



## Artículo

## The legacy of Earl J. Hamilton. New data for the study of prices in Spain, 1650–1800

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## ABSTRACT

This paper presents a new dataset on regional prices in Early Modern Spain. Earl J. Hamilton published in the *American Treasure and The Price Revolution in Spain, 1500–1650* prices for the four regions in which he divided Spain – Valencia, Andalusia, Old Castile-León and New Castile- but this was not the case in *War and Prices in Spain, 1651–1800*. Here he printed only prices for the last region. Nevertheless, he presented indices of prices and salaries throughout the book for the three remaining regions for which the raw data is preserved in the archive of his personal papers at Duke University. Having access to the cards and worksheets where prices from primary sources were computed allows us, firstly, to recover the prices for Old Castile-León, Andalusia and Valencia and to discover how the series for each region and period were built; secondly, to test their validity for purposes other than those he sought. Finally, the prices of some selected goods for the period 1651–1800 are reconstructed, analysed and published.

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### El legado de Earl J. Hamilton. Nuevos datos para el estudio de los precios en España, 1650–1800

## RESUMEN

Este texto tiene como objetivo incrementar la información cuantitativa sobre precios disponible para la España Moderna. En los apéndices de *El tesoro americano y la revolución de los precios, 1501–1650* Hamilton publicó series de las cuatro regiones en las que divide España. Sin embargo, en *Guerra y Precios en España 1651–1800* únicamente lo hizo para Castilla la Nueva, aunque elaboró índices de precios y salarios de Andalucía, Valencia y Castilla la Vieja con datos que se conservan en su archivo personal en la Universidad de Duke. El acceso a las fichas y hojas de trabajo en las que recogió los precios permite descubrir el origen de las cifras y la forma en la que las series fueron elaboradas para cada región y período. Gracias a ello ha sido posible, primero, recuperar los precios no publicados de Castilla la Vieja-León, Andalucía y Valencia, y completar la imagen peninsular entre 1500 y 1800; y, segundo, testar y poner a prueba la validez de los mismos para otros usos distintos a los que Hamilton pretendió. La principal aportación de este texto es la reconstrucción, análisis y publicación de series de precios de varios productos básicos en las cestas de la compra españolas de la Edad Moderna para el período 1650–1800.

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## 1. Introduction

The importance<sup>1</sup> that prices and wages have for Early Modern historiography is unquestionable, as they shed light on many aspects of an economic reality lacking in quantitative information. The paucity of data for macroeconomic estimations during the Early Modern period reinforces the added value that wages, salaries and prices offer for its understanding. As Van Zanden put it not so long ago, they would constitute the genetic print of the pre-industrial economies (Van Zanden, 2009b, p. 131). A large part of the statistical information on prices used currently is taken from research the International Scientific Committee on Price History instituted in the interwar years<sup>2</sup>. The monetary disarray following WWI and the crisis that capitalist economies were suffering at the time were behind all these studies<sup>3</sup>. Their intention was to understand the causes and consequences of inflationary processes by analysing possible historical precedents. The impoverishment and pauperization of a large part of the population in the same countries was another factor that stimulated research on the relationship between prices and wages. After WWII, research into price history achieved good results too, particularly in France, under the influence of Labrousse and the rich material offered by the *mercuriales* of that country, as well as in other countries such as Belgium or Great Britain<sup>4</sup>. In recent times, the debates on the Industrial Revolution and the Little/Great Divergence have once again situated prices and wages at the centre of historical debate. The emphasis placed on questions such as long-term economic performance or the source of economic inequality, both in and between countries and continents since pre-industrial times, has made their use as a reference inescapable<sup>5</sup>. In Spain, few picked up Hamilton's trail – although the works of Vilar (1987) for Catalonia, Fernández Romero (2005) for Navarre and Ponsot's research on West Andalusia are worthy of mention<sup>6</sup>. Following the French example, what are known as the *mercuriales* have also been exploited in Spain to compose series of grain prices, but few are the works that offer prices for staples other than cereals<sup>7</sup>. The exception to the rule for its breadth as regards time period, subject matter and analysis is the outstanding work of Feliu (1991, 2004) on Early Modern Catalonia. In this context, Hamilton's series have been used widely, and rarely

<sup>1</sup> The appendix with the annual series of prices can be found in the Supplementary materials for López, E., "The legacy of E. Hamilton. New data for the study of prices in Spain, 1650–1800", *Investigaciones de Historia Económica*, 9, (2013), pp. 75–87 available at doi:10.1016/j.ihe.2012.09.003. Apart from the commodities analysed below the appendix includes prices of charcoal.

<sup>2</sup> For example, Labrousse (1933); Hamilton (1934, 1936, 1947); Hauser (1936); Parenti (1939); Simiand (1932b, 1932c, 1932a, 1934); Beveridge (1939); Cole (1938); Hoszowski and Bujak (1928); Hoszowski (1934); Elsas (1936). For International Scientific Committee on Price History, see Cole and Crandall (1964). The canonical approach to Price history appears in Kula (1974), pp. 403–480.

<sup>3</sup> "Le problème des prix: quelle en est l'importance, aujourd'hui, dans tous les domaines de la vie économique et sociale d'un univers profondément troublé". Febvre (1930), p. 67.

<sup>4</sup> For instance, Braudel and Spooner (1967); Baulant and Meuvret (1960); Baulant (1968, 1976); Dupâquier et al. (1968); Frêche and Frêche (1967); Verlinden (1959); Wee (1963); Phelps Brown and Hopkins (1955, 1956); Rappaport (1989); Boulton (1996, 2000); Gibson and Smout (1995).

<sup>5</sup> Including but not limited to Allen (2001, 2003, 2005, 2007a, 2007b, 2011); Allen et al. (2005); Allen et al. (2011a); Allen et al. (2011b); Clark (2005, 2007); Van Zanden (1995, 1999, 2002, 2003, 2005, 2009b); Ma and Van Zanden (2011); Hoffman et al. (2002, 2005); Malanima (2009); Pamuk (2004, 2007); Lindert (2000); Broadberry and Gupta (2006); Van Zanden (2009a).

<sup>6</sup> Hamilton provided Ponsot with some of his unpublished series for Seville. Ponsot (1986), xi.

<sup>7</sup> For example, Ánes (1970); Garrabou (1970); Le Flem (1977); Usero González and Eiras Roel (1975); Palop (1975); Eiras Roel (1984); Arizcun Cela (1989); Barquín Gil (2001); García-Zúñiga (1996); Vicedo Rius (2008); Caro López (1985, 1987); Ruiz Rivera (1977); Gámez-Amián (1981); Hernández Franco (1981); Carrión Arregui et al. (1998); Crespo López-Urrutia (1995); Macías Hernández (2011); Álvarez Vázquez (1987); Salazar Anuncibay (2005); Uriarte Ayo (1988).

disputed, and have served as the basis for long term approaches to the performance of the Spanish economy during the Early Modern centuries<sup>8</sup>. Hamilton's printed series are not without their idiosyncrasies. Setting aside his approach to medieval Valencia, Aragón and Navarre (Hamilton, 1936), he made series of prices and wages for the 1501–1650 period available for four areas he considered representative of the whole country: Andalusia, Old Castile-León, New Castile and Valencia (Hamilton, 1934)<sup>9</sup>. However, in *War and Prices in Spain, 1651–1800*, due to printing costs, he published only those for New Castile (Hamilton, 1947, p. 101). Although recent studies have increased knowledge on the subject, the deficit of published nominal series of prices, wages and salaries is still extensive for the years after 1650 (Llopis et al., 2000; Llopis Agelán et al., 2009; Llopis & García, 2011; Feliu, 2004; Andrés Ucendo & Lanza García, 2007). This text does not intend to reactivate the debate on Hamiltonian theses about the rise of capitalism or the quantity theory of money; its goal is another. Firstly, it aims to present the prices Hamilton used to create his indices for Old Castile-León, Andalusia and Valencia between 1651 and 1800 but did not publish. Secondly, it scrutinizes their potential and deficiencies for their hypothetical use in purposes other than those the American economist intended. Finally, the appendix reproduces the annual price series of the selected goods standardised to metric measures and with prices converted to grams of silver<sup>10</sup>. Throughout the text, in addition, the data will be displayed in figures based on five-year averages to ease the visual approach to the series.

## 2. Hamilton's papers

In 2001 Robert C. Allen published an influential article on prices and wages in Europe from the Middle Ages to WWI (Allen, 2001). Among several European cities, he presented information for two Spanish cities, Madrid and Valencia. While the data for the first was known, that of Valencia was a surprise for it was, certainly, unknown. Allen's reference alluded to the Earl J. Hamilton Papers collection in the archives of Duke University, where the raw material for the non-published price series of Valencia, Andalusia and Old Castile-León was kept<sup>11</sup>. Thanks to that, it has been possible to recover the prices he used to devise the series for these regions and to study the mechanics used to produce them. As is well known, Hamilton used fifty-year periods for his analysis, a methodology that was criticised by contemporaries (Vilar, 1949, p. 35). Hamilton does not seem to have been very worried, either about small variations in the number of goods in every fifty-year index, or in representing the real and relative prices of the items included; as he opted for building unweighted arithmetic indices of prices and wages between 1651 and 1800, that was not apparently a big issue (Hamilton, 1947, p. 114). Nevertheless, he always tried to maintain the same origin for each price series in each period. When he considered it necessary, instead of adding data from other institutions or places, he recurred to estimating hypothetical prices through the ratios obtained from comparisons with other sources – preferably of the same locality – to compose the most complete series possible. As Vilar (1949, p. 31) pointed out, he was more interested in having the series of each item be the most homogenous possible

<sup>8</sup> Yun Casalilla (1994); Carreras (2003); Álvarez Nogal and Prados de la Escosura (2006); Álvarez Nogal and Prados de la Escosura (2007); Martín Aceña (1992); Reher and Ballesteros (1993); Drelichman (2005).

<sup>9</sup> Vilar (1949) and Nadal (1959) underlined loopholes in this scheme.

<sup>10</sup> Unless indicated, I followed the equivalence of measures and weights given by Hamilton (1934).

<sup>11</sup> Duke University. David M. Rubenstein Rare Books and Manuscript Library. Inventory of the Earl J. Hamilton Papers, 1350–1995 and undated (bulk 1650–1940). Major Works Series, 1350–1961 and undated. <http://library.duke.edu/digitalcollections/rbmscl/hamiltonearl/inv/> (Hereafter EHP-MWS).

**Table 1**  
Origin of prices for Old Castile-León indices.

	1651–1700	1701–1750	1751–1800
Hospital de Nuestra Señora de Esgueva (Valladolid)	29	18	11
Monasterio de Nuestra Señora de Sandoval (Mansilla)	32	33	16
Total	61	51	27

Source: Hamilton (1947, pp. 117, 138, 153).

**Table 2**  
Control prices for the Old-Castile-León series.

	Years		Years
<i>Ávila</i>		<i>Santander</i>	
San Jerónimo de Jesús	1661–1685	Dominicos de Santillana	1754–1768
	1691–1699	Franciscanos (Castro Urdiales)	1768
Benitos	1662–1685		
	1691–1696	<i>León</i>	
<i>Segovia</i>		Benitos de Sahagún	1701–1713
Mercenarios Calzados	1687–1705		1729–1753
	1711–1720	<i>Salamanca</i>	
	1742–1768	Dominicos San Esteban	1705
	1788–1800	Carmelitas Calzados	1755–1763
Convento Hospital de San Juan de Dios	1706–1740	Trinitarios Ciudad Rodrigo	1764–1787
Dominicos de Nieva	1774–1800		

Source: EHP-MWS, Box 5, Old Castile prices (3 folders), 1651–1700; 1700–1750; 1750–1800.

than in the homogeneity between the prices of the different goods included in every regional index. The objective here is to build the most homogeneous and continuous prices series possible based on the data he collected covering the years 1651–1800. This involves analysing Hamilton's annotations, product by product and year by year, to distinguish the source for every price, the way they were assembled, to find out where real values were entered and where prices were estimated and how. By doing so, it is possible to ascertain the origin and characteristics of every single price and product and, in this way, to clarify the validity of their use for purposes other than analysing the inflationist trends of the Spanish economy of the time.

Hamilton composed the indices for Old Castile-León using prices from the Hospital de Nuestra Señora de Esgueva in Valladolid and the Monasterio de Nuestra Señora de Sandoval in Villaverde de Sandoval<sup>12</sup>. The origin of the prices of oil, rice, a variety of fish, grain, soap, cloth, salt and shoes would be the latter; meats (beef and mutton), lard, fruit, coal, twine, bread and eggs were from Valladolid. Among his papers there are also data for other places in the region. Although general trends were usually similar, he believed that distances made their use complicated; consequently, he took them only as control references (Hamilton, 1947, pp. 116–117). The comparison with prices he gathered from Segovia presents some peculiarities, given that the price of products such as wine, cod, hake or meats show differences with those of León or Valladolid. The price of olive oil or other groceries, however, was very similar; chocolate, for instance, cost practically the same in Valladolid and in Segovia. Reasons are impossible to discern from Hamilton's papers. Different measuring systems could be responsible for these variations as, for instance, the existence of a 40-ounce pound for

**Table 3**  
New Castile 1651–1800. Number of product prices according to source.

	1651–1700	1701–1750	1751–1800
Madrid	10	13	17
Toledo	49	45	56
Casarrubios del Monte	34	31	26
Total	93	89	99

Source: Hamilton (1947), pp. 117–118, 138, 153.

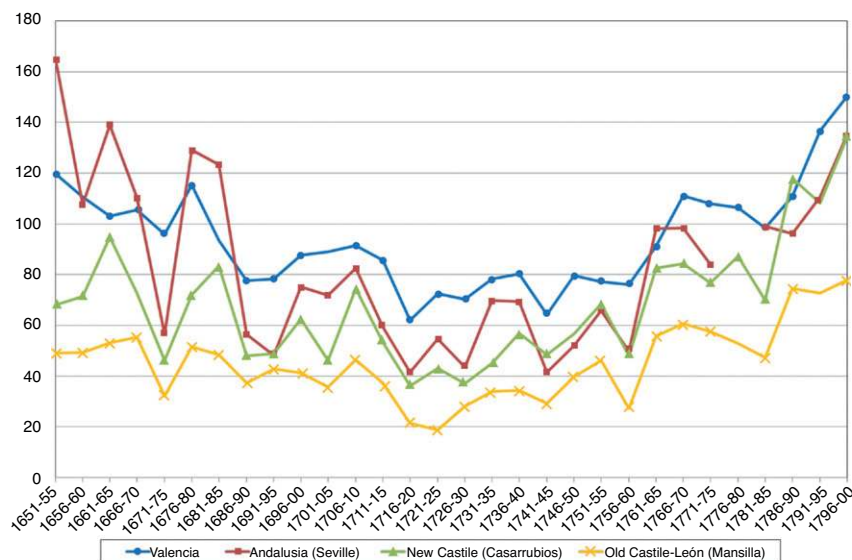
meats was known in Segovia<sup>13</sup>. Nor can one discount the influence of factors such as product quality or taxes, although there is little conclusive information at the moment. When he made inter- or extrapolations, he estimated ratios from the Monasterio Real de San Benito in Sahagún and, principally, from Mansilla or Valladolid alternatively. Only in some few cases (firewood, hens) did he use prices from Ávila, Segovia or Salamanca as a reference for his calculations. (Tables 1 and 2). For New Castile, prices were derived from several sources: the Hospital Tavera (San Juan Bautista) and the Monasterio de los Dominicos de San Pedro (both in Toledo), the Convento de las Religiosas Bernardas in Casarrubios del Monte (a village in the province of Toledo, halfway between the cities of Toledo and Madrid), while for the last city, the main source was the Hospital de la Venerable Orden Tercera, with some prices inter- and extrapolated using records of colleges of the University of Alcalá and the Monasterio de Nuestra Señora del Paular for the period 1651–1701 (Hamilton, 1947, pp. 117–118). As Llopis and García (2011) indicate, most of the prices for New Castile are taken from Toledo, this city providing approximately 50% of them (olive oil, rice, twine, beef, mutton. . .), while around a third come from Casarrubios (wheat, chickpeas, cod or shoes. . .). Wine and linen are the most significant prices from Madrid, followed by chocolate from 1701 onwards<sup>14</sup> (Table 3).

In Valencia, prices were collected from the Hospital dels Innocents, and, to a lesser extent, from the Colegio Santo Tomás de

<sup>12</sup> Villaverde de Sandoval belongs to Mansilla, a village twelve miles southeast of the city of León. (Henceforth Mansilla). Surprisingly enough, Regina Grafe (2011, p. 49) asserts that Old Castile-León series were "collated out using prices from Valladolid, León, Salamanca, Ávila, Segovia, Santander, Castro Urdiales and Logroño, something that Hamilton never stated and that his inedited notes, and *War and Prices* itself, clearly prove not to be the case. The same applies to Andalusia, for the prices are exclusively from Seville and not a mix of prices from Seville and Cádiz as she wrote. See Grafe (2011, p. 49, 100).

<sup>13</sup> "In this city you will find a pound of . . . 40 (ounces), which is the butcher's pound in Segovia, or the libra carnífera. . . Clarke (1763, p. 92; Aznar (1727, p. 153).

<sup>14</sup> In the case of wheat, some gaps in the series were completed with prices from the San Juan Hospital in Toledo, which were quite similar to those in Casarrubios. EHP-MWS, Box 7. New Castile Original Price Sheets.



**Figure 1.** Wheat prices. Grams of silver per hectolitre.

Source: EHP-MWS. Box 5, Old Castile Worksheets; Andalusia Final Commodity List. Box 7. New Castile Original Price Sheets; Santo Tomas, prices/commodity worksheets; Worksheets and Calculations for Prices. Feliu (1991).

Villanueva; in Seville, they came from the del Espíritu Santo, del Amor de Dios and de la Sangre Hospitals (Hamilton, 1947, pp. 115, 137, 153). In both cases, prices being of the same locality appears to guarantee some homogeneity. However, differences appear in products under the same label and bought in similar measures, which would point to hypothetical differences in quality.

### 3. Prices of several staples by regions, 1651–1800

This section deals with presenting and analysing the regional series of some significant foodstuffs in Early Modern Spain. To standardize the series, weights and prices were converted to metric measures and to grams of silver respectively. For monetary conversions, I adopted Hamilton's equivalences for Castile and those provided by Feliu for Valencia. The comparison of this last series with Allen (2001) reveals significant discrepancies, with the relative position of prices in Valencia varying notably depending on which is used<sup>15</sup>.

#### 3.1. Wheat

Among cereals, the most complete series correspond to wheat. The data for Old Castile-León comes from Mansilla, that of New Castile from Casarrubios del Monte, for Andalusia from Seville and for Valencia from the city of Valencia. Seville prices cover only 1650–1750, with prices for the other fifty years being taken to complete the figure from Ponsot (1986), converted from harvest years to calendar years by Feliu (1991, p. 28, note 15). However, I only reproduce in the appendix Hamilton's quotations (Figure 1).

The trends display similarity in broad terms; nevertheless, regional differences in price behaviour are relevant. Price volatility in Valencia was significantly lower than in the two Castiles or Andalusia, showing the advantage of coastal areas getting access to the international wheat trade — although the role played by rice as a substitute was pointed out to explain the case as well (Palop,

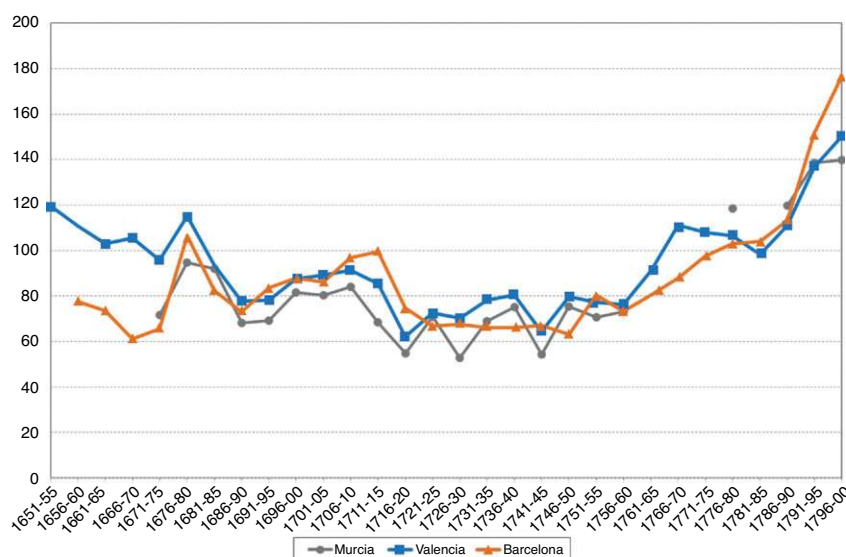
<sup>15</sup> Feliu (1991, p. 21); Feliu (1991–1993). In Allen's case "After 1650, the calculated values are for 1719, 1726, 1739, 1740, 1754, 1764, 1777, 1781. The rest are interpolated". Allen (2001) in "Conversions, Sources and Comments". [www.nuffield.ox.ac.uk/users/Allen/studer/valencia.xls](http://www.nuffield.ox.ac.uk/users/Allen/studer/valencia.xls).

1975, p. 431; Reher, 2001, pp. 549–551). With varying degrees, all the series show a sharp downward trend from the mid-17th century, which would last until approximately 1716–20 (1721–25 in the North). Afterwards there was a period of relative stability until the start of the 1760s, when prices rose significantly, in spite of showing a slight downward movement during the seventies. From a comparative viewpoint, during most of the period, Valencia had the steepest prices; within Castile, the lowest were those in Mansilla. The great similarity in regional price behaviour made Ánes speak of the existence of a Castilian price, highlighting the uniformity of the cyclical and long-term movements of Hamilton's prices for New Castile and Segovia (Ánes, 1970, p. 205, footnote 6). Llopis and Sotoca (2005, p. 249) placed the beginnings of grain market integration in Castile before the mid-18th century, despite a slowdown in this process in the last decades of the century, and Reher (2001) also found this trend during the same period. In the Mediterranean area, price integration (interpreted as similarity in cycles, long-term trends and price levels) appears to have been somewhat higher than in Castile. To paraphrase Ánes, it is likely that a Mediterranean price for wheat existed too (Figure 2).

#### 3.2. Legumes

Legumes were an important part of the working class diet. Broad beans, beans and chickpeas provided people with plenty of calories. However, details on their prices are less plentiful. Geographically, the relationship between prices of different types of legumes, and thus consumption, varied. On the Cantabrian coast, bean use expanded associated with maize and they were clearly cheaper than chickpeas<sup>16</sup>. In the Mediterranean, the fragmented data for Valencia does not allow deep analysis, but the same relationship between chickpeas and beans seems to apply with somewhat less marked differences. In Castile, the available evidence suggests that differences in prices between chickpeas and beans reduce as we move inland. Although the evidence is sketchy, the most affordable

<sup>16</sup> Fernández de Pinedo (1974, pp. 173, 215); Lanza García (1991, p. 16). Although prices oscillated year to year, in the Basque Country beans and broad beans were between two and three times cheaper than chickpeas. I am grateful to Santiago Piquero for this information.



**Figure 2.** Wheat prices in Barcelona, Valencia and Murcia. Grams of silver per hectolitre.

Source: EHP-MWS, Box 7. Santo Tomas, prices/commodity worksheets; Feliu (1991, pp. 50-51); Caro López (1985, pp. 262-263).

legume in the Peninsula was the broad bean, sold at prices nearly half (and many times less) of those of chickpeas almost everywhere.

Hamilton included only chickpea prices in the Seville and New Castile series, but he also gathered scattered evidence of prices for other places and legumes. For the Seville series, he used and interpolated prices from three hospitals. Whatever the case, the difference between them was small and the resulting series is consistent. In contrast with Hamilton's method, I worked out the quarterly average of all the entries, irrespective of their provenance, and subsequently calculated the annual price and the result is still very similar. The only notable difference is that while in the primary worksheets there are no chickpea prices for the years from 1756 to 1769, the typewritten series does contain data. It is not possible to ascertain their origin from the information available; nevertheless, I have made use of them thanks to their apparent reliability.

In the case of New Castile, Hamilton wrote in his notes that he had to use numerous substitutes in order to complete the series and recognised that the ratios employed might not be reliable<sup>17</sup>. I assembled a new series for New Castile from quarterly averages of all the entries collected no matter what the source, to later calculate their annual average. Despite the geographically distinct origins, the new series seems coherent and differs little from that calculated by Hamilton (see Appendix A2). For Valencia the few chickpea prices recorded make it difficult to construct representative series. However, while they should be considered provisional and subject to improvement, they may be a useful reference for comparing with other locations. The series for Castile and León was compiled from quarterly averages (and later yearly) of prices in several, many times distant, locations throughout the region; consequently, as in Valencia, the final result should be treated with caution and as being provisional (see Appendix A2).

Chickpea price movement in Andalusia and the two Castiles is fairly similar. From 1720 prices in Seville and Toledo started increasing, at first faster in Seville, then converging towards the end of the century. Taking the years 1721–25 as base 100, prices rose in New Castile to 219 in 1766–70 and 224 in 1796–1800. In Andalusia the increase was not so steep at first, increasing to 142 in the 1760s and to 224 for 1796–1800; prices went up at a similar rate in Old Castile-León, to 173 and 224 for these five-year periods.

The comparison between wheat and chickpea prices shows that in Andalusia and New Castile both cycles and trends are very similar up until the mid-18th century for the latter and the last decades of that century for Seville, when wheat prices started rising faster. In Old Castile-León, however, the opposite occurred: wheat went up more quickly than chickpeas during the second half of the 18th century. If we confine ourselves to price levels, the data leave us in no doubt: New Castile prices were the highest (Figure 3).

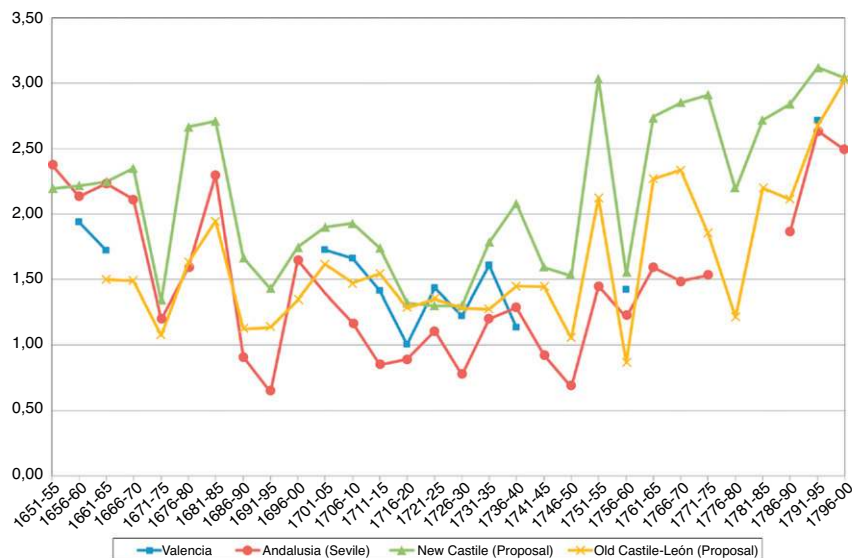
As far as other legumes, the only existing and really consistent series is for dried beans from Casarrubios del Monte, of which Hamilton published data for the 18th century; that has been extended backwards to the last years of the 17th century. Even though they are fragmented and very provisional, it is possible to present bean prices for León and Valencia, with the addition of a short series from Valladolid from 1750 onwards<sup>18</sup>. With all due precaution because of the nature and the provisional status of the available evidence, bean prices would resemble those of chickpeas, with New Castile prices again being visibly the highest. Unfortunately, there are hardly any entries regarding broad beans allowing us to build any series among Hamilton's papers. As it was a very cheap, widely consumed legume all around the country, it would be of great interest to increase the geographical stock of prices to add to those of Feliu (1991) for Barcelona and Sainz Ripa (1985) for Logroño (Figure 4).

### 3.3. Mutton

Mutton was one of the most appreciated meats of the time in Spain, with prices commonly higher than those of beef. Despite its relatively high cost and being tied to middle and high-income consumers, some references seem to place mutton consumption as being greater than beef and other meats over a large part of the country. In the 1730s, Zabala y Auñón estimated consumption in Castile – excluding the Basque Provinces – to be 50% mutton, a quarter beef and a quarter goat (Zabala y Auñón, 1732, p. 58). In Madrid, for 1796–1801, Ringrose gives

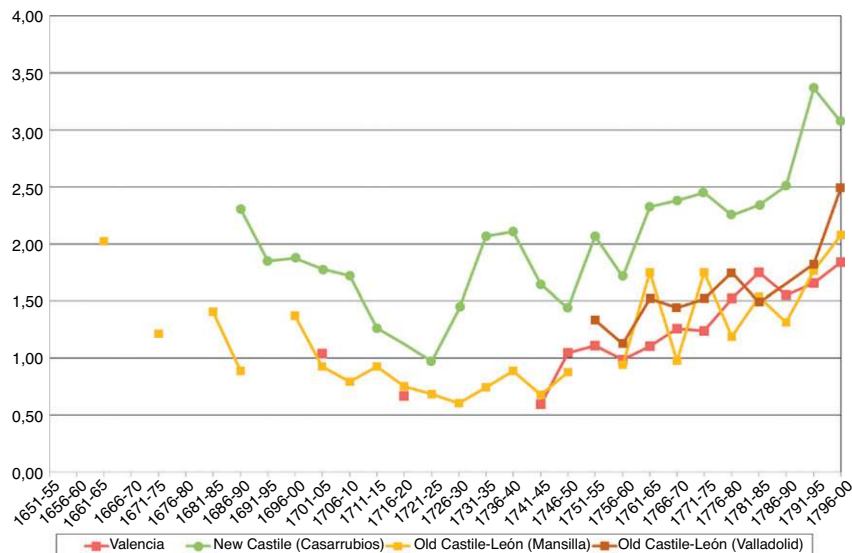
<sup>18</sup> Archivo Histórico Nacional (AHN), Clero Secular Regular, Libros 16901 and 16919. Monasterio de San Joaquín y Santa Ana.

<sup>17</sup> EHP-MWS, Box 19. Research Cards.



**Figure 3.** Chickpea prices. Grams of silver per kilogram.

Source: See Figure 1 and footnote 25.



**Figure 4.** Bean prices. Grams of silver per kilogram.

Source: See Figure 3.

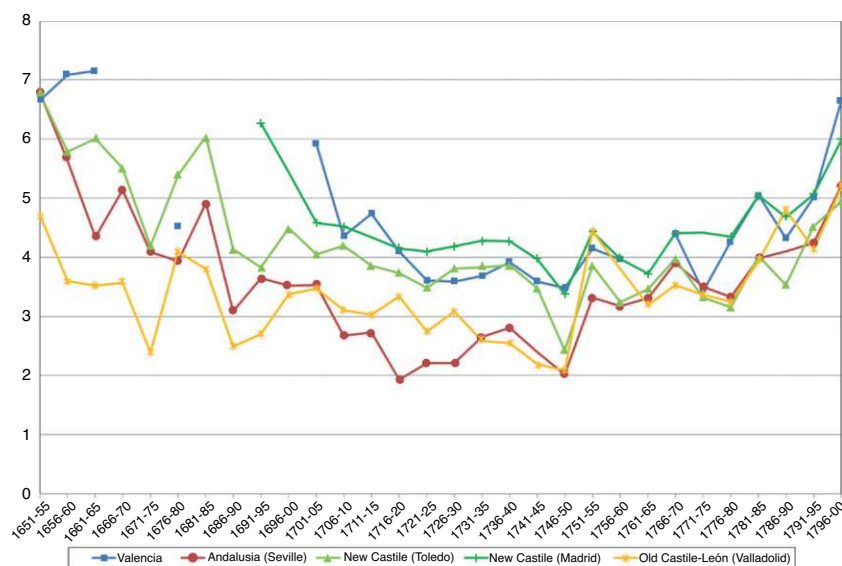
48.5% mutton, 28.6% beef and 22.9% pork.<sup>19</sup> In northern areas, proportions were somewhat different, with beef being more popular. In the second half of the 18th century in León, beef amounted to a bit more than half of total consumption, with one third being mutton and pork the rest (Cubillo de la Puente, 2000, pp. 69–103). By the mid-1740s, in Vitoria, estimations put beef consumption well above mutton with a relationship of 5.5 to 1 (Porres, 1995, p. 250). Examples are many and variations too, but there seems to have been a geographical pattern of meat consumption together with a market segmentation as far as mutton and beef consumption are concerned.

As with other products, prices and measures have been standardised. In the case of meat, the data for Seville is based on

<sup>19</sup> Ringrose (1983, pp. 359–360). Likewise, Palacio Atard (1998), presented this ratio for Madrid: mutton 45%, beef 32% and pork 23%. Bernardos (1997) indicated that to the end of the 18th century beef consumption tended to equal that of mutton.

prices in maravedís for a “meat pound” of 32 ounces. In Valencia a “meat pound” of 36 ounces was also in use (Hamilton, 1934, pp. 175, 181), while I used the Castilian pound of 16 ounces for Valladolid and Toledo. To build the price series of mutton in Seville, Hamilton used the accountancy records of the Hospital del Espíritu Santo for the period 1701–1800. The price series for 1651–1700 has been estimated from the relationship between live sheep and mutton throughout the 18th century. The median price calculated (live sheep/12.5) coincides exactly with the one Hamilton used to extrapolate some prices at the end of the 18th century and has been used to estimate its price between 1651 y 1700<sup>20</sup>. For the series of New Castile, Hamilton took the prices from the books of the *Hospital Tavera* in Toledo, and he did only a few interpolations using

<sup>20</sup> EHP-MWS Box 5. Final Commodity List for Andalusia 1651–1800, (2 folders), Andalusia, typed prices, 1651–1800. Prices of live sheep are from the Hospital de la Sangre.



**Figure 5.** Mutton prices. Grams of silver per kilogram.

Source: See Figure 1.

the ratios calculated with the prices from Casarrubios del Monte, as the relationship between them varied little all along the period<sup>21</sup>. As in other cases, I calculated the annual mean and built the Toledo series without any interpolation. Prices for New Castile abound and good series for other places apart from Toledo can be elaborated, in particular for 18th century Madrid. There is a dearth of data for Valencia and, consequently, Hamilton did not start the mutton price series until 1701. I recovered some values for prior years, but their scarcity makes any analysis of a very limited reach for the years 1651–1700 (Figure 5).

The major trends seen before are also present here, although with some variations. The general drop in prices would continue until 1746–50, most evidently in the two Castiles. In Andalusia, they bottomed out somewhat earlier (1721–25) and stayed low until 1746–50. The low point was reached in Valencia in 1716–20, and from then on prices fluctuated in a relatively narrow band until the rise from the mid-1770s. Price comparisons put mutton prices in Valencia at similar levels to those of Madrid during the 18th century, which were the highest of all the places considered. They were higher in Toledo than in Seville until 1756–60 and the latter fell below those of Valladolid during the first third of the 18th century. Nonetheless, from the 1750s, Castile prices tended to follow each other upwards and, interestingly, mutton prices in Madrid would rank above those of the nearby Toledo.

### 3.4. Olive oil

Apart from being a food product, olive oil was widely used for lighting and other industrial uses (textiles, soap)<sup>22</sup>. The distribution of olive trees in the Iberian Peninsula responds to specific ecological and climatic conditions. Of the four regions for which Hamilton compiled prices, Old Castile-León is the only one with no olive oil production, with its correspondence in price levels. Feliu (1991, I, p. 104) expressed surprise regarding the wide differences found between Old Castile-León and Andalusia in the 1501–1650 period, which made him think there might be metrological errors

in Hamilton's proposals. However, this gap persisted between 1651 and 1800, with prices in Mansilla being 1.5–2 times higher than in Seville during the whole period.

When standardising the regional olive oil price series, metrology plays a significant role, for measures may vary geographically and even within same places. Hamilton noted in his research cards that sources documented prices in Toledo and Seville for two types of *arroba* (measures): *mayor* and *menor* (greater and lesser). The difference between them relied on the latter being affected by taxation and Hamilton assumed the relationship was stable in time, as well as the ratio for conversions he obtained in the comparison of their prices (*menor* price \* 1.15 = *mayor* price)<sup>23</sup>. During the second half of the 18th century, olive oil prices in Toledo were also recorded interchangeably in *arrobos de medida* (of capacity) and *arrobos de peso* (in weight), which he always converted to the first using weight equivalences<sup>24</sup>. The series for Seville was produced with prices from the Hospital de la Sangre, and while Hamilton made some interpolations with other prices (fundamentally from the Hospital del Espíritu Santo), differences were negligible. The prices for Toledo were computed from the books of the Hospital Tavera and those for Valencia were taken from the Hospital dels Innocents. As in other occasions, only prices recorded for the institutions are displayed in the series. In Old Castile-León, prices came from Mansilla and Hamilton also expressed his doubts on the weight of the *arroba* there. He presumed that in Valladolid it equaled 12.25 l as in Palencia, but he did not find any clear equivalence for León. Price comparison showed that prices in Mansilla were regularly about a 10% higher than in Valladolid and, given that it was unlikely that transportation cost from production areas differed much in the two cities, he assumed that the *arroba* in León (Mansilla) might be somewhat near 5% higher than the Castilian standard and I followed his reasoning to build the series<sup>25</sup>. As well as with other products, it has been possible to increase the stock of prices of olive oil by composing series for places other than those Hamilton included in the

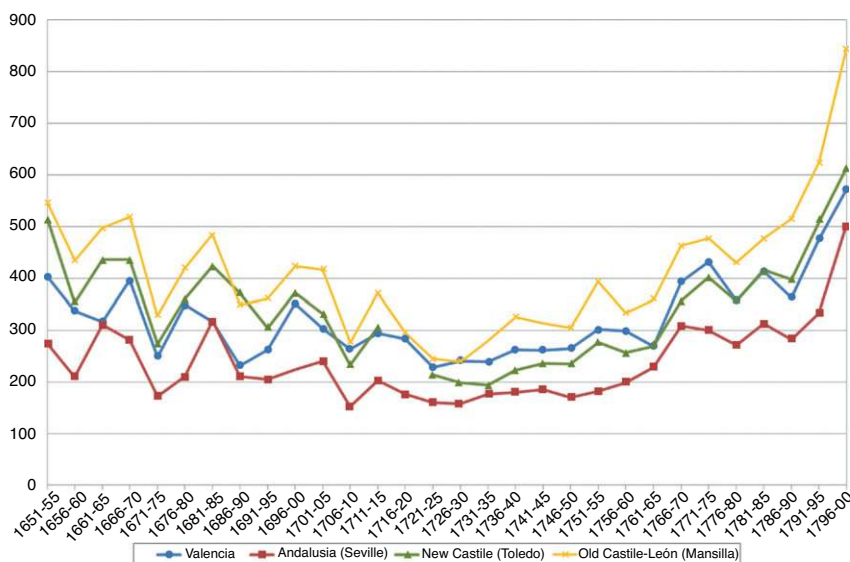
<sup>23</sup> EHP-MWS Box 5, Worksheet summary for Andalusia; Box 19, Research Note Cards. Hamilton (1934, pp. 159–160).

<sup>24</sup> EHP-MWS. Box 19, Research Note Cards.

<sup>25</sup> Hamilton (1934, p. 173). Prices in Valladolid during the second half of the 18th century shared movements with those of Mansilla but they were still somewhat lower, even after standardising measures to hectolitres using Hamilton's measures.

<sup>21</sup> EHP-MWS Box 19, Research Note Cards.

<sup>22</sup> For instance, Hernández García (2007).



**Figure 6.** Olive oil prices by region. Grams of silver per hectolitre.

Source: See Figure 1.

indices. In Old-Castile this is the case of two series for Valladolid: 1651–1750 from the Hospital de Esgueva and from 1751 onwards with data from the Monastery of San Joaquin and Santa Ana. In the case of New Castile, comparable series have been computed for Casarrubios (1656–1750) and Madrid (1692–1744).

In broad terms, price trends for olive oil in the four regions were fairly similar and not so different to those observed for wheat: markedly downwards until the late 1720s, stabilising with a slight upward movement to the 1760s and then a vigorous rise from the late 1770s. The comparison of regional prices leaves no room for doubt: northern prices were the highest and the relationship with the lowest (Seville) did not experience any further changes during the entire period. Between these two, the prices in Toledo and Valencia would tend to approach each other during the 18th century, especially from the 1760s (Figure 6).

### 3.5. Wine

Wine is undoubtedly a complex product with respect to price, as there are many variations among types and qualities, as well as in taxation or metrology. This means that comparing prices can generate problems and uncertainties and may be the source of misunderstandings. Feliu (1991, I, p. 86) mentions one of these regarding wine prices for New Castile between 1651 and 1800. According to him, Hamilton prices were unlikely to correspond with the measures he indicated: *maravedís per azumbre*. In looking for possible alternatives, and without any references to guide him, he decided to use a hypothetical measure, the half *cántara*, which was the only one that offered a coherent series; however, he stated that, unfortunately, it was the only argument to defend the choice. Allen (2001, pp. 438–43) found another way. He reckoned that the price for 1651 would be the same as for 1650 and then calculated a ratio between this and the price offered by Hamilton for 1651 that applied to the rest of the years. Fortunately, the Hamilton papers help shed light on the reason for these “disparate” prices.

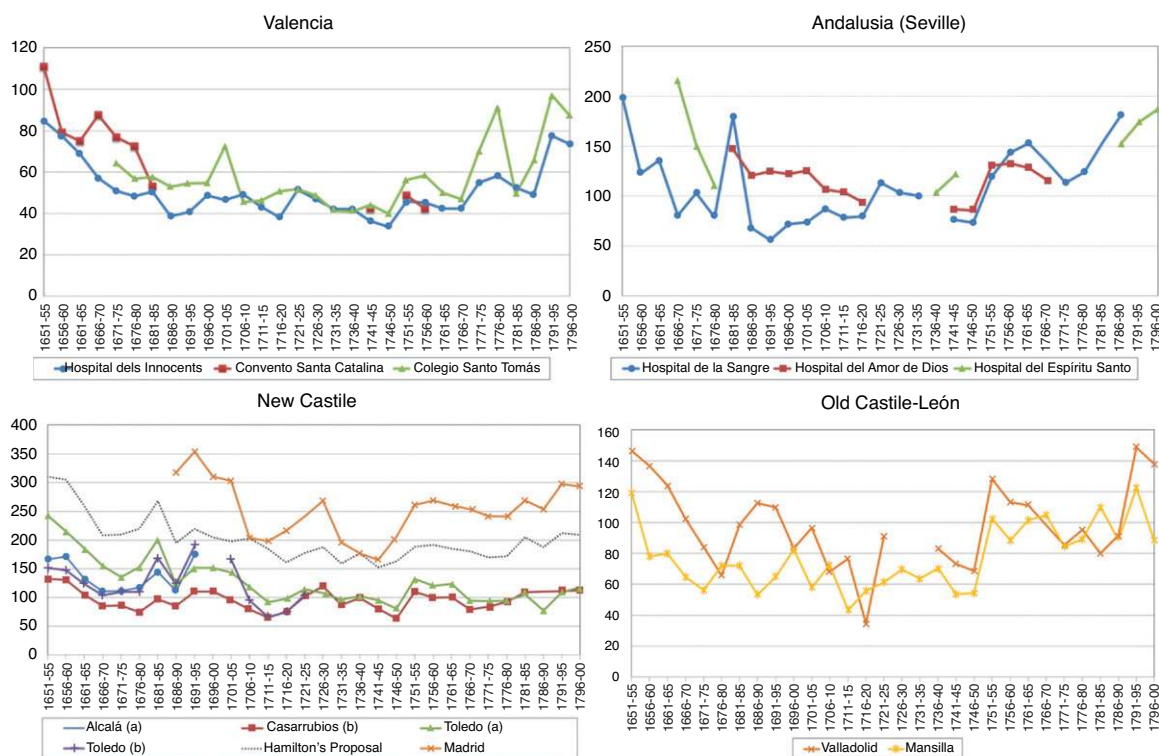
To compile the New Castile series, Hamilton had quite a heterogeneous set of prices for different places, types and measures available. And the paradox is that Hamilton presents a series that does not correspond with any of them. Hamilton left annotated in his research cards that the price series for Madrid referred to the

price in *maravedís* of the *azumbre de la medida menor* (hereafter *azumbre menor*) of the red wine bought by the Hospital de la Venerable Orden Tercera. However, the construction of the series was somewhat complex. First, as its records did not start until the 1690s, for those previous decades he calculated price ratios and applied them to estimate prices with the cost of wine in Alcalá (1651 to 1687 and 1689) and for the remaining years with prices of the Hospital Tavera of Toledo (1688, 1691–1693)<sup>26</sup>. For the years after, when there were no red wine prices, he used for the series those of white wine, which showed almost the same levels.

However, for the years 1719–1732 and 1748–1800, the quotations in the worksheets do not fit with the prices he finally published. Between 1726 and 1732, his notes indicate whether the price was for *azumbres de la medida mayor* (thereafter *azumbre mayor*) or for “*de la medida menor*”. The distinction between the two measures stems from the reduction of the amount of wine in the *azumbre* retailed to consumers due to the *sis*a (tax) levied, which in theory amounted for one eighth. Apparently he presumed that all the annotations belonged to that measure until 1716, so the series fits with the original quotations. From the mentioned periods of 1719–1732 and 1748–1800, he believed that prices were of the *azumbre mayor* and, therefore, he converted them into the smaller measure. The theoretical content of the *azumbre menor* would equal 1.771 (12.5% less or a 1/8 of the content of the regular one, 2016l). However, Andrés Ucendo (2011) demonstrated that this equivalence was far from stable during the 17th century, as it varied significantly. When it was created in 1601, the equivalence in litres of the *azumbre menor* was those 1.771, but by the end of the century, it was only 1.341. This last figure is confirmed by a few quotations in which prices of both measures appear together. By the late 1729 and early 1730s, the price of the small measure was 1.6 times lower than that of its bigger equivalence, which means that the amount of wine sold under the label *de la medida menor* equalled the same 1.341. However, Hamilton did not use this ratio and instead assumed the price of the *azumbre mayor*/1.404, which in theory would make the *azumbre menor* equal to 1.539l. Hamilton pointed to some cross correlations to obtain this relationship

<sup>26</sup> EHP-MWS, Box 19 – Research Note Cards.





**Figure 7.** Wine prices by region. Grams of silver per hectolitre.

Source: See Figure 1. See also Appendix A6.

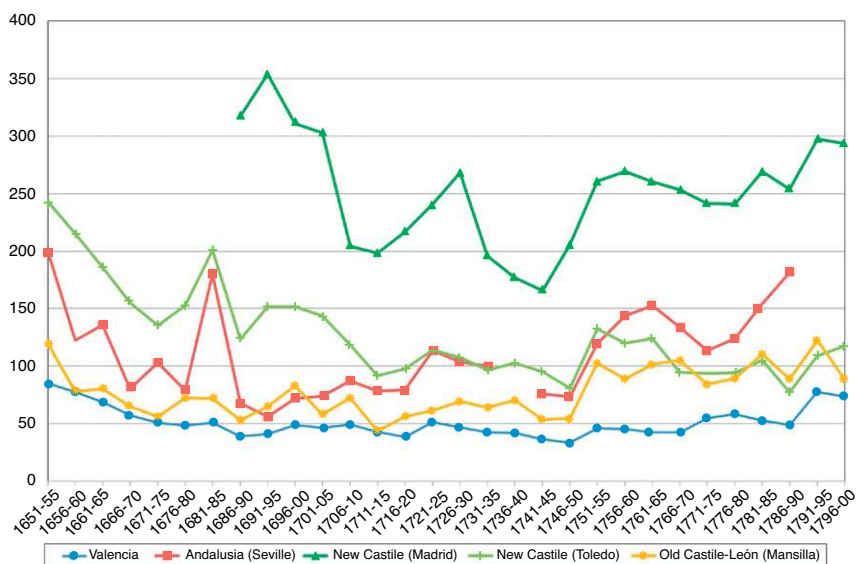
but without specifying them. Therefore, for my calculations and further conversions, I standardised the price series using 1.34 as the measure in litres of the *azumbre de la medida menor*.

The series I propose in this paper is still tentative, for it still is unknown whether the *azumbre menor* measured this quantity or changed during the rest of the century. However, it seems feasible to suppose that it remained stable. After 1707, while some mistakes of identification may occur, prices recorded in the worksheets are estimated to be of maravedís per *azumbre de la medida mayor*. Before that year, in contrast, I considered prices to be of the *azumbre menor* and they were consequently converted using the factor above. Further research would confirm or deny the accuracy of the choice that I made but, with all the necessary caution, positive correlations with prices of nearby locations would sustain this option. Red wine prices form the backbone of the series. Only when they did not exist did I made use of white wine prices, which showed almost the same price in the years comparisons were possible. My results differ substantially to Hamilton's proposal. Firstly, because I do not extrapolate data back to 1651 and the series therefore is shorter and, secondly, because my estimations are clearly above those of Hamilton after standardising them to metric measures. This poses a number of questions on how to interpret and use these prices that are difficult to sort out with the evidence available today. Generally, price sources do not specify qualities. Many times, quotations in the books reflect prices under the generic wine and they seldom enter into other descriptions apart from identifying types or signalling origins. Nonetheless, from other qualitative sources, it is known that different wine qualities existed and their prices varied accordingly. The case of these exceptionally high prices of wine in Madrid is likely related to that question: the quality. If we accept that sacramental wine was commonly of a good quality, the similarity of prices between white, red and sacramental wine in the Madrid worksheets would point in the same direction. On the other hand, taxation also plays its role in this scheme. The situation described by Aznar in the early

18th century is testimony of the great variety of local taxes levied on wine in urban Spain (see Appendix B2). Moreover, the recent article of Andrés Ucendo (2011) has drawn attention to the importance of local taxes in the final prices of ordinary wine in Madrid. Further empirical studies on the subject would tell us whether the case of Madrid was the exception or more common than thought in other Castilian cities. Apart from the Madrid wine series, I assembled two more for the same region (Toledo and Casarrubios) that, sharing similar trends, are a useful contrast to the uniqueness of the Madrid prices.

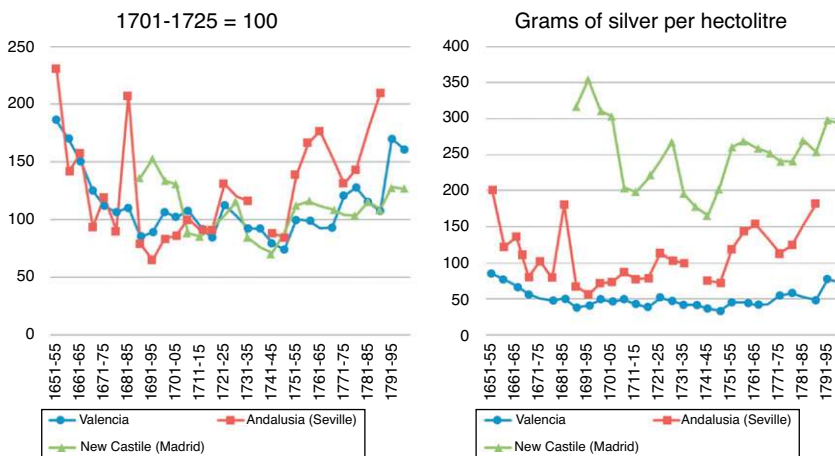
To compose the Old Castile-León series, Hamilton combined prices from Valladolid and Mansilla. Up to 1750 he used the quotations from the latter and those of Valladolid for the last fifty years. This choice was conditioned by what he considered bizarre prices recorded every last quarter of the year in the latter city. For that reason, Hamilton preferred not to use them and gave priority to Leon prices<sup>27</sup>. Curiously enough, those wine prices would comprise a short series that presents some similarities to what was described for Madrid. In this case, quality may again be the explanation of these distinctive prices. In order to maintain uniformity for the origin of the prices, I preferred to compile separate series for each of the cities. In spite of the gaps, differences between the two are not particularly notable as regards trends and levels, although those for Valladolid are usually slightly higher. For Seville, the choice was the prices from the Hospital de la Sangre, completed with quotations from the Hospital del Espíritu Santo in the last decades of the 18th century. As before, I chose to distinguish every series by their sources, as they sometimes showed slight differences in levels or trends difficult to ascertain. In Valencia, the preference was for the prices recorded in the Hospital dels Innocents because they were the most complete,

<sup>27</sup> EHP-MWS, Box 5, Castile Old Dopesheets 1651–1800.



**Figure 8.** Wine prices in Spain. Grams of silver per hectolitre.

Source: See Figure 1.



**Figure 9.** Wine prices in Spain. Grams of silver per hectolitre.

Source: See Figure 1.

regular series found in this city. The prices from the Colegio de Santo Tomás (although with fewer quotations) form a significant compilation that helps compare price levels and trends of prices for a hypothetically similar commodity in the same city (Figure 7).

Regional comparisons are conditioned by the absence of information regarding to which type of wine the prices refer and the varying impact of taxes on them. On the other hand, metrology might also have played its role. If the regular metric equivalence in Castile for the *cántara* or *arroba* of wine equalled approximately 16.13 litres, the correspondence was 15.65 litres in Seville and in Valladolid, while it was 15.85 litres in León. Hamilton (1934, p. 171) thought that originally most of the cities adopted the regular Castilian measure and it was possibly lowered later due to local taxes; but, in the end, they became standard until the official conversion of all measures to the metric system in the 19th century (Figure 8).

With all due precaution, the contrast of the assembled series would raise some questions worth researching: first of all, the significant differences in wine prices between the Mediterranean and Castile, also confirmed by the wine prices of Barcelona from Feliu (1991, pp. 95–96). Was it quality? Lower taxes? Secondly, the exceptionality of the Madrid prices, which presumably were

of wines of a quality above the ordinary ones, but also keeping in mind what the history of taxation in the city tells us; on the other hand, comparisons show that volatility levels in Madrid were lower than in the rest of the places for which Hamilton collected prices – which would be in line with the findings of Llopis and García (2011). Finally, the own evolution of prices inside Castile, with León prices being the lowest until the last quarter of the 18th century when they started growing clearly faster (together with Valencia prices) than those of Toledo, Madrid or Seville.

#### 4. Conclusions

Thanks to the Earl Hamilton's notes and papers kept in his personal archive at Duke University, it has been possible to recover the dataset he used to devise the regional price indexes for his book *War and Prices in Spain, 1651–1800*. The fact that only the prices and wages of New Castile were finally printed in the book makes it possible to increase significantly the quantitative evidence available for Early Modern Spain. The aim of this paper was to carry out an initial approach to these data by publishing a sample

of prices of some basic foodstuffs in the consumption baskets of the time it covers. It does not intend to provide an explanation for the price movements beyond some basic comparisons of the regional levels and general trends. Neither does it make use of the econometric techniques commonly applied in this type of studies in consequence. This paper is a first step; those are goals for a second stage in the research program. I consider that, before using any more sophisticated analytical tools, it is imperative to know what we are applying them to. This implies going through the dataset and scrutinising it deeply to unveil its origin, quality, composition and goals, for not every price recorded and every series printed would be valid for everything. A good knowledge of the data and its deficiencies –and, therefore, possibilities– may help to avoid mistakes in their interpretation, which would lead to apparently innovative explanatory models that, in the end, are no more than the result of a misunderstanding of the numbers<sup>28</sup>.

The use that we make of the sources is directly related with the type of questions we would like to answer. The method and objectives that Hamilton pursued in his research made him treat prices in a way that might not be valid for other uses. His division of the analysis into fifty-year periods, the use of index numbers instead of real prices for comparative analysis, or the inter- and extrapolations that he made to complete series all had a clear methodological purpose linked to its goal of testing his theories on the origins and consequences of the inflationary processes in Early Modern Spain. My approach to Hamilton's prices seeks other ends different from those that he intended and, to some extent, it again coincides with those expressed by Feliu (1991, I, pp. 8–9). First of all, I try to identify what type of prices we are dealing with. As Vilar correctly stated, the homogeneity sought within each price series did not necessarily exist among those comprising the indices. What can have sense in index numbers may show a very different face if we use real prices instead, as the example of Figure 9 does.

Secondly, by using the prices Hamilton gathered, I attempt to build the longest and most homogeneous series of prices, breaking the glass ceilings of the fifty-year period that he established every time it is possible. Thirdly, I publish the prices in a way that historians and social scientists of every kind will find easy to handle. The data have been standardised to metric measures and the prices converted into silver grams. The use of silver prices instead of common currency, in spite of differences of criteria existing and the different readings that could be made in times of monetary instability, has its advantages, too (Feliu, 1991, I, pp. 16–17). Whatever the limitations, it allows comparative analyses to be made across places with different currencies and helps to establish baselines, which is another of the goals of this paper.

Among other things, a careful approach to the sources brings to the surface many aspects that can condition price levels and complicate their reading. Together with transportation costs (which are sometimes specified as being included in the price, others that they are not, and many times neither the first nor the second), the metrological question is a considerable one. The different measures used in the sale of meat, olive oil, wine and many other products mean that close examination of the prices is necessary, as distortions can easily occur both when compiling the series and comparing them. The different estimates for the silver premium used by Feliu and Allen also warn about this type of consequences. Having data from an ever-increasing number of locations can help unravel such complex matters as transportation costs or the effect of taxes on final prices and their impact on price level comparisons; this is always assuming that territorial comparisons can be

made regarding products of the same quality, usually a subject with which it is difficult to deal, as this is information that sources do not usually give. To compare prices from institutions of different character in the same city may be one of the alternatives for finding out to what extent hypothetically different qualities of similar goods affect prices. On the other hand, widening the geographical scope of the price evidence also helps in clarifying differences in consumption between zones. The use of whale and fish oil for lighting in the north is probably related to the high prices that olive oil reached in this zone; in the case of legumes, for example, prices would point us towards the use of beans more than chickpeas in the baskets of the Mediterranean or in the Cantabrian area.

Bearing all these questions in mind, the prices proposed here intend to increase the existing knowledge on the subject in Spain. Hamilton carried out a gigantic task under unimaginable conditions by today's standards. His long, hard work studying and processing source after source has bequeathed to us all one of the most impressive collections of prices for any country in Early Modern Europe ready for use, and this paper attempts to pay a modest tribute to his efforts.

### Acknowledgements

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### Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.ihe.2012.09.003 or [www.elsevierciencia.com/en/linksolver/ft/ivp/1698-6989/9/75](http://www.elsevierciencia.com/en/linksolver/ft/ivp/1698-6989/9/75).

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<sup>28</sup> "... poor numbers are bad not only in themselves but because, more damagingly, they encourage unreliable conclusions". Platt (1989, p. 1).

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