serious limitations of reliable data that characterized early modern societies is shown in Figure 19, where grain wages are plotted against GDP per capita. As it was expectable, Bolivia, Colombia and Mexico appear in the relatively less unequal region of Figure 19, in which, by the way, only two European countries are located. Colombia and the USA turn to be clear outliers within the comparatively more egalitarian region of the scattered graph.

Results shown in Figure 18 and Figure 19 deserve some additional comments. On the one hand, differences between countries in our ad hoc version of Williamson’s are enormous –i. e. roughly a factor of eight between Italy, Austria and Japan and Bolivia, the USA and Colombia. Are they due to similar real differences in any meaningful meaning of economic inequality or to other circumstances? The high variability in the GDP per capita to grain wages ratio deserves closer scrutiny that probably would permit to properly answer the above question. On the other hand, it is also striking that small differences in Maddison’s GDP per capita estimates coexist with big differences in nominal (grams of silver) and grain wages –i. e. Bolivia versus Japan. Again, this counterintuitive result is worth to be explored as well.

As to the results in terms our ad hoc version of Williamson's inequality regarding colonial Latin America, we considerer them valuable evidence in favor of what we term the "hypothesis of normality". However, albeit three Spanish colonies share low relative inequality, differences between them are substantial too –i. e. Colombia versus Mexico.

This work in progress also explores the potential of an additional and complementary approach to the study of economic inequality when direct indicators of income distribution are arguably reliable or non-existent at all, as it is more often than not the case in early modern societies. As mentioned before, the anthropometric literature has been producing substantial arguments and evidence supporting the notion that heights are very sensitive to inequality. Drawing on a number of contributions, 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 GDP per capita to heights ratios, which may be as an alternative index of inequality. The rationale under this tentative suggestion is very intuitive: given a certain level of GDP per capita, higher heights would be associated with less inequality. This hypothetical relationship between GDP per capita to heights ratio is consistent with contemporary evidence available for some developed countries [Bilger (2004)]. In Figure 20, the ratio of GDP per capita in 1700 and 1820 to heights of those born in 1750-1760 is shown.

The ratios are, both in 1700 and 1820 for Northern and Southern Mexico and, particularly, for Venezuela, significantly lower than those for Europe. By 1700, the USA are among the "American group": relatively tall people for their GDP per capita. Not so in 1820, when the USA ratio is one of the highest while the ones for Mexico and, especially, for Venezuela stay at the lower part of the ranking. If this index of inequality that we are suggesting makes sense, the conclusion is clear: those Spanish colonies for which we have found original sources for heights are not among the most unequal societies in eighteenth and early nineteenth centuries, rather the opposite is true.

When our sample of heights for mid eighteenth century is plotted against Maddison's estimates of GDP per capita for 1700 and 1820, an interesting picture emerges –see figures 21 and 22. In 1700 USA and Venezuela are clear outliers. By 1820 only Venezuela remains as such. Northern and Southern Mexico never appear too far from the regression line. In our interpretation, these results would indicate that neither Bourbon Mexico nor, especially, Bourbon Venezuela were more unequal societies than Europe according to this plausible measure of inequality.

## 5. Final remarks

1) More empirical research is needed to widen the –so far too small- quantitative information on which most claims on colonial Latin America economic conditions are commonly based. The gap between strong assumptions and weak –or inexistent at all- empirical evidence should urgently be closed if the economics of Spanish colonialism in America and its consequences on post-colonial economic development are to be properly assessed. The importance of the issue goes beyond academic debates.

2) In our interpretation, judging from an international comparative perspective, the limited available evidence does not support the idea that colonial Latin America was an especially unequal society.

3) Those views on colonial Latin America and its economic long-term legacy based on assumptions about extractive, unequal or bad institutions appeared shortly after 1500 should offer more convincing empirical evidence.

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### The Height Gap

**Why Europeans are getting taller and taller-and Americans aren't.**

by [Burkhard Bilger](#)

The New Yorker, April 5, 2004.

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## Tables and figures.

Table 1

Main characteristics of the heights sample				
		N	N (50 ≥ age ≥ 23)	N (after truncation)
Northern México (1)		1559	848	845
Central México (2)		119	35	35
Southern México (3)	Whites	1981	1502	1106
	"Pardos"	1327	961	311
Maracaibo (Venezuela)	Whites	396	298	207
	"Pardos"	400	222	169
Total		5782	3866	2673

Source: See Appendix 2.

(1) Current states of Sonora, Sinaloa, California, Coahuila, Durango, Chihuahua, Nuevo León, Tamaulipas, California, Arizona, Nuevo México and Texas.

(2) Current states of Jalisco, Aguascalientes, Puebla, San Luis de Potosí, Querétaro and México DF. Because of the small size of this subsample, it has been excluded from the analysis.

(3) Current states of Yucatán and Campeche.

Table 2

Average heights, cohorts born from 1730's to 1780's.						
	Northern México		Southern México, whites		Maracaibo (Venezuela), whites	
Decade of birth	N	Average height	N	Average height	N	Average height
1730	47	1645			8	1690
1740	201	1653	143	1614	56	1690
1750	364	1656	307	1608	94	1675
1760	143	1647	409	1593	49	1680
1770	46	1662				

Source: See Appendix 2.

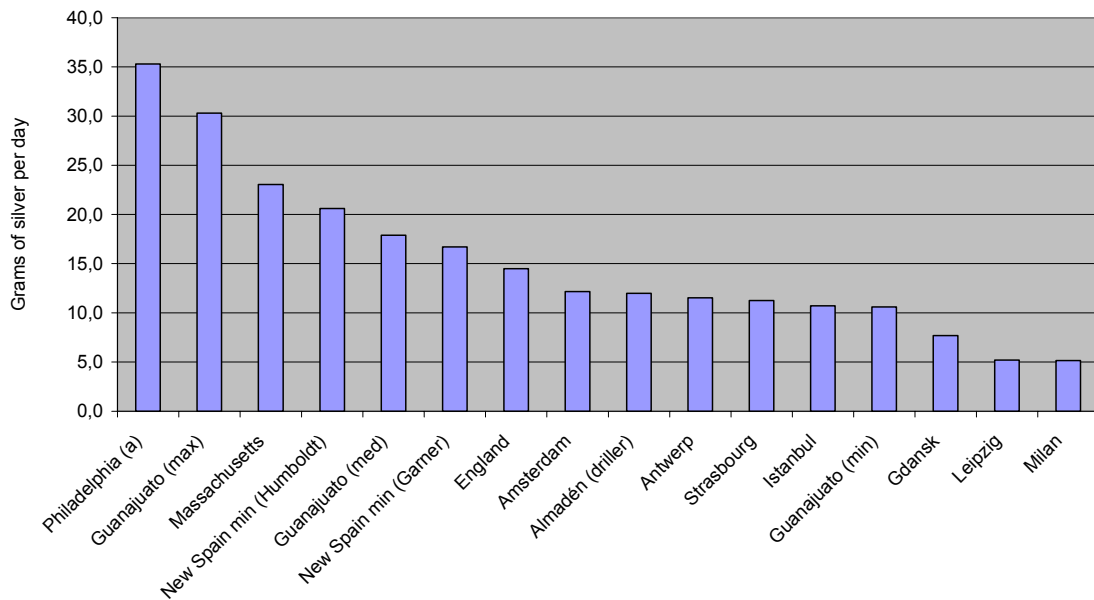
Table 3

Evolution of the “racial gap”.								
	Southern México				Maracaibo (Venezuela)			
	“Pardos”		Whites		“Pardos”		Whites	
Birth decade	Average height	N	Average height	N	Average height	N	Average height	N
1730		4			1627	8	1690	8
1740	1570	103	1614	143	1647	45	1690	56
1750	1580	132	1608	307	1660	76	1675	94
1760	1590	73	1593	409	1665	40	1680	49

Source: See Appendix 2.

Figure 1 (\*)

Nominal wages in 1803: Skilled workers.

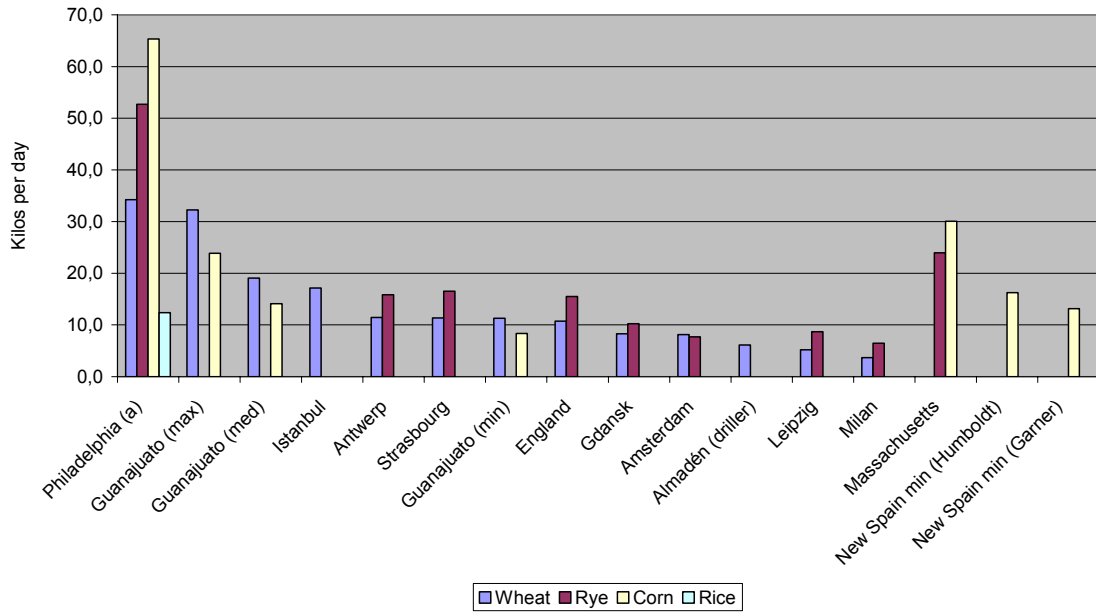


Source: See Appendix 1.

(\*) a, artisan; max, maximum; med, medium; min, minimum.

Figure 2 (\*)

Grain wages in 1803: Skilled workers.

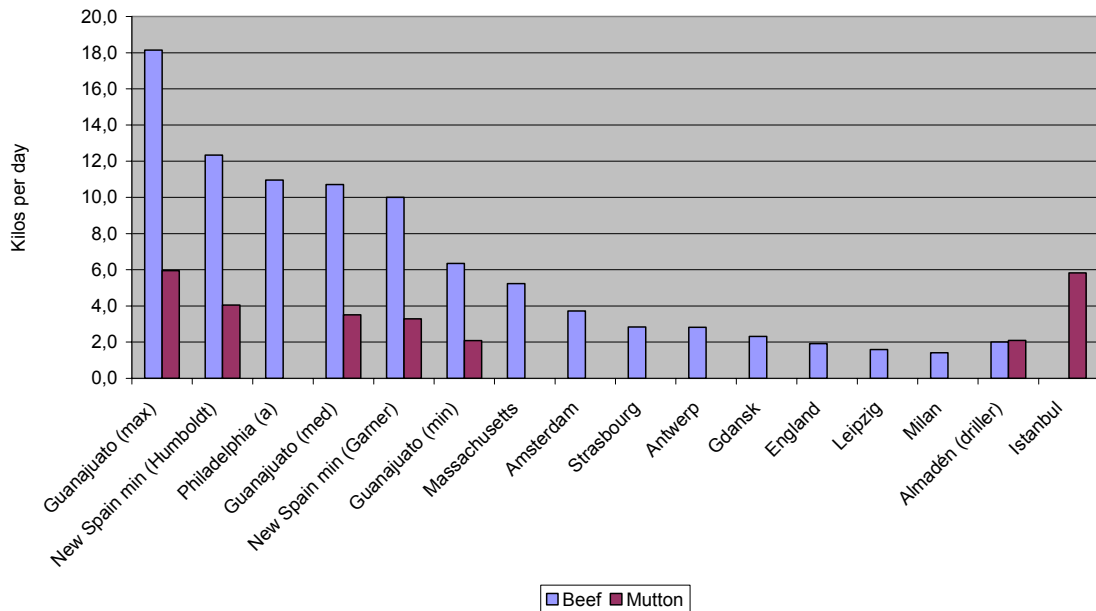


Source: See Appendix 1.

(\*) a, artisan; max, maximum; med, medium; min, minimum.

Figure 3 (\*)

Meat wages in 1803: Skilled workers.

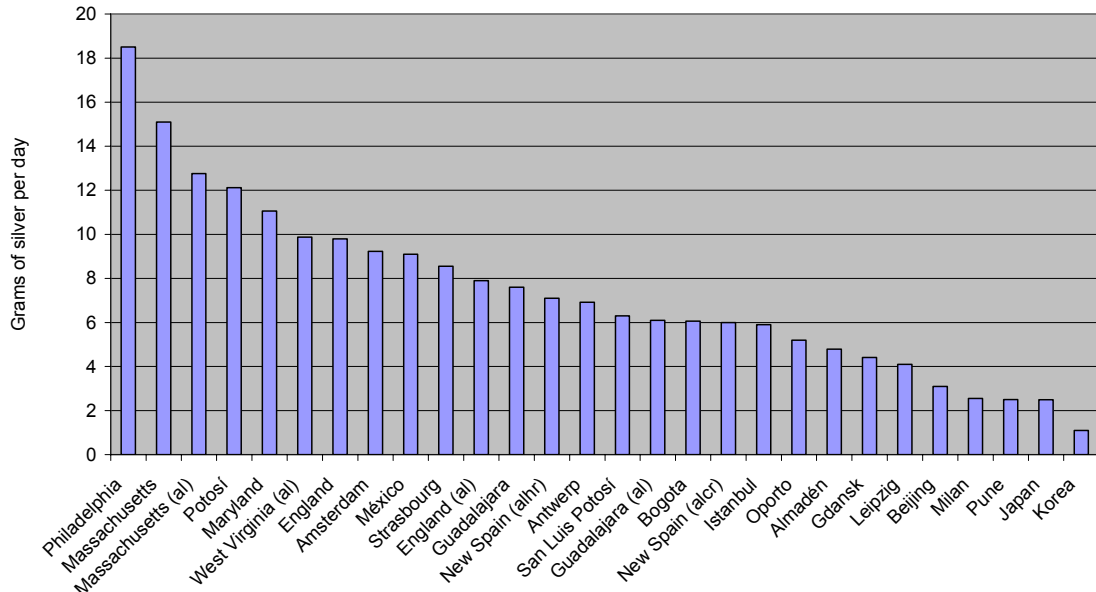


Source: See Appendix 1.

(\*) a, artisan; max, maximum; med, medium; min, minimum.

Figure 4 (\*)

Nominal wages circa 1803: Unskilled workers.

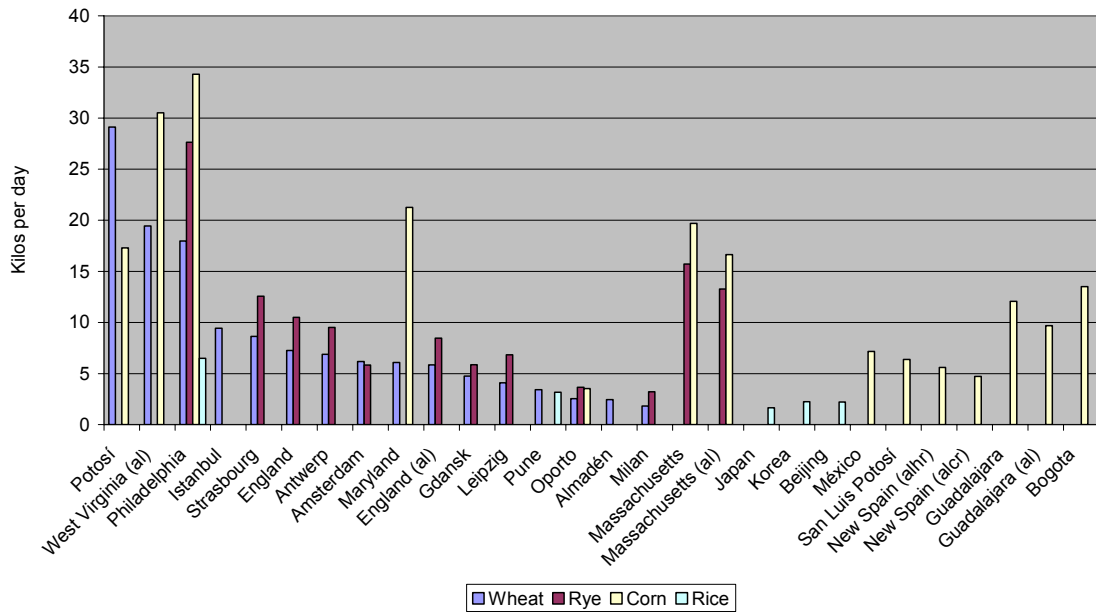


Source: See Appendix 1.

(\*) al, agricultural laborer; alhr, agricultural laborer “hot regions”; alcr, agricultural laborer “cold regions”.

Figure 5 (\*)

Grain wages circa 1803: Unskilled workers.

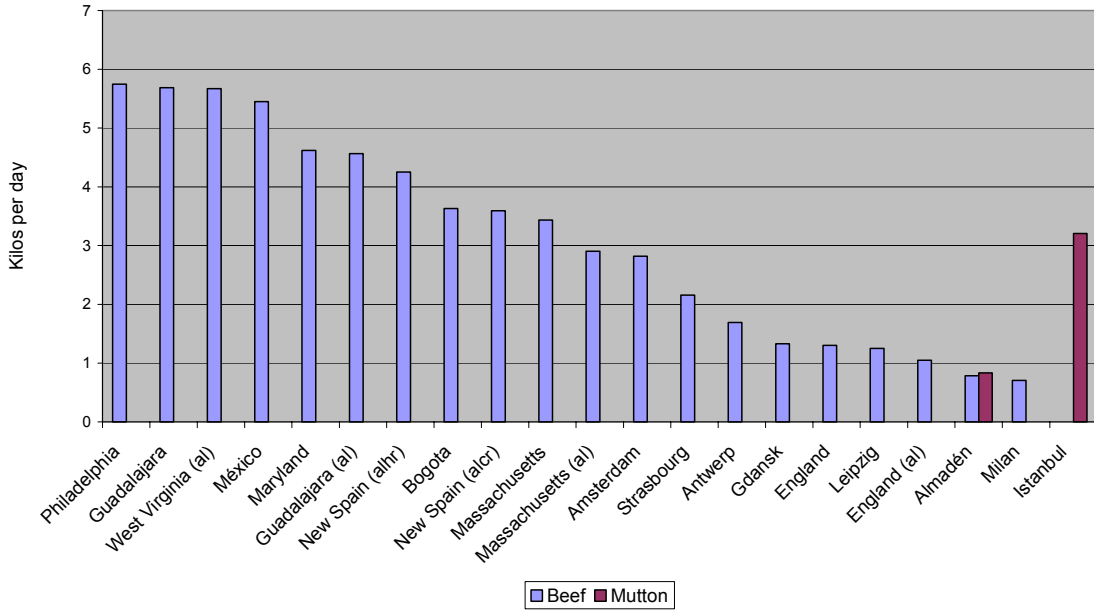


Source: See Appendix 1.

(\*) al, agricultural laborer; alhr, agricultural laborer “hot regions”; alcr, agricultural laborer “cold regions”.

Figure 6 (\*)

Meat wages circa 1803: Unskilled workers.

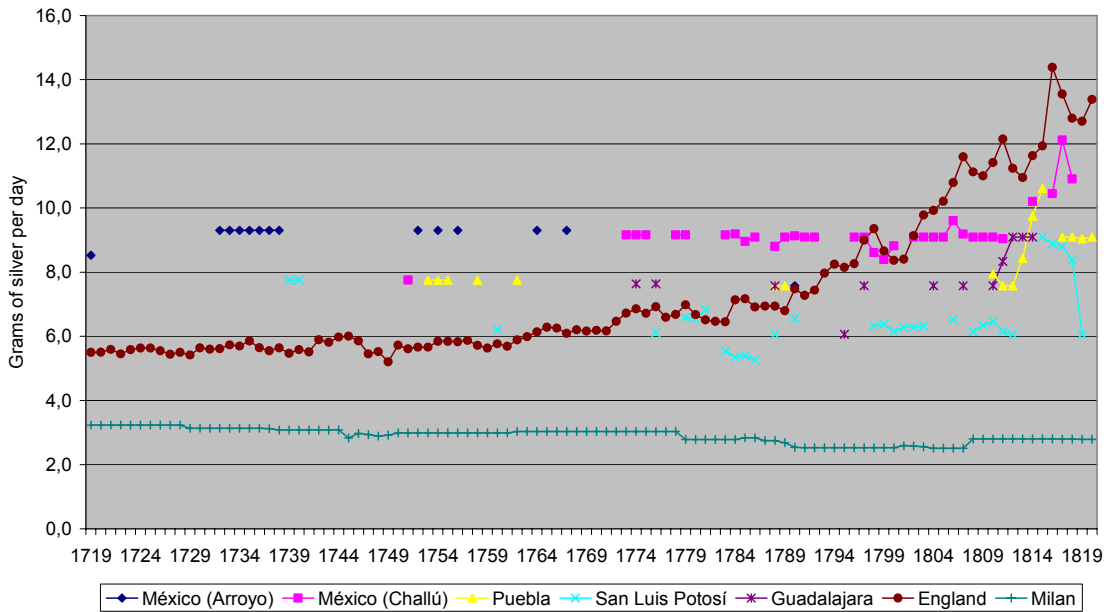


Source: See Appendix 1.

(\*) al, agricultural laborer; alhr, agricultural laborer “hot regions”; alcr, agricultural laborer “cold regions”.

Figure 7

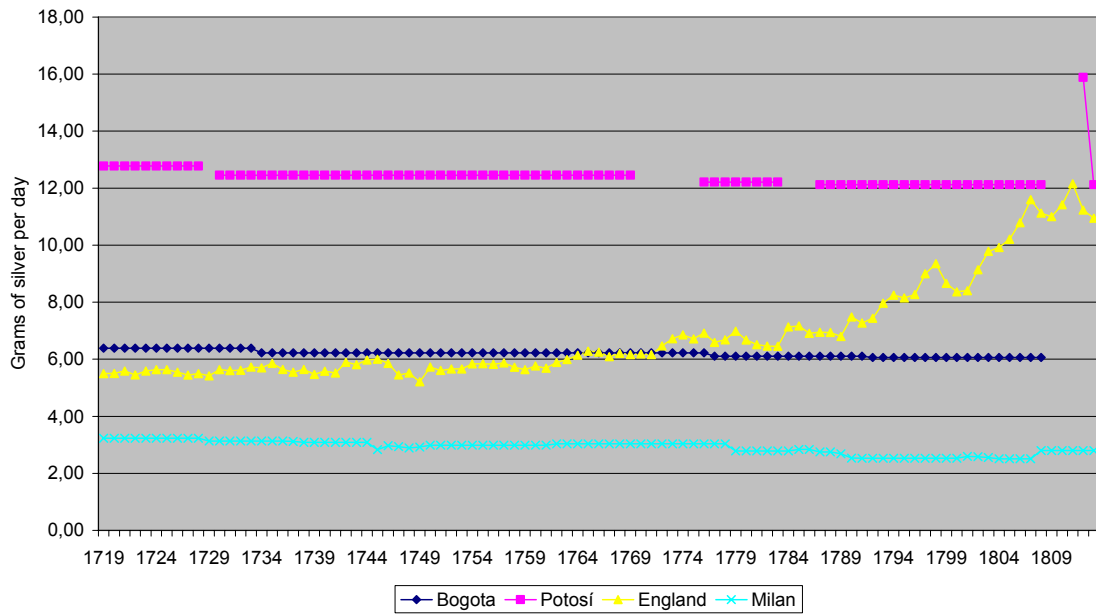
Nominal wages of unskilled workers: New Spain, England and Milan, 1719-1820.



Source: See Appendix 1.

Figure 8

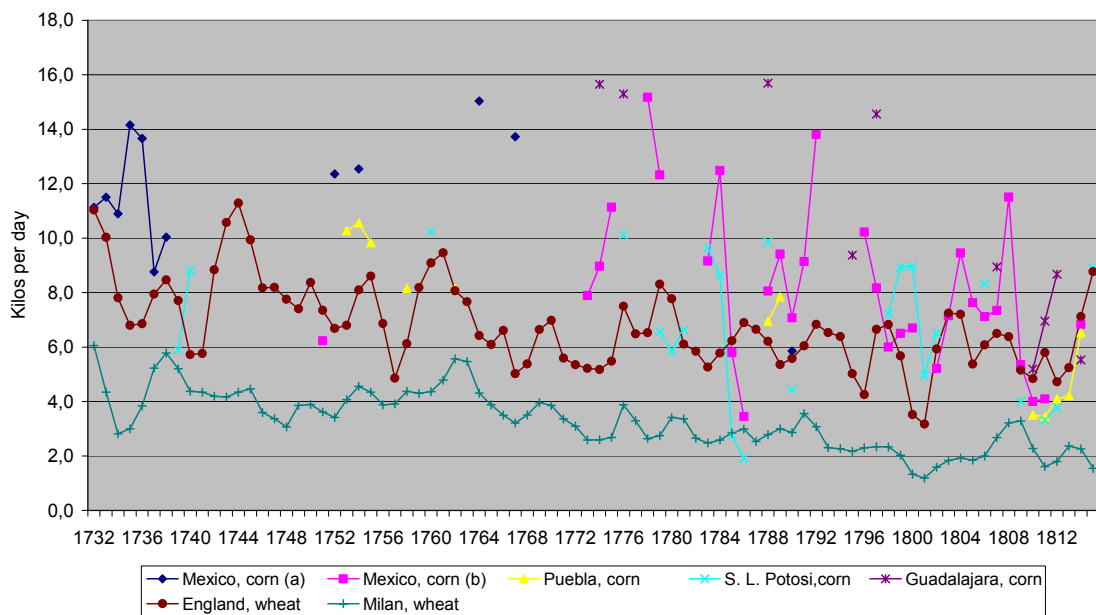
Nominal wages of unskilled workers: Botoga, Potosi, England and Milan, 1719-1813.



Source: See Appendix 1.

Figure 9

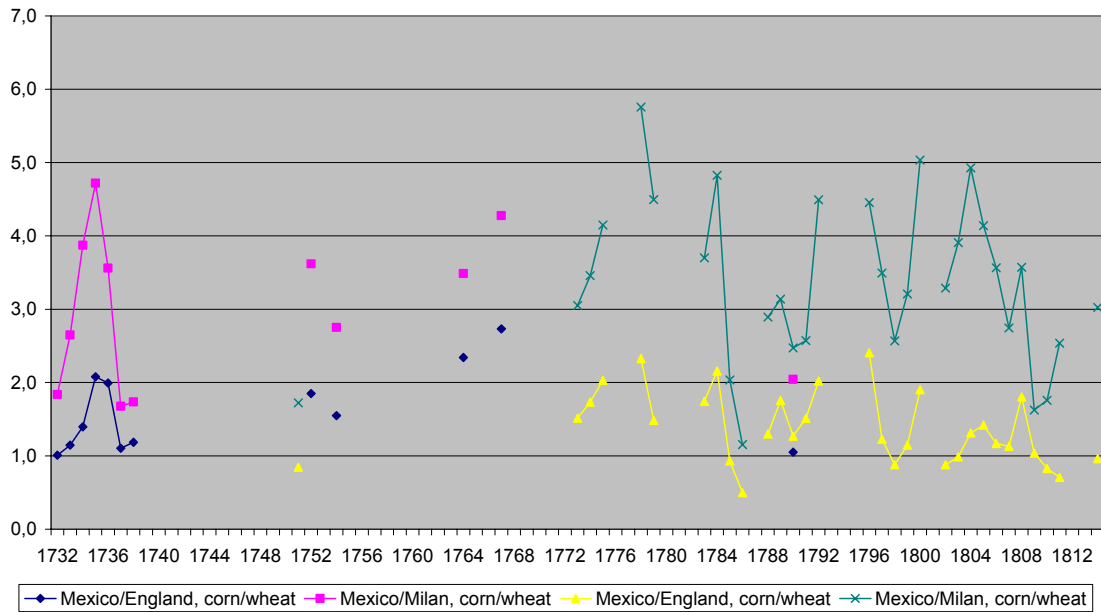
Grain wages of unskilled workers: New Spain, England and Milan, 1732-1815.



Source: Appendix 1.

Figure 10

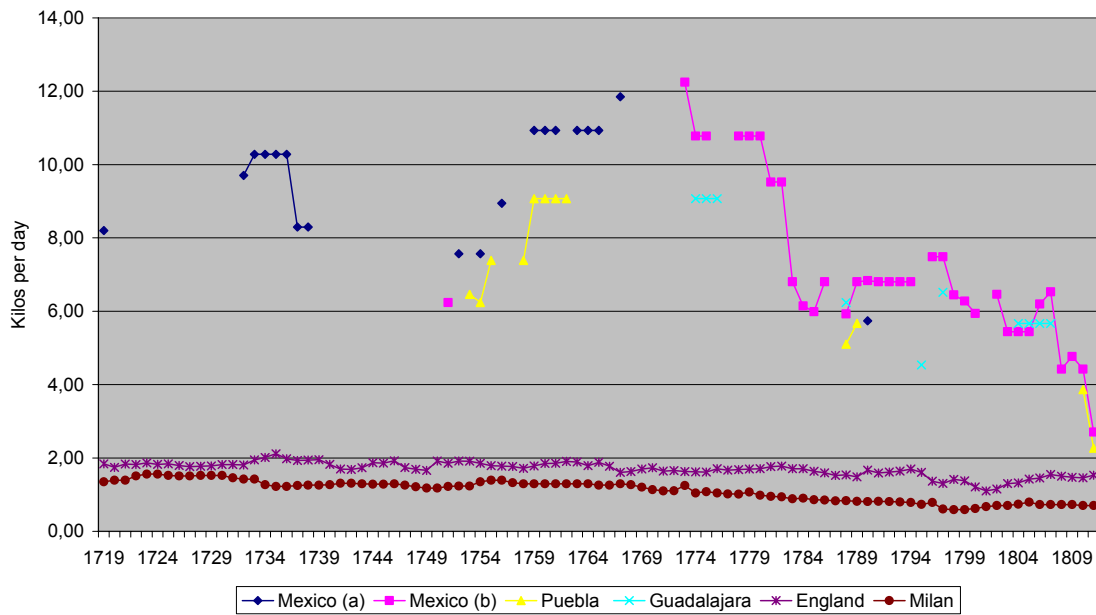
Relative grain wages of unskilled workers, 1732-1814.



Source: See Appendix 1.

Figure 11

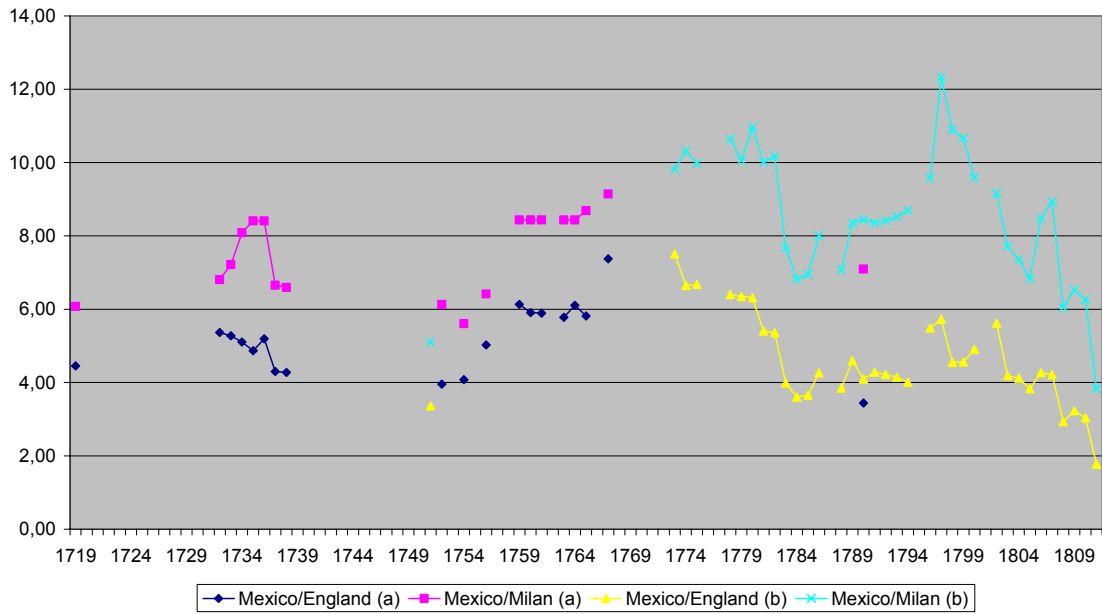
Meat wages of unskilled workers: New Spain, England and Milan, 1719-1811.



Source: See Appendix 1.

Figure 12

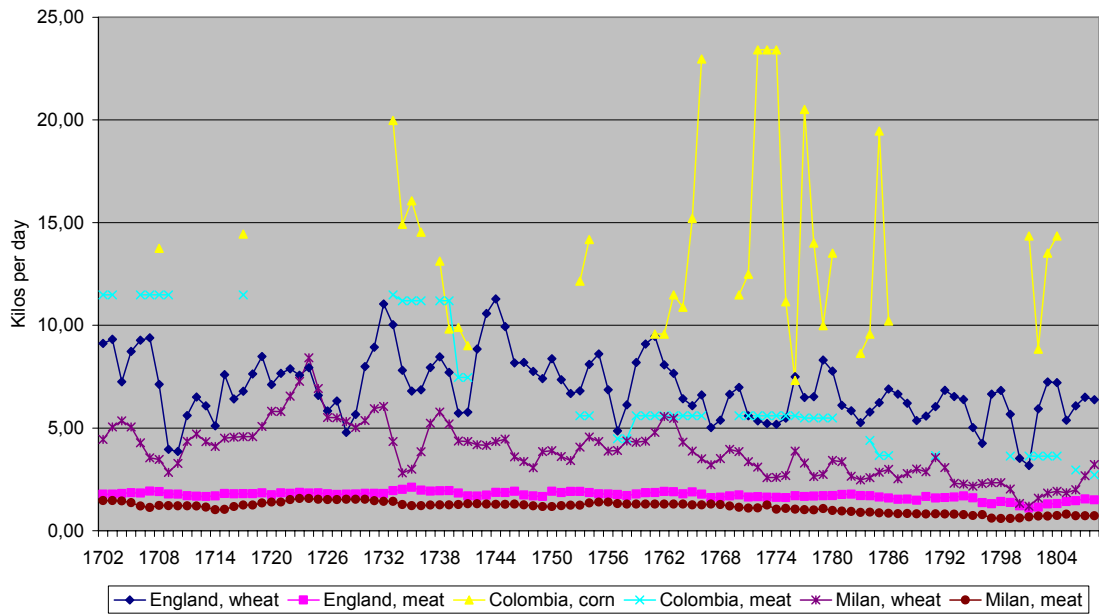
Relative meat wages of unskilled workers, 1719-1811.



Source: See Appendix 1.

Figure 13

Grain and meat wages of unskilled workers: Bogota, England and Milan, 1702-1808.

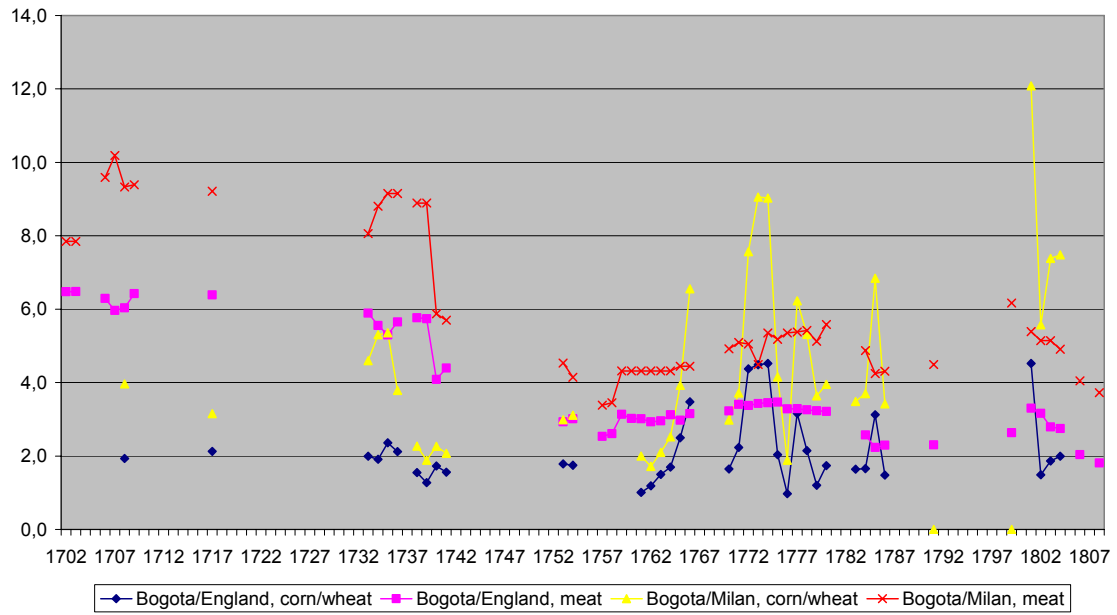


Source: See Appendix 1.



Figure 14

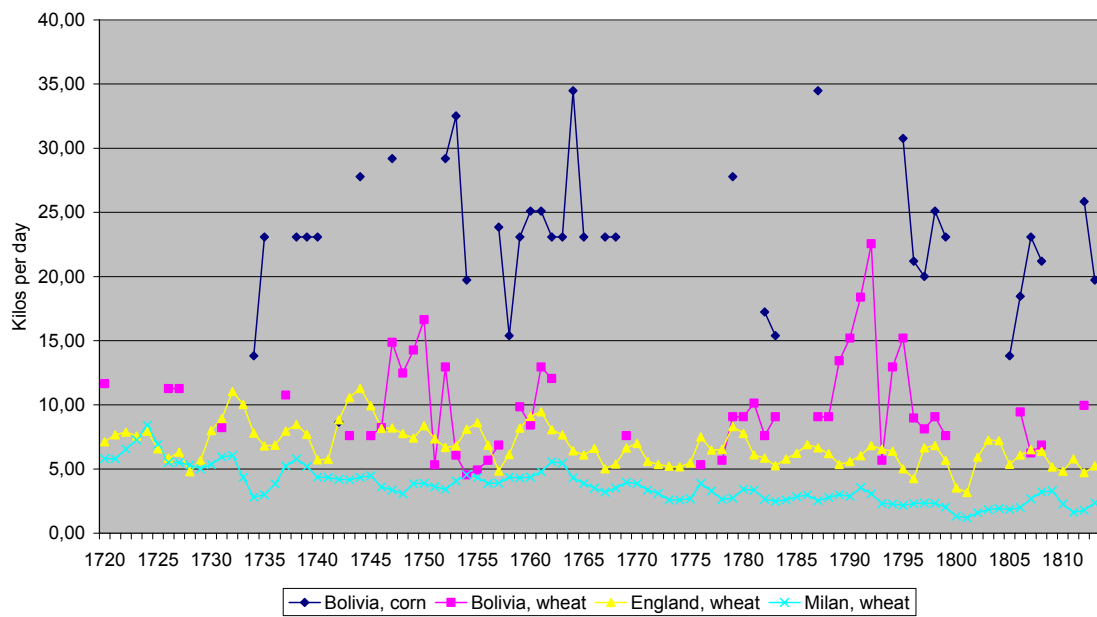
Relative grain and meat wages of unskilled workers, 1702-1808.



Source: See Appendix 1.

Figure 15

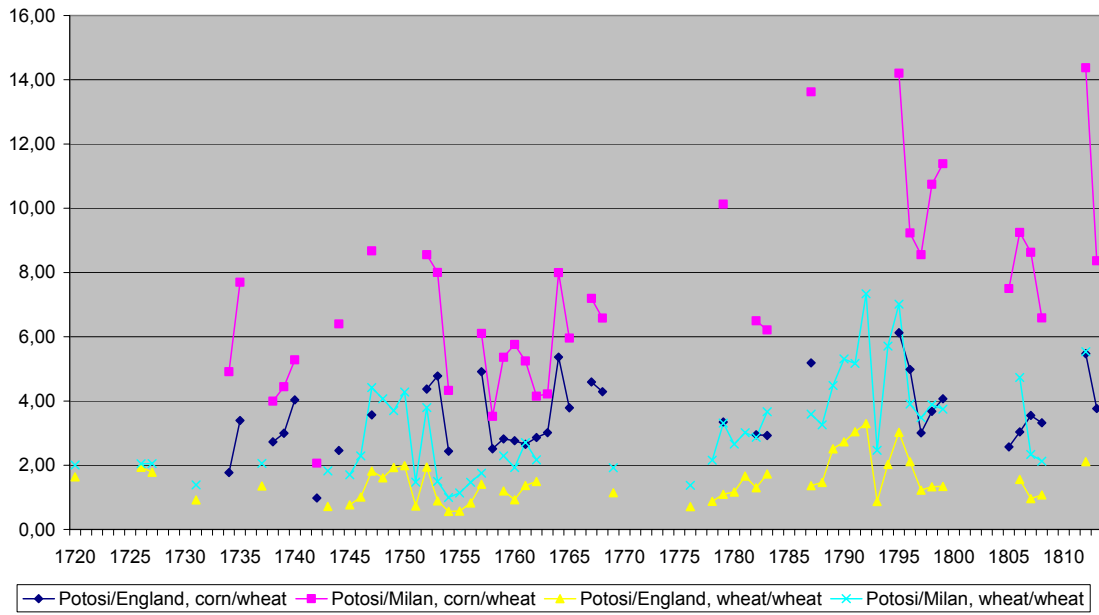
Grain wages of unskilled workers: Potosi, England and Milan, 1720-1813.



Source: See Appendix 1.

Figure 16

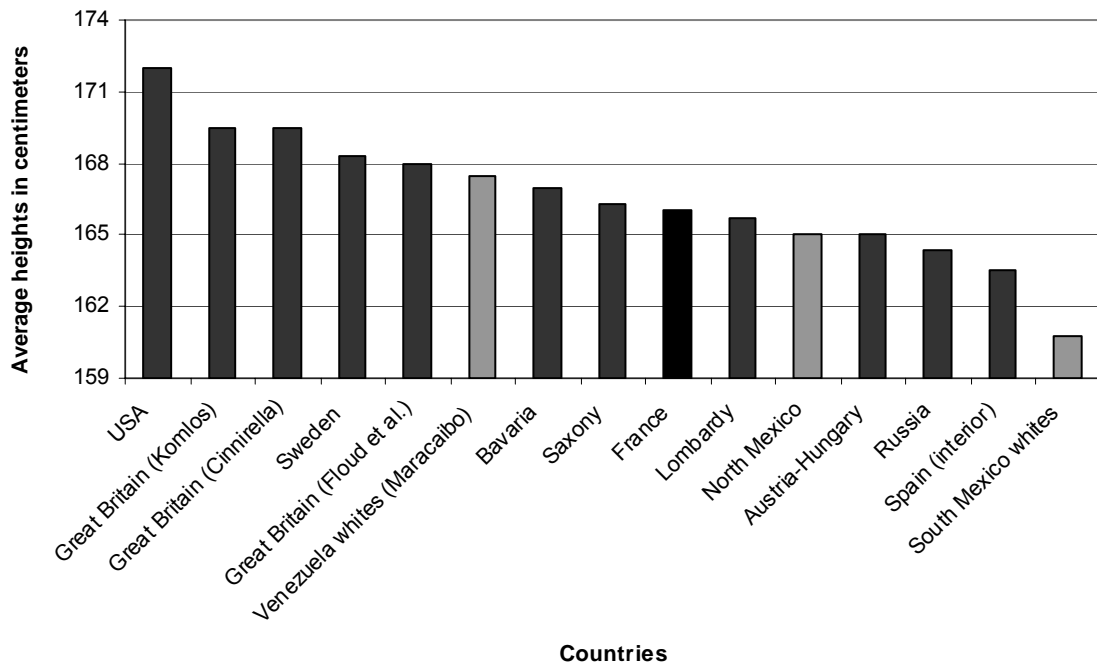
Relative grain wages of unskilled workers, 1720-1813.



Source: See Appendix 1.

Figure 17

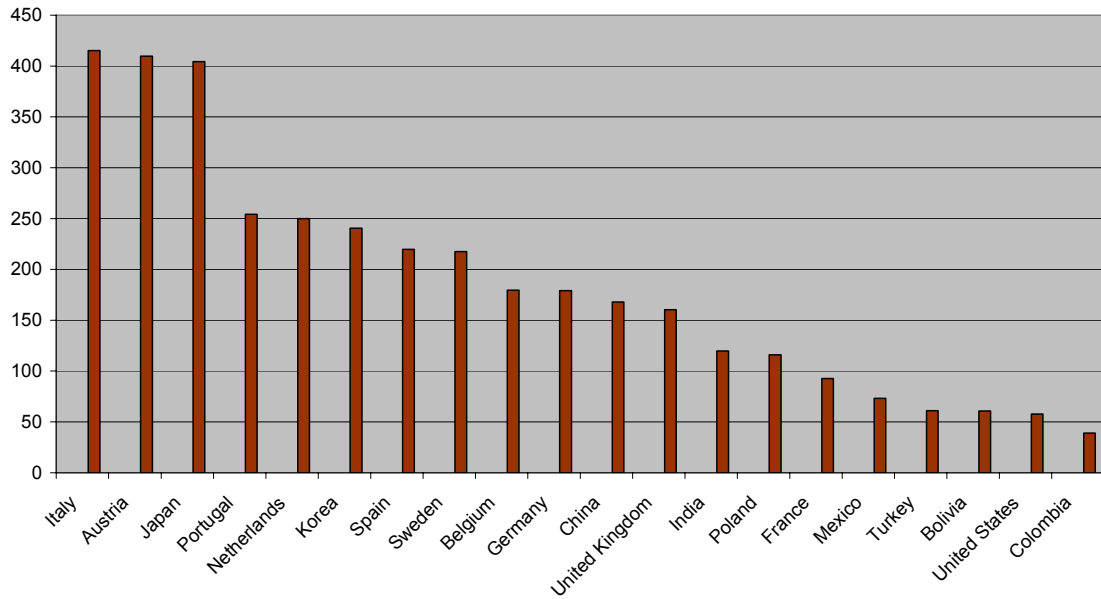
Average height, cohorts born in 1750s



Source: See Appendix 1.

Figure 18

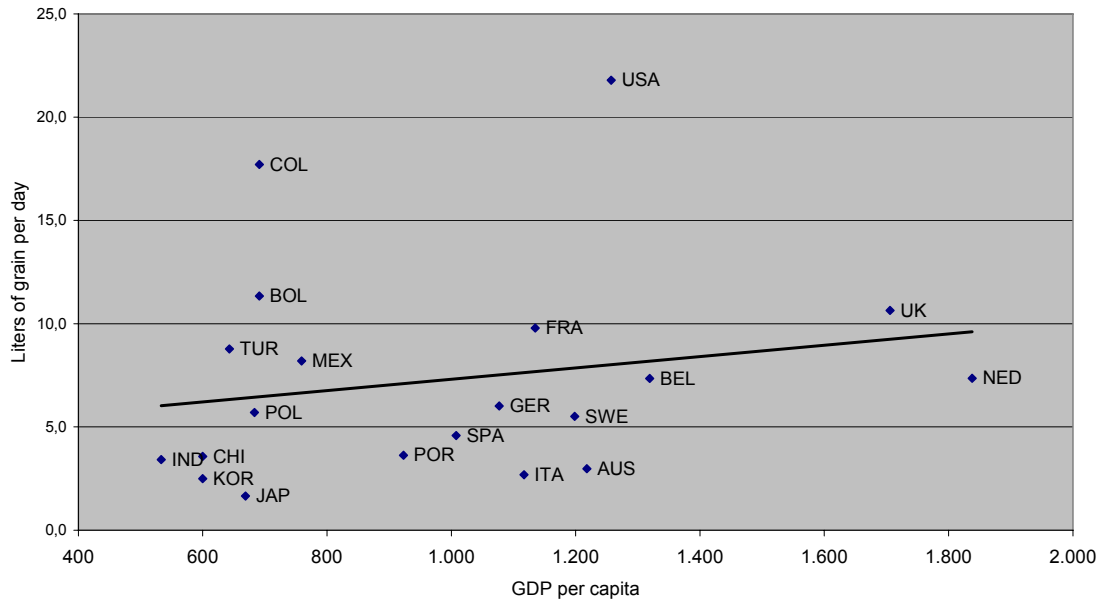
Williamson's inequality index circa 1820



Source: See Appendix 1.

Figure 19

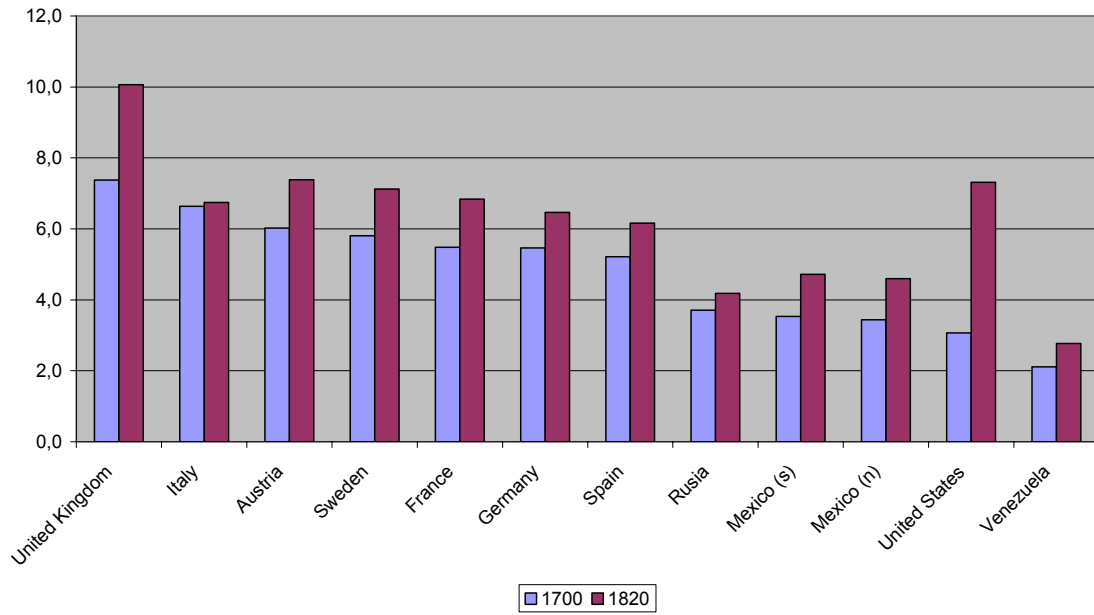
Grain wages and GDP per capita circa 1820



Source: See Appendix 1.

Figure 20

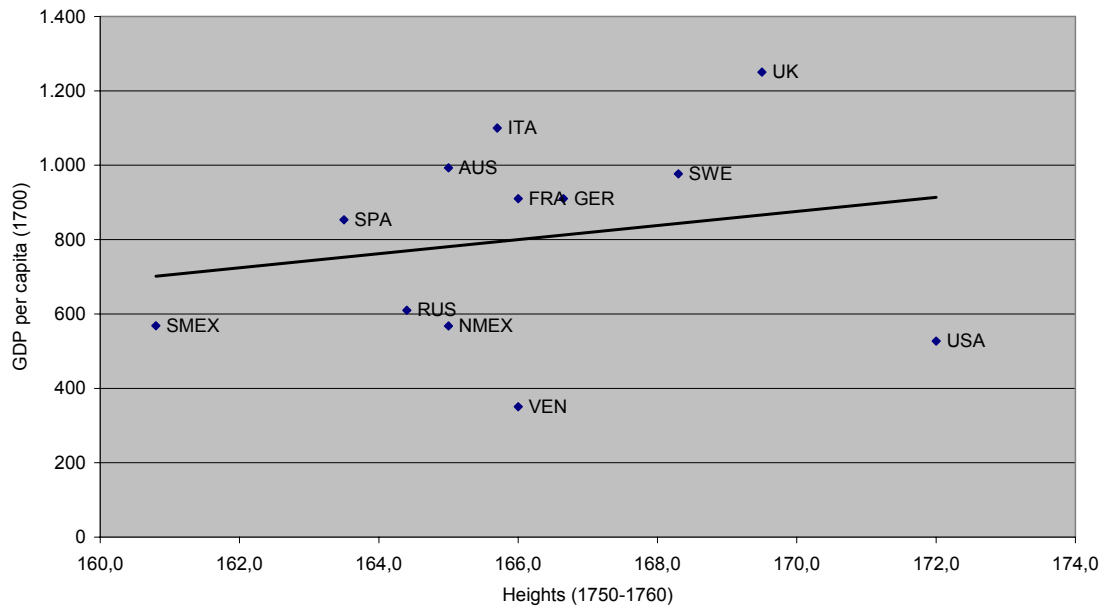
GDP per capita (1700 and 1820) to heights (1750-1760) ratios.



Source: See Appendix 1.

Figure 21

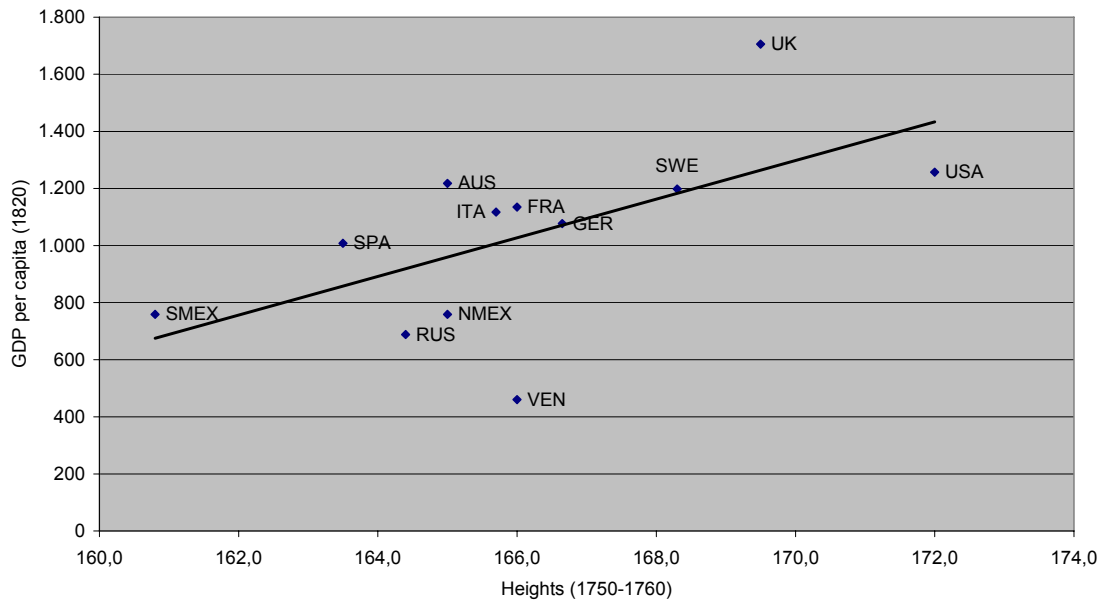
GDP per capita(1700) and heights (1750-1760).



Source: See Appendix 1.

Figure 22

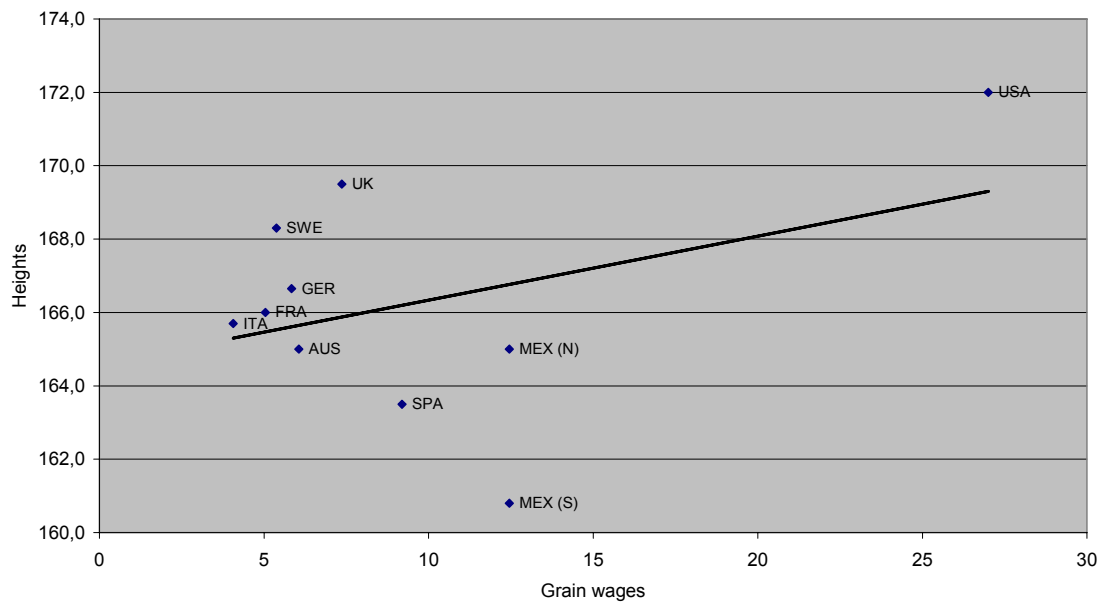
GDP per capita (1820) and heights (1750-1760)



Source: See Appendix 1.

Figure 23

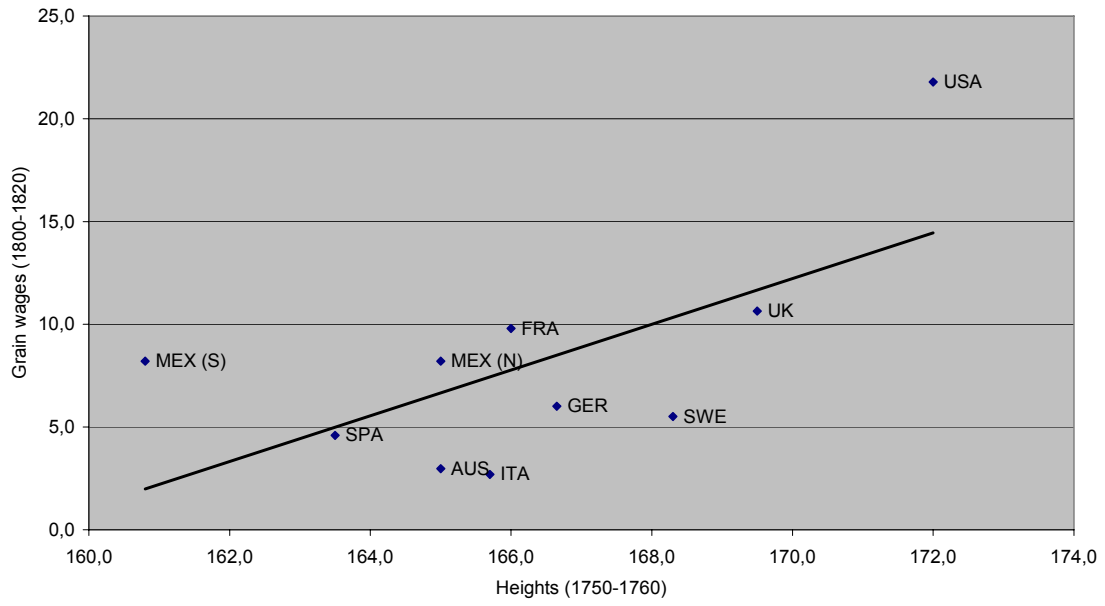
Grain wages and heights, 1750-1760.



Source: See Appendix 1.

Figure 24

Heights and grain wages.



Source: See Appendix 1.

## **Appendix 1: Sources of figures.**

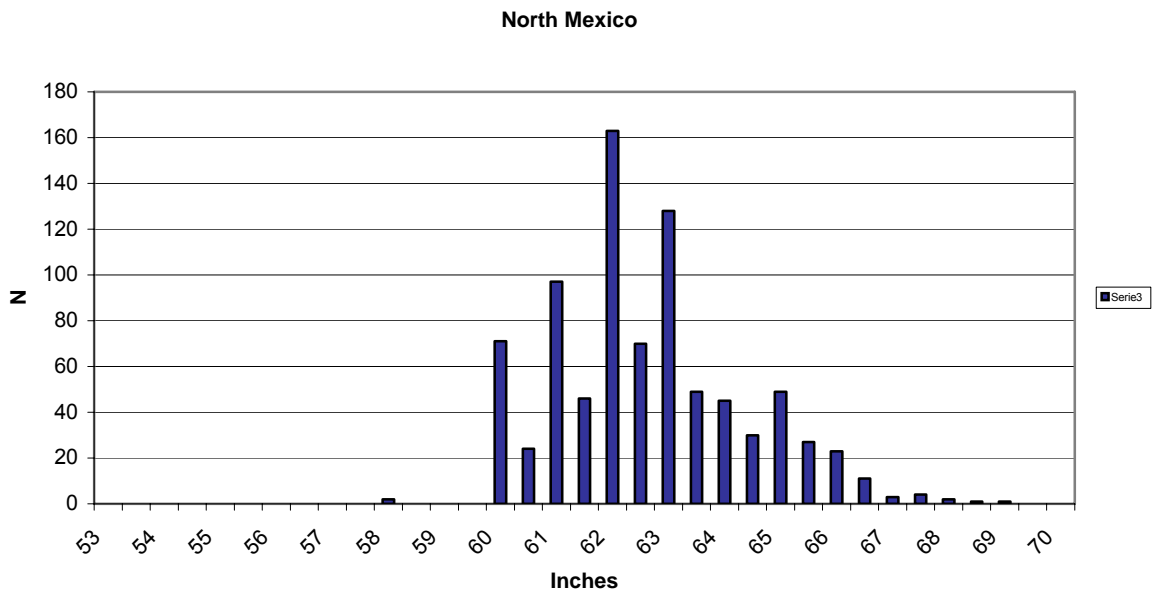
Available under request to the authors.

**Figure 17:** Sources: USA [Sokoloff and Villaflor (1982)], Great Britain [Floud et al. (1990), Komlos (1993) and Cinnirella (2008)], Sweden [Heintel *et al.* (1998)], Bavaria [Baten (2001)], Saxony [Cinnirella (2008)], France [Komlos *et al.* (2003)], Lombardy [A'Hearn (2003)], Austria-Hungary [Komlos (1989)], Russia [Mironov (2005)] and Interior Spain [García Montero (2009)]. For Latinoamerican heights see Appendix 2.

## Appendix 2.

**Sources:** Archivo General de Simancas (Simancas General Archive), 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.

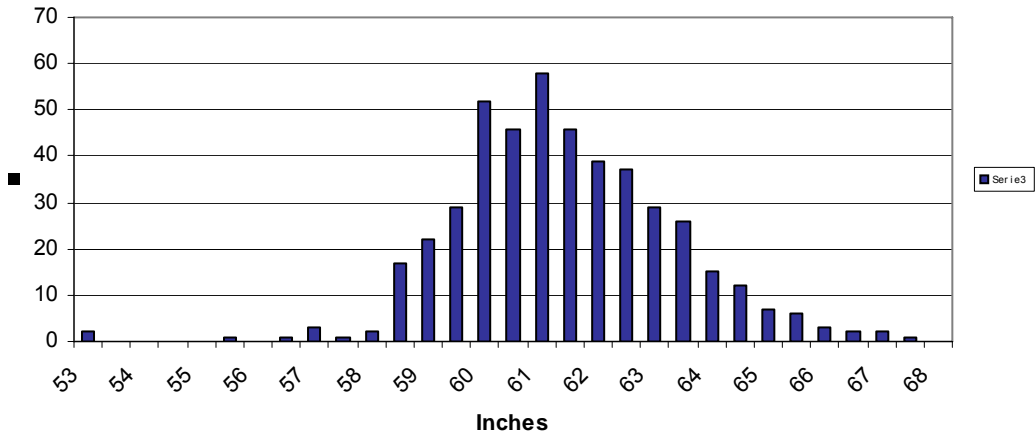
### HISTOGRAMS FOR MILITARY UNITs



Truncation point used to estimate average height: 60 inches

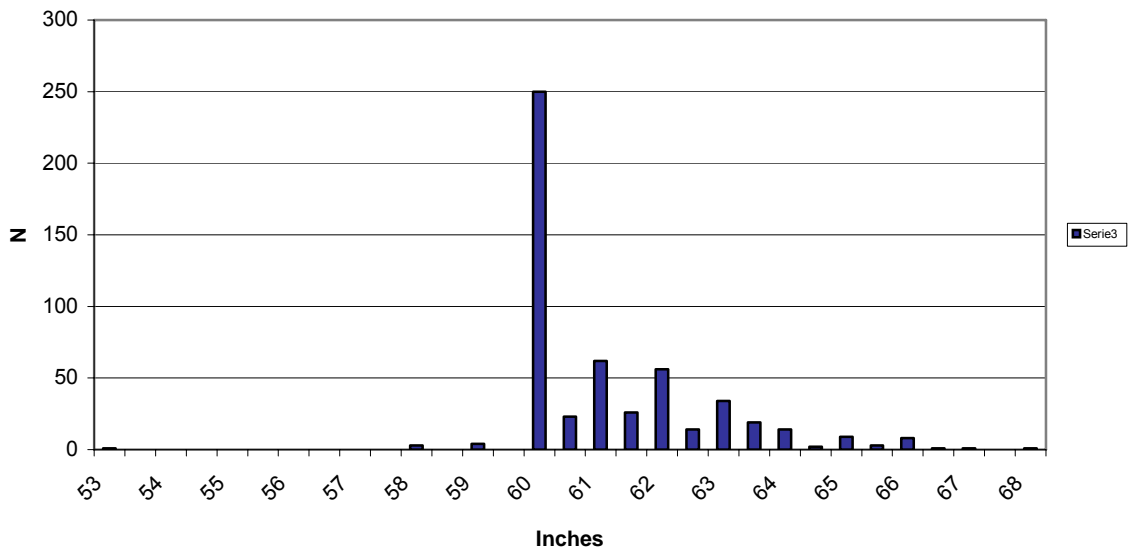


**Battalion Infantry of Castile (South Mexico)**



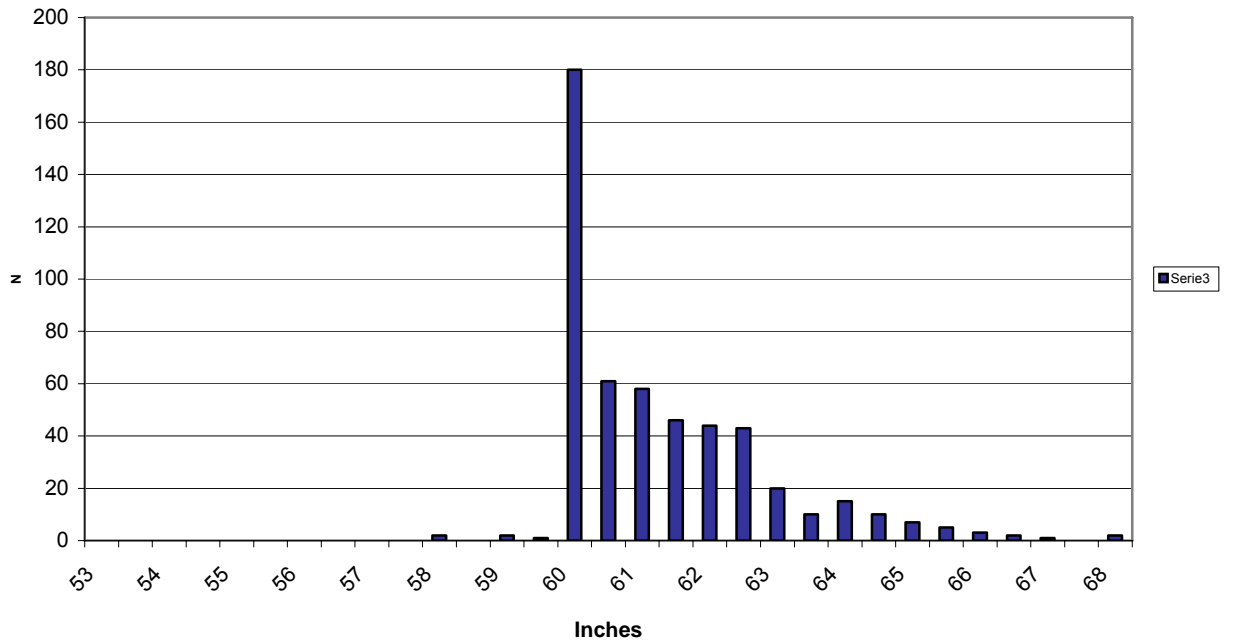
Truncation point used to estimate average height: 60 inches

**Infantry Militia of Whites from Campeche (South Mexico)**



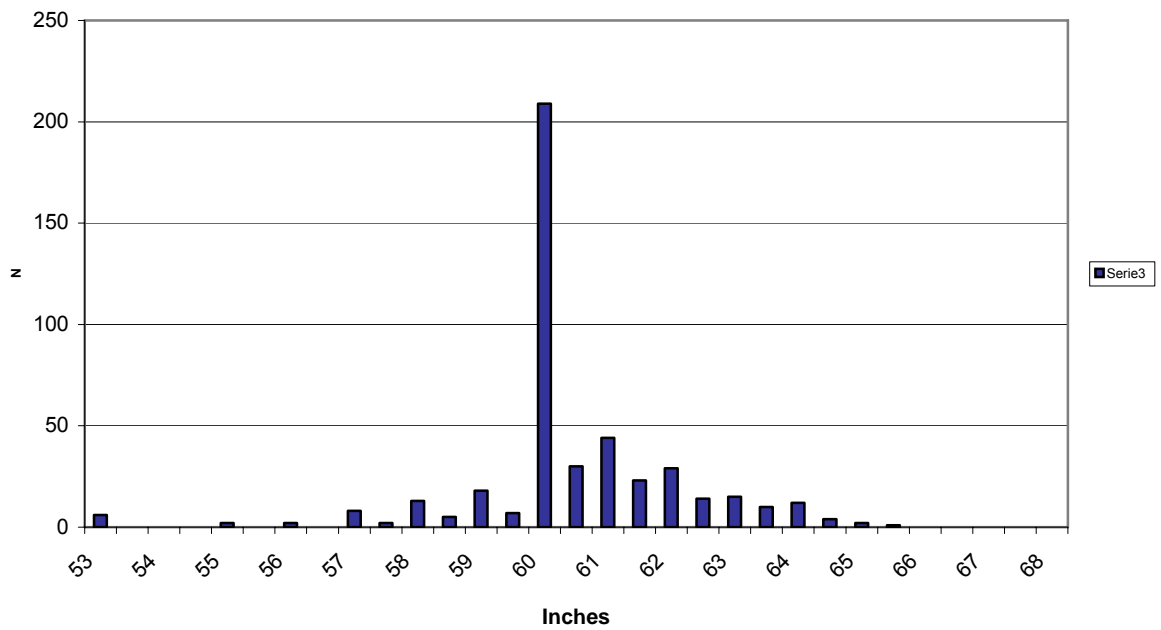
Truncation point used to estimate average height: 61 inches

**Battalion of White Infantry from Mérida of Yucatán (South Mexico)**



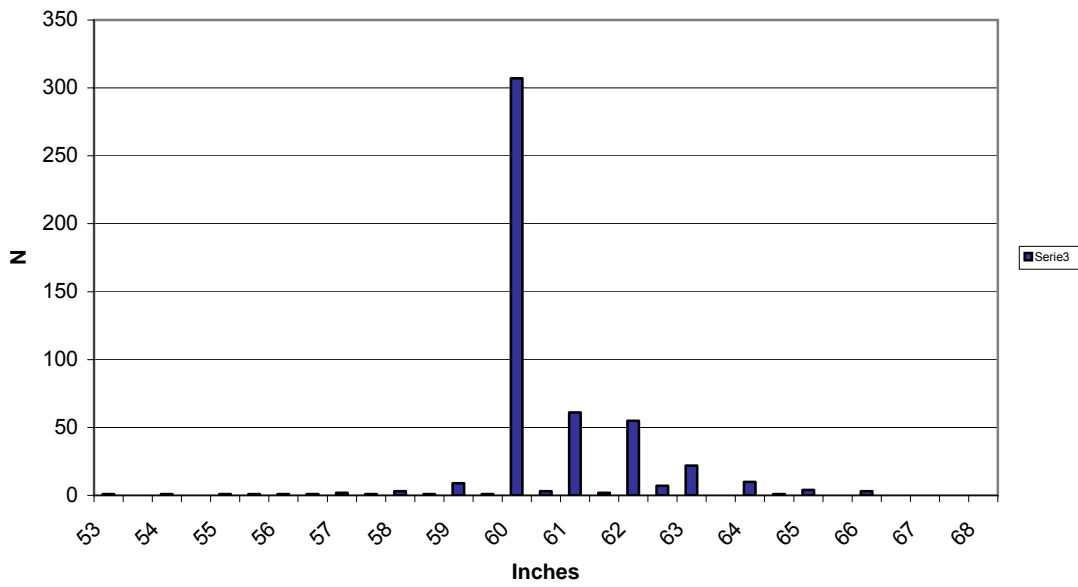
Truncation point used to estimate average height: 61 inches

**1st Division Pardos Yucatan (South Mexico)**



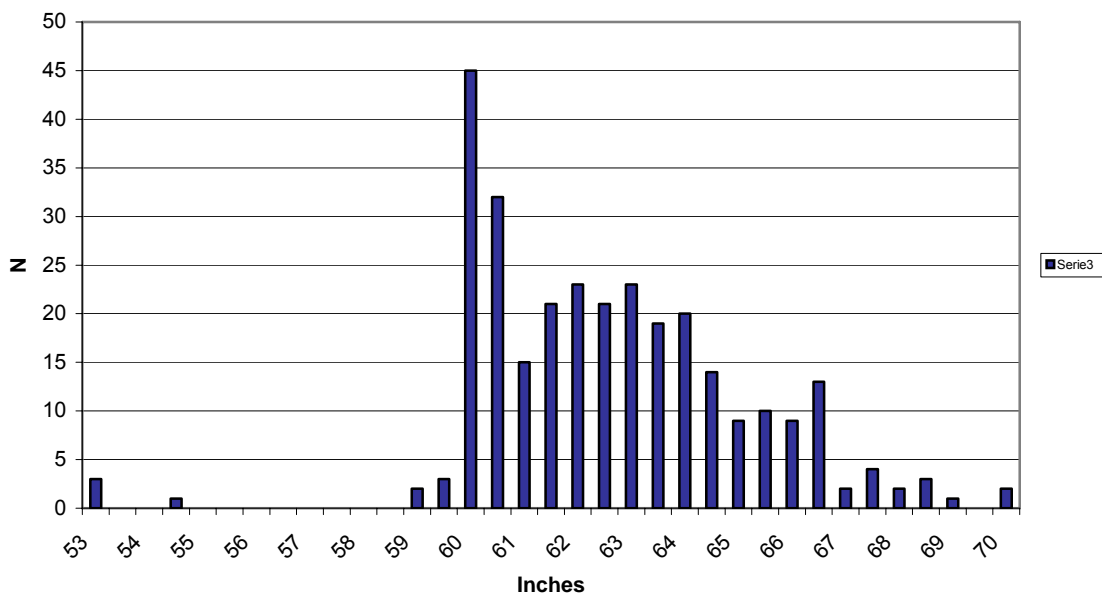
Truncation point used to estimate average height: 61 inches

2nd Division Pardos from Yucatan



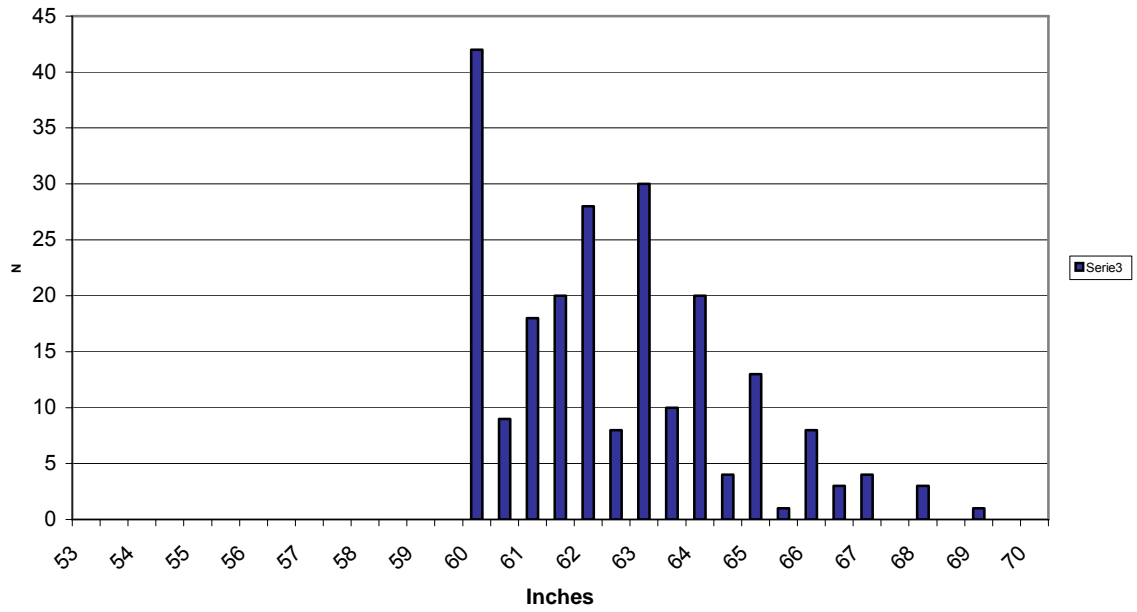
Truncation point used to estimate average height: 61 inches

Militia of Whites from Maracaibo



Truncation point used to estimate average height: 61 inches

### Militia of pardos from Maracaibo



Truncation point used to estimate average height: 61 inches