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New research guidelines for living standards, consumer baskets, and prices in Madrid and Mexico

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New research guidelines for living standards, consumer baskets, and prices in Madrid and Mexico[1]

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ABSTRACT

The history of prices has played a key role in the economic history of the preindustrial world. In this field, Allen's paper (2001) set a milestone by proposing the calculation of a *welfare ratio* that would allow a comparison among different areas of the world and different times. Nevertheless, we consider that this method *as is* has reached its limits and needs major improvements. We therefore propose a change of scope that would allow the establishment of the real *consumption-possibility frontier* of families—the actual unit of production and consumption in Early Modern times. We also revise the *barebone baskets* that have been used until now, replacing them with consumer baskets that approach, to a greater degree, the true consumption patterns of different kinds of families. By focusing on two widely documented cases—Madrid and Mexico City—we conclude, first, that consumers had *regular* access to a wider array of products than previously assumed; second, that in the 18th century prices evolved in Madrid in a relatively similar way to the large cities of Western Europe, even if Madrid constituted an exception in the Castilian context, where inflation was more intense during the second half of the aforementioned century; and, third, that volatility in the consumer price index was around 10% higher for unskilled workers than for skilled workers. However, the volatility deduced from our price indices is significantly lower than the one calculated using the typical *barebone* method.

Keywords: economic history; standard of living; prices; welfare ratios; consumer baskets; real wages; Europe; Spain; Latin America; Mexico.

JEL codes: N30, N33, N36, E31, I31, I32

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1. INTRODUCTION

The history of prices has played a pivotal role in the economic history of the preindustrial world. Among other contributions, it has allowed the identification of periods and situations of serious instability and the turning of nominal values of several series of variables into real values, making comparisons of each one of these variables possible over time. Even though it also dealt with other topics, the history of prices has been closely related to the history of wages and living standards. This work is placed within that field.

It is undeniable that in the course of the investigations on salaries and living standards, and indirectly on the construction of consumer price indexes (CPIs), "the publication of the paper by Allen (2001) marks the time in which the discussion took a new direction".[5] Allen's goal was to design a new methodology that would allow the more-effective comparison of living standards of workers in different areas of the world and in the very long run. His ultimate purpose consisted of analysing the chronology and the intensity of the economic divergence among Northwestern European countries and countries located in other European areas, as well as on other continents, between the end of the Middle Ages or the beginning of the Early Modern period and the 19th century.

The aims of this paper are threefold: 1) to contribute to the debate on the lines of research that should be given priority in the study of the evolution of living standards in the preindustrial age; 2) to approach the actual consumption structure of families of skilled and unskilled workers in the cities of Madrid and Mexico in the 18th century and propose new consumer baskets for these social groups in each one of these cities; and 3) to calculate cost of living indices for these categories of workers with the new baskets and compare the evolution of prices with previous estimations.

Following this brief introduction, the paper is divided into three parts. The first one focuses on what has been discovered and what is still unclear about the transformations of living standards of common people in different areas of the world between the end of the Middle Ages and the 19th century. In the second part, we lay the foundations that justify the use of consumer baskets, which include richer and more varied diets than the "bare-bones". Finally, the third section of the work presents, analyses, and compares our new price indexes. A brief conclusion closes the text.

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[5] R.C. ALLEN, T.E. MURPHY, E.B. SCHNEIDER, *Una de cal y otra de arena. Building comparable real wages in a global perspective* in "Revista de Historia Económica", 33 – 1, 2015, pp. 61-75, 66.

2. THE DEBATE ON LIVING STANDARDS.

Allen proposed calculating what percentage of a theoretical consumption basket, one that meets the minimum subsistence needs of urban workers' families, could be afforded by the wage of variously qualified male workers in different periods and countries. This idea has been very fruitful. As a matter of fact, his "welfare ratios" have allowed the determination of the chronology of the gestation of English economic leadership,[6] discernment of the existence of clearly different models of wages in the different areas of Early Modern Europe, and the tracing of the evolution of living standards in several European cities between 1500 and 1913.[7]

In the last fifteen years, Allen, Allen, *et al.* significantly contributed to the inclusion of other continents such as Asia and the Americas into the research on the evolution of living standards, to revising the content of the consumption basket that provided the basic subsistence, to reconsidering the issue of the food energy requirements, and to highlighting the role played by high salaries in the industrial revolution and in the development of the education and training systems, especially in Britain.[8]

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[6] However, some topics, such as the dates in which real wages in England diverged from the other countries of the European continent, are still debated. In this respect see P. MALANIMA, *When did England overtake Italy? Medieval and Early Modern divergence in prices and wages*, in "European Review of Economic History", 17, 2013, pp. 45-70; and E. LÓPEZ LOSA, S. PIQUERO, *Spanish Real Wages in the North-western Mirror. On the Timings and Magnitude of the Little Divergence in Europe* (XV Congress of the SEHA. Old and New Worlds: The Global Challanges of Rural History, Panel S10 - Living standards in the Americas and Europe, 16th – 20th centuries) Lisbon, January 27-30, 2016.

[7] R.C. ALLEN, *The Great Divergence in European Wages and Prices from the Middle Ages to the First World War*, in "Explorations in Economic History", 38, 2001, pp. 411-447.

[8] See R.C. ALLEN, *Real Wages in Europe and Asia: A First Look at the Long-Term Patterns*, in R.C. ALLEN, T. BENGTSSON, M. DRIBE eds., *Living Standards in the Past. New Perspectives on Well-being in Asia and Europe*, Oxford, 2005, pp. 111-130; R.C. ALLEN, *India in the Great Divergence*, in *The New Comparative Economic History. Essays in Honor of Jeffrey G. Williamson*, T. HATTON, K. O'ROURKE, A.M. TAYLOR eds., Cambridge & London, 2007, pp. 9-32; R.C. ALLEN, *The British Industrial Revolution in Global Perspective*, Cambridge & New York, 2009; R.C. ALLEN, *Poverty lines in history, theory, and current international practice*, University of Oxford, Departament of Economics, Discussions Paper Series, 685, 2013; R.C. ALLEN, J.P. BASSINO, D. MA, C. MOLL-MURATA, J.L. VAN ZANDEN, *Wages, prices, and livings standards in China, 1738-1925: in comparison with Europe, Japan, and India*, in "Economic History Review", 64 - S1, 2011, pp. 8-38; R.C. ALLEN, J.L. WEISDORF, *Was there an 'industrious revolution' before the industrial revolution? An empirical exercise for England, 1300-1800*, in "Economic History Review", 64 - 3, 2011, pp. 715-729; R.C. ALLEN, T.E. MURPHY, E.B. SCHNEIDER, *The Colonial Origins of the Divergence in the Americas: A Labour Market Approach*, in "The Journal of

In short, this important effort, along with the work of other authors, allowed the formulation of sounder hypotheses on the chronology and intensity of the "Little Divergence" and the "Great Divergence" in several areas of the world between the 16th and the 19th centuries, and the underlining of the catalyst role played by high wages in the economic development of certain areas in the preindustrial period.

So, should we close the research on the "welfare ratios" based on "bare-bone" baskets? In our opinion, Allen's methodology can still deliver important results. In order to achieve this aim, it is necessary to improve the information we have on prices and/or wages in some cities and to extend the samples in order to include more non-European and small- and medium-sized cities.

Two problems compromise the quality of some price or wage series in Allen's and Allen *et al.*'s works: the huge gaps in certain series and, in some cases, the use of data related to a different city from the one being analysed. Thus, to take the example of Madrid,[9] E.J. Hamilton's series come from the Colegio Mayor de San Ildefonso and the Hospital de Antezana, which are located in Alcalá de Henares, and mostly from the Hospital de Tavera and the Dominican monastery of San Pedro in the city of Toledo.[10] Therefore, Hamilton attributed to New Castile series that do not refer to the "prices of things" in Madrid.[11] And this is not a minor issue, since the unequal rise in the sales taxes of some basic foodstuffs (meat, wine, and oil) in Castilian cities, particularly since the end of the 16th century, and the dissimilar intensity of the consumers' protection policy in the different Castilian cities, above all in the second half of the 18th century and in the early 19th century,[12]

Economic History", 72 - 4, 2012, pp. 863-894, and; R.C. ALLEN, T.E. MURPHY, E.B. SCHNEIDER, *Una de cal y otra de arena,* cit., pp. 61-75.

[9] R.C. ALLEN, *The Great Divergence in European Wages and Prices from the Middle Ages to the First World War*, cit.

[10] E.J. HAMILTON, *El tesoro americano y la revolución de los precios en España, 1501-1650*, Barcelona, 1975, p. 156; IDEM, *Guerra y precios en España, 1651-1800*, Madrid, 1988, p. 128.

[11] The indices of prices built for Madrid by Andrés & Lanza for the period between 1595 and 1700 (J.I. ANDRÉS, R. LANZA, *Prices and real wages in seventeenth century Madrid*, in "Economic History Review", 67 - 3, 2014, pp. 607-626) and by Llopis *et al.* (E. LLOPIS, A. GARCÍA-HIERNAUX, H. GARCÍA MONTERO, M. GONZÁLEZ MARISCAL, R. HERNÁNDEZ GARCÍA, *Índices de precios de tres ciudades españolas, 1680-1800: Palencia, Madrid y Sevilla*, in "América Latina en la Historia Económica", 32, 2009, pp. 29-80). The period between 1680 and 1800 is instead based on the accounting of institutions of this city.

[12] On the extraordinary growth of the royal and local taxation in Madrid in the 17th century see J.I. ANDRÉS, *Fiscalidad real y fiscalidad municipal en Castilla durante el siglo XVII: el caso de Madrid*, in "Investigaciones de Historia Económica", 5, 2006, pp. 41-70. With respect to the magnitude of the policy to protect consumers in Madrid in the second half of the 18th century see C. CASTRO, *El pan de Madrid. El abasto de las ciudades españolas del Antiguo Régimen*, Madrid, 1987, pp. 205-295.

brought about certain discrepancies in the magnitude of the long term trends of prices and in their cyclical fluctuations.[13]

The series that have been used by Allen *et al.* to build the price index for Mexico City in the period 1525-1800 pose two major problems: their huge omissions[14] and their non-homogeneous geographical origin.[15] There are other proceedings that are questionable in our opinion: first, they don't indicate a clear methodology for adjusting series of retail and wholesale prices.[16] Price research in Spanish America also has a major complication that is poorly addressed by Allen *et al*: the diversity of units of measure. Some units may bear the same names as Spanish ones but don't have the same content, and the measurement system gets even more complicated due to the use of indigenous units mixed with the Castilian system.[17] Since Allen

[13] It can be seen even in close cities such as Madrid and Toledo. Between 1740-1748 and 1792-1800, prices rose much more in Toledo than in Madrid. In the former, the cumulative average annual growth rate was 1.50 per cent, while in the latter it was 1.12 per cent. Madrid is only 70 km from Toledo. The reason behind this high differential in the speed of the growth of prices is probably the significant amount of subsidies for basic foodstuffs in Madrid (E. LLOPIS, H. GARCÍA MONTERO, *Precios y salarios en Madrid, 1680-1800*, in "Investigaciones de Historia Económica", 7 – 2, 2011, pp. 295-309, p. 300).

[14] For instance, they lack actual prices for beans for the period 1525-1664, and they have deducted all prices from the maize series, without bearing in mind that relative prices may have changed—a lot, perhaps—in one-and-a-half centuries.

[15] Again with bean prices, Allen *et al* used the data of Espinosa (L. ESPINOSA MORALES, *Análisis de precios de los productos diezmados. El Bajío oriental, 1665-1786,* in *Los precios de alimentos y manufacturas novohipanos,* coord. V. GARCÍA ACOSTA, Mexico City, 1995, pp. 122-172, pp. 140-149) and Garner (R.L. GARNER, *Price trends in eighteenth-century Mexico*, in "Hispanic American Historical Review", 65 - 2, 1985, pp. 279–326, p. 313). There are great variations in prices from one town to another, even if they all lay in a region that is not too big, El Bajío, having some 40,000 sq. km. Nevertheless, the series are applied for Mexico City, more than 300 km from this area. In the capital of the viceroyalty in 1761, a *fanega* of 'meco' bean cost 28 *reales* (Archivo General de la Nación, México, [AGNM] – Indiferente Virreinal, 6299, 27) while the average bean price of the Eastern Bajío was 13 *reales* (although one locality, Acámbaro, had a price twice as high as the average, L. ESPINOSA MORALES, *Análisis de precios de los productos diezmados*, cit., p. 159). In 1765, the *fanega* of black and *parraleño* beans cost 16 *reales* in Mexico City (AGNM – Indiferente Virreinal, 3124, 6) while in the Eastern Bajío it cost on average less than 7 *reales* (L. ESPINOSA MORALES, *Análisis de precios de los productos diezmados*, cit., p. 159). The next year (1766), the price in the Bajío was even lower, less than 6 *reales*, while in Mexico City it had risen to 20. As we can see, price series don't coincide in either level or movements.

[16] They just say that they "have applied the appropriate mark-up to wholesale prices as necessary to estimate the retail prices needed for our cost of living indices" (R.C. ALLEN, T. E. MURPHY & E. B. SCHNEIDER, *The Colonial Origins of the Divergence in the Americas,* cit.)

[17] Allen *et al* refer to an article from 2005 as their source for conversions (R.C. ALLEN, T.E. MURPHY, *Just before the metre, the gram, the litre: building a Rosetta Stone of weights and measures in the Early Modern World*, 2005). Nevertheless, there is not a single Spanish American town on their equivalences lists, just Spanish cities. Some scholars have tried to shed light on the peculiarities of the measurement system of New Spain (H. VERA, *A peso el kilo. Historia del*

et al. have made many conversions to assemble their series,[18] this is not a minor issue.[19]

To summarise, the revision or improvement of the series of prices or wages in Madrid and Mexico can allow a better calculation of the "welfare ratios". The same issues we have detected in the data on these two cities, as well as other problems not mentioned in this pages, may also be present in the price and/or wage indexes in other European or non-European cities. For this reason, it is important to work on the re-validation of the series well beyond the two specific cases studied in this paper.

Notwithstanding the research efforts made in recent years, the samples of cities used to compare different living standards during the Early Modern period in diverse parts of the world are not representative enough. On one side, we have very few long series of prices and wages in some continents. In America, for instance, we have series only for Boston, Philadelphia, the Chesapeake Bay (region), Mexico City, Bogota, Lima, Potosi, Buenos Aires, and Santiago de Chile.[20] Some of these series present relevant, sometimes enormous, gaps. The representativeness issue also impinges on another sphere: a high proportion of the sample is made up of the largest cities, which in many cases were the capital of the political unit in which they were located.

The living standards and their evolution in London and Madrid, at least for much of the Early Modern period, cannot be considered as representative of the English and Spanish cities, respectively.[21] Furthermore,

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sistema métrico decimal en México, Mexico City, 2007; I.E. SANTACRUZ, L. GIMÉNEZ-CACHO GARCÍA, *Pesas y medidas. Las pesas y medidas en la agricultura*", in *Siete ensayos sobre la hacienda mexicana. 1780-1880*, coord. E. SEMO, Mexico City, 1977, pp. 247-269). Nevertheless, a comprehensive metrological study for New Spain is still unavailable.

[18] R.C. ALLEN, J.P. BASSINO, *ET AL*, *Wages, prices, and livings standards in China,* cit., p. 48.

[19] By doing far fewer conversions and more detailed research, Challú & Gómez Galvarriato (A.E. CHALLÚ, A. GÓMEZ GALVARRIATO, *Mexico's real wages in the age of the Great Divergence, 1730-1930,* in "Revista de Historia Económica", 33 – 1, 2015, pp. 83-122) have found prices that are 5% lower for the 18th century and 35% lower for the 19th century. When compared with Arroyo & van Zanden's series (L. ARROYO, E. DAVIES, J.L. VAN ZANDEN, *Between conquest and independence: Real wages and demographic change in Spanish America*, in "Explorations in Economic History", 49 - 2, 2012, pp. 149-166), their series are 35% to 70% lower. Even though the trend is similar, as Challú & Gómez Galvarriato themselves state, we consider that the difference in levels is significant and that the 'crisis' of the late viceregal period may have been less acute or at least had different implications than those suggested by Allen *et al* and van Zanden *et al.*

[20] R.C. ALLEN, T.E. MURPHY, E.B. SCHNEIDER, *The Colonial Origins of the Divergence in the Americas,* cit., p. 867; L. ARROYO, E. DAVIES, J.L. VAN ZANDEN *Between conquest and independence*, cit., p. 153.

[21] Wages in London diverged from the other cities in England after 1650. The convergence in the living standards in the cities of these countries did not occur until the 18th century (R. C. ALLEN, *The British Industrial Revolution in Global Perspective,* cit., pp. 43-44).

Malanima showed that the uniqueness of London wages in an international perspective did not reflect English cities as a whole.[22]

In the same way, López Losa & Piquero significantly reduce the differences between the living standards of workers in London and Madrid before 1700. If the diet of London workers was essentially based on the cheapest wheat bread—something that sounds reasonable—instead of oatmeal, the purchasing power of their wages would not have been substantially higher than the one of their Madrid counterparts, at least until the 18th century.[23] That is to say, the "oatmeal effect" may have exaggerated the differences in wages between London and Amsterdam and other cities of Western, Central, and Southern Europe.

Real wages represent a good indicator of living standards and their evolution in urban centres. Having said that, is this indicator suitable for the rural areas and for the whole population of a region or country? In our humble opinion, this is frequently not the case. Why? Because wages were not the main source of income available to rural families in many areas in Europe and other continents. A high percentage of these families owned or made use of the production of small farms, and their net income, both in cash and in kind, represented an important, or the major part, of the family income. It is true that one or more family members were frequently involved in other activities as wage earners during a greater or lesser number of days every year. But the income coming from wage sources, albeit growing at the end of the *Ancien Régime*, did not represent in many cases the main component of the family income. In short, the amount of the annual daily wages cannot adequately assess the evolution of rural family incomes.

It is undeniable that measuring the trend of real wages, in particular urban ones, is less arduous and is usually subject to smaller margins of error than the measurement of per capita GDP or per capita agricultural product.[24] Nevertheless, real wages represent an insufficient indicator for understanding the evolution of living standards in both the rural world and of the whole population in a region or nation. Therefore, it is necessary to continue our efforts, especially in the areas in which the sources needed to construct other indicators of the evolution of living standards, such as per capita GDP, per capita agricultural product,[25] or crude death rate, are

As far as Spain is concerned, real wages in Madrid behaved very differently than those in the cities of the Crown of Aragon during almost all the Early Modern period (E. LÓPEZ LOSA, S. PIQUERO, *Spanish Real Wages in the North-western Mirror*, cit., p. 18).

[22] P. MALANIMA, *When did England overtake Italy?*, cit., p. 60.

[23] E. LÓPEZ LOSA, S. PIQUERO, *Spanish Real Wages in the North-western Mirror*, cit., pp. 8-9.

[24] R.C. ALLEN, T.E. MURPHY, E.B. SCHNEIDER, *The Colonial Origins of the Divergence in the Americas,* cit., pp. 865-866.

[25] Estimates of the growth of per capita agricultural product have been conducted

available.[26]

The discrepancy between the trends of per capita GDP and real wages in some phases of the economic development of different countries before the Industrial Revolution is well known. The second half of the 18th century represents a good example in this sense: real wages dropped significantly,[27] but at the same time there was a reduction of mortality in many regions of Europe.[28] It seems doubtful to argue at the same time that mortality could decrease and that improvements in diet were absent. Consequently, to estimate a slight growth of per capita agricultural product in some European areas does not seem unreasonable.[29]

In 18th century England, the different behaviour of per capita GDP and

recently through the direct estimate of the product itself, which is considered more adequate and subject to a minor margin of error, on Holland (J.L. VAN ZANDEN, B. VAN LEEUWEN, *Persistent but not consistent: the growth of national income in Holland 1347-1807*, in "Explorations in Economic History", 49, 2012, pp. 119-130), Britain (S. BROADBERRY, B. CAMPBELL, A. KLEIN, M. OVERTON, B. VAN LEEUWEN, *British Economic Growth, 1270-1870*, Cambridge, 2015), Spain (C. ÁLVÁREZ-NOGAL, L. PRADOS DE LA ESCOSURA, C. SANTIAGO-CABALLERO, *Agriculture in Europe´s Little Divergence: The Case of Spain*, in "Working Papers in Economic History", WP 15-07, 2015) and Castile and Leon (E. LLOPIS, J.A. SEBASTIÁN, V. ABARCA, J.U. BERNARDOS, A.L. VELASCO, *¿Retrocedió el producto agrario por habitante en Europa entre el siglo XVI y la segunda mitad del XVIII? El caso castellano*, (XV Congress of the SEHA. Old and New Worlds: The Global Challanges of Rural History, Panel S10 - Living standards in the Americas and Europe, 16th – 20th centuries) Lisbon, January 27-30, 2016).

[26] Cuervo (N. CUERVO, *Población y crecimiento agrario en un territorio de la España central. La provincia de Ávila (siglos XVI-XIX)*, Madrid, 2015 (Universidad Complutense de Madrid. PhD thesis)) and Abarca (V. ABARCA, *Campos conocidos, senderos nuevos. Población y producción agraria en Burgos, 1540-1865*, Madrid, 2016 (Universidad Complutense de Madrid. PhD thesis)) reconstructed the mortality trend in two Castilian provinces, Ávila and Burgos, respectively, from the early and mid 17th century until the second half of the 19th century.

[27] R.C. ALLEN, *The Great Divergence in European Wages and Prices from the Middle Ages to the First World War,* cit., p. 427; P. MALANIMA, *When did England overtake Italy?,* cit., p. 61; E. LLOPIS, H. GARCÍA MONTERO, *Precios y salarios en Madrid,* cit., p. 306.

[28] See J. VALLIN, *Mortality in Europe from 1720 to 1914: Long-Term Trends and Changes in Patterns by Age and Sex*, in *The decline of mortality in Europe*, R. SCHOFIELD, D.S. REHER, A. BIDEAU eds., Oxford & New York, 1991, pp. 38-67); R. SCHOFIELD, D.S. REHER, *The decline of mortality in Europe*, in R. SCHOFIELD, D.S. REHER, A. BIDEAU, *op. cit.*, pp. 1-17; A. PERRENOUD, *El retroceso de la mortalidad ordinaria*, in *Historia de las Poblaciones Europeas*, Vol. II. *La revolución demográfica, 1750-1914*, J.P. BARDET, J. DUPÂQUIER dirs., Madrid, 2001, pp. 59-82; U. PFISTER, G. FERTIG, *The Population history of Germany: Reasearch agenda and preliminary results*, in "Max Planck Institute for Demographic Research Working Paper", WP 2010-035, 2010; E. LLOPIS, J.U. BERNARDOS, A.L. VELASCO, *¿Pasó de largo por la España interior la primera fase de la transición demográfica? La mortalidad en Ávila y Guadalajara, 1700-1895*, in "Investigaciones de Historia Económica", 11 - 2, 2015, pp. 69-79.

[29] V. ABARCA, E. LLOPIS, J.A. SEBASTIÁN, J.U. BERNARDOS, A.L. VELASCO, *El descenso de la mortalidad en la España interior: Albacete y Ciudad Real, 1700-1895*, in "América Latina en la Historia Económica", 22 – 3, 2015, pp. 108-144, pp. 132-139.

real wages has been explained by means of the increase in per capita work supply and the consequent reduction of labour costs.[30] However, these dynamics could also be explained, both in England and in other European territories, by arguing that the income of rural families, which was not based on wages, performed quite better than the income based on wages.[31]

In conclusion, the research effort undertaken in the last fifteen years has allowed us to approach the differences in living standards and their trends in the medium and long run in a relatively high number of European cities and a minor number of urban centres in Asia and America in the Early Modern age. However, as far as rural areas are concerned, which were clearly predominant in the world, we have less information on real wages trends (also because it is difficult to calculate the cost of the consumption basket in these kinds of households). On top of this, real wages represent an insufficient indicator for understanding the transformations in rural living standards.

3. OUR PROPOSAL TO FURTHER ADVANCE OUR KNOWLEDGE ON LIVING STANDARDS.

As we have said, the methodology developed by Allen has allowed an interesting comparison of construction workers' living standards and their basic trends in several cities of different continents between the end of the Middle Ages or the Early Modern age and the 19th century. Nevertheless, this methodology is not suitable for measuring with preciseness the living standards of the families of urban wage earners and their yearly and cyclical fluctuations.[32] For this reason we consider it fundamental to develop another —parallel—line of research that should make possible a better assessment of income, consumption models, and expenses of urban workers' families. This requires a transformation of the "lens of our camera": the "fish-eye" or "wide angle" lens must be substituted by a "normal" one.

In order to improve accuracy it is necessary to renounce investigations

[30] L.A. ÁNGELES, *GDP per capita or real wages? Making sense of conflicting views on pre-industrial Europe*, in "Explorations in Economic History", 45 - 2, 2008, pp. 147-163, p. 158.

[31] In the largest part of pre-industrial Europe, GDP and per capita GDP depended basically on what happened in the rural world. In Castile, the per capita agricultural product was a bit higher in the second part of the 18th century than at the end of the 16th. This was possible thanks to the recovery of agricultural activities in the century of the Enlightenment (E. LLOPIS, J.A. SEBASTIÁN, V. ABARCA, J.U. BERNARDOS, A.L. VELASCO, *¿Retrocedió el producto agrario por habitante en Europa entre el siglo XVI y la segunda mitad del XVIII?,* cit.).

[32] To this purpose it is necessary to get more information on family income, on the real basket of different groups of wage earners, and on the margin they had to introduce changes in their diet in the case of strong variations in relative or absolute prices of the main foodstuffs.

which cover many centuries,[33] and the samples used for international comparisons should be downsized.[34] Comparisons would still be possible, but the time period considered will be shorter and they will be circumscribed to the urban centres that hold sources with high quality and comparable information, at least for the topics that are investigated in this work.[35]

I. A REASSESMENT OF FAMILY INCOME.

A) THE INCLUSION OF CHILDREN AND WOMEN'S LABOUR AS PART OF FAMILY INCOME.

A considerable amount of evidence points to the fact that women and children contributed to a non-minor extent to the funding of the budget of most urban European families in the preindustrial period. Specifically, the "breadwinner" represented an exception, not the rule.[36] Consequently, "the true labor unit, as several scholars have shown, was the family".[37] This other way to approach the evolution of the living standards of different groups of urban workers requires going back to archives to look for new and better information, and presents many difficulties. But it is absolutely necessary in order to approach a real *consumption-possibility frontier* of families and its evolution over time.

In the case of Madrid, we have a recent doctoral dissertation of great

[33] The approach to the income and expenses of the families of different kinds of urban workers requires much more information than that needed for the investigations of the living standards of construction workers and labourers made through "Allen's method".

[34] Arroyo and van Zanden claimed that the improvement in the measurement of the cost of living in cities has a high cost in terms of international comparisons (L. ARROYO, E. DAVIES, J.L. VAN ZANDEN, *Optimistic but flawed? A reply*, in "Revista de Historia Económica", 33 – 1, 2015, pp. 77-82, p. 79).

[35] Frequently, studies on prices and wages in Early Modern Europe still rely heavily on data gathered by investigations driven by the Internacional Scientific Comité on Price History that were conducted between the 1930s and the 1950s. These series did not include either house rents or, at least in many cases, the prices of bread. It would be good to encourage coordinated international projects to extend, complete, and improve these price and wages series.

[36] J.I. ANDRÉS, R. LANZA, *Trabajar y vivir en el Madrid de los Austrias*, in *Ciudades y ciudadanía en la Europa moderna*, R. LÓPEZ VELA, M. TORRES eds., Madrid, 2015, pp. 227-253. Allen also recognises that female work was necessary to the survival of many families of unskilled wage earners in Asia and Europe in the last part of the 18th century and during the first part of the 19th century (R.C. ALLEN, *The British industrial revolution in global perspective*, cit., pp. 40-41).

[37] J. DJENDEREDJIAN, J.L. MARTIRÉN, *Measuring living standards. Some caveats concerning salary elements in pre-modern Rio de la Plata región, 1770-1830*, (XV Congress of the SEHA. Old and New Worlds: The Global Challanges of Rural History, Panel S10 - Living standards in the Americas and Europe, 16th – 20th centuries) Lisbon, January 27-30, 2016, p. 5.

quality on female labour in the 18th century[38] and we also have several series of female wages.[39] Thus, we know that in Madrid, in that century, the rate of female activity was around 60 per cent and that workers represented 37 per cent of the whole female population in this time period.[40] Female wages amounted to no less than half of that of males.[41] Taking into account the rates of female activity and the wage differences between men and women, it is likely that the income of a family of workers in Madrid were, at least, 30 per cent higher than the wage of the male head of the household. This percentage could be higher when one or more children worked as wage earners[42] and/or when one or more members of the family got wages from activities other than from their usual ones or other kinds of income that did not come from wages. To sum up, it would be necessary to multiply male wages by a minimum of 1.3 in order to estimate the total income of their families.

Of course, it is quite possible that the contribution of female labour to family income was quite heterogeneous among the different urban wage earner households. Its importance was higher in the case of families of unskilled male workers than in the case of the families of skilled workers.[43] This would imply that the differences among the total rents of the urban wage earners were a bit weaker than the contrasts among the levels of urban male wages. However, we do acknowledge that female work was marginal or nonexistent in those families in which the income coming from the male

[38] V. LÓPEZ BARAHONA, *Las trabajadoras madrileñas en el siglo XVIII. Familias, talleres y mercados*, Madrid, 2015 (Universidad Autónoma de Madrid, PhD thesis).

[39] E. LLOPIS, H. GARCÍA MONTERO, *Precios y salarios en Madrid,* cit., p. 305.

[40] V. LÓPEZ BARAHONA, *Las trabajadoras madrileñas en el siglo XVIII,* cit.

[41] In the 17th century, in Madrid, laundresses earned half of the wage of an unskilled labourer in the construction sector (J.I. ANDRÉS, R. LANZA, *Trabajar y vivir en el Madrid de los Austrias*, cit.). In the 1740s, for instance, the average yearly wage of a female servant increased to 724.6 *reales* while the wage of an unskilled labourer in construction was 1,013 *reales*. Therefore, in this case, the wage of an unskilled female worker was only 28.5 per cent lower than the wage of an unskilled male worker. Wages of unskilled labourers from the construction sector proceed from the accounting of the Santa Hermandad del Refugio, and wages of the female servants proceed from the accounting of the Colegio de Santa Isabel (E. LLOPIS, H. GARCÍA MONTERO, *Precios y salarios en Madrid,* cit., p. 298).

[42] According to recent estimations, inclusion in the labour market in Spain occurred at an average age of 10 (C. SARASÚA, *¿Activos desde cuándo? La edad de acceso al mercado de trabajo en la España del siglo XVIII*, in *El trabajo infantil en España (1700-1950),* ed. J.M. BORRÁS, Barcelona, 2013, pp. 63-89).

[43] If women had some skills, they could earn even more than their male partners. This was the case of Clara, a cook at the Vizcaínas College in Mexico City, who in 1817 earned 3 pesos a month, while her husband, Casimiro, working as a *mozo* (servant) for the same insititution earned only 2 pesos (A. CALDERÓN FERNÁNDEZ, *Una serie de precios de vivienda. Las accesorias del Real Colegio de San Ignacio de Loyola de los Señores Vizcaínos, 1771-1821*, in "Gaceta Vizcaínas"*,* 2 – 4, July-December, 2009, pp. 47-83, p. 60).

breadwinner was high or very high.

B) THE CREATION OF WAGE SERIES FOR PROFESSIONS OTHER THAN CONSTRUCTION.

To what extent do construction workers' real wages represent a good indicator of the trends in living standards of urban workers in the European, American, and Asian cities in the preindustrial period? The case of Madrid can provide some evidence. Our work on wages in this city, which covers the period between 1680 and 1800, includes 10 series of male wages—3 are based on construction workers and 7 on service workers—and 4 series of female wages.[44] This study showed that there was coincidence among the fundamental trends in real wages of different kinds of workers in Madrid between the end of the 17th century and the final part of the 18th century, but also that: 1) the average male wage dropped twice as much as the female one; 2) the decrease in male wages was higher in the construction sector than in the service sector; 3) the "skill premium" significantly increased in the service sector and remained high in construction; and 4) the chronology in the trends of increase and decrease in the payments of different kinds of workers showed notable contrasts.[45] This suggests that construction workers' wages represent an insufficient indicator for determining the changes in the living standards of the urban working class, especially if an approximation to the trends in the short and medium run of this variable is expected. It is thus necessary to search in the archives in order to try to build new series of wages of different kinds of workers, both male and female, in the manufacturing and services sector. It is likely that it won't be possible to do so in many cities, and in others the time coverage of the series will be limited. But, at the same time, it is worthwhile to assume these inconveniences in order to draw a sounder picture of the evolution of living standards in the universe of urban workers in one or more periods.

When the living standards of construction workers in one or more cities are considered, it is necessary to take into account the fact that a significant percentage of unskilled labourers in construction, at least in the case of Madrid, were temporary immigrants. In particular, in those years in which real estate investments or public works were stronger, many men came to Madrid in the spring to offer small transportation services, as unskilled labourers in construction, or as warehouse assistants. In the autumn, they went back to their home towns and villages located in the two Castiles and, above all, in Galicia and on the Cantabrian coast.[46] This should lead us either

[44] E. LLOPIS, H. GARCÍA MONTERO, *Precios y salarios en Madrid,* cit., p. 298.

[45] *Ibid.,* pp. 304-308.

[46] J.I. ANDRÉS, R. LANZA, *Prices and real wages in seventeenth century Madrid*, cit., p. 16; IIDEM, *Trabajar y vivir en el Madrid de los Austrias,* cit.

to reduce the average size of the families of unskilled labourers in construction or to consider the rural income of these families.

C) THE ATTEMPT TO ESTIMATE THE CHANGES IN THE NUMBER OF DAYS IN WHICH PEOPLE ACTUALLY WORKED.

The exact calculation of a particular kind of family income or, even more, of different kinds of workers in a city, especially if we consider a time span of many centuries, represents an unachievable aim most of the time. To achieve this goal it would be necessary to gather good information on male, female, and child wages; on the number of working days in a year for every active man, woman, and child in the family and their relative variations over time; on the rates of activity of women and children younger than 16 and their transformations during the period; and, moreover, on the wage income from other activities, as well as non-wage income, both in cash and in kind, from hunting, fishing, and the picking of wild fruits, firewood, and wood.[47]

Although the goal seems unattainable, for Mexico City we have found construction wages covering whole years in different 'private' construction works for the years of 1759, 1775, and 1789.[48] Working days at the construction sites increased from 250 in 1759, to 276½ in 1775, and again to 287½ in 1789; this represents a 15% increase in thirty years. Such alterations did have an impact on the real income of wage earners.

D) THE ESTIMATION OF FAMILY SIZES.

In order to better estimate the living standards of urban wage earners, it is also necessary to know the size of their families and their evolution, the consumption baskets of the households involved in the different activities that have been studied, and the prices of the main goods and services included in the consumption baskets used by the families of skilled and unskilled workers.

Allen, Murphy, and Schneider claimed that: "Family sizes were likely larger in Spain and Latin America than in England and British North America, amplifying the wage gap".[49] As far as the largest part of the Spanish territory is concerned, the best data on the *Ancien Régime* do not support this hypothesis: at the beginning of the decade of 1750 the average size of the

[47] Most European cities had less than 200,000 inhabitants and their urban centres were relatively close to wooded areas.

[48] The data for 1759 come from the Convent of Santa Clara (AGNM - Indiferente Virreinal, 5978, 10); those for 1775 from the San Hipólito Hospital for Madmen (AGNM - Indiferente Virreinal, 303, 1), and those for 1789 from the Convent of San Bernardo (AGNM - Indiferente Virreinal, 3802, 17).

[49] R.C. ALLEN, T.E. MURPHY, E.B. SCHNEIDER, *Una de cal y otra de arena,* cit., p. 69.

families in the Crown of Castile was about 3.8 members,[50] smaller than in the regions around the North Sea. In the last three decades of the 18th century, for instance, in a sample of 409 English communities, the average number of members of a household was 4.8.[51] Data for Spanish America are more scant but there is no evidence that large households were common. For instance, in Mexico City in 1767, in the district of the parish of San Miguel, its 7,448 inhabitants came from to 2,607 households—that is, the average household size was of 2.86.[52]

Schneider showed that the variations in the size of families in England were not important enough to modify the general picture of the evolution of living standards inferred by the purchasing power of daily wages.[53] Having said this, in regions in which there was a deep depression in a long phase of the Early Modern period, as in Castile in the last part of the 16th century and the first half of the 17th century, we cannot exclude that the average size of the families were significantly reduced over time due to the dwindling of the birth rate, the increase of mortality rates, and the intensification of migration flows towards other territories.[54]

II. A BETTER APPRAISAL OF FAMILY EXPENDITURE.

How families of wage earners spent their money depended on their income levels, on the supply of goods and services in their cities, on the variations in the relative prices of different products, and on cultural factors.[55]

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[50] C. CAMARERO, J. CAMPOS, *El Vecindario de la Ensenada para la Corona de Castilla. Estudio preliminar*, in *Vecindario de Castilla, 1759*, ed. C. CAMARERO, Madrid, 1991, Vol. 1, pp. XXI-CXI, pp. CIV-CV.

[51] R. WALL, *Mean Household and Family in Past Time*, in *Household and Family in Past Time*, P. LASLETT, R. WALL eds., Cambridge, 1974, pp. 159-203, pp. 191-192.

[52] A. CALDERÓN FERNÁNDEZ, *Mirando a Nueva España en otros espejos. Cuatro ensayos sobre demografía y niveles de vida, siglos XVI-XIX*, Madrid, 2016 (Universidad Complutense de Madrid. PhD thesis), p. 182.

[53] E.B. SCHNEIDER, *Real Wages and the family. Adjusting real wages to changing demography in pre-modern England*, in "Explorations in Economic History", 50, 2013, pp. 99-115, p. 114.

[54] On the Castilian depression at the end of the 16th century and the first half of the 17th century, see E. LLOPIS, *La crisis económica en la España del siglo XVII: la decadencia de Castilla*, in A. FURIÓ, E. LLOPIS, F. COMÍN, J.M. SERRANO, A. COSTAS, *Las crisis a lo largo de la historia*, Valladolid, 2010, pp. 47-96. See also J.A. SEBASTIÁN AMARILLA, *El largo siglo XVII: crisis en España, depresión en Castilla*, in *España en crisis. Las grandes depresiones económicas, 1348-2012*, E. LLOPIS, J. MALUQUER DE MOTES eds., Barcelona, 2013, pp. 59-96.

[55] Wheat was, as in the rest of Europe, the most expensive cereal in the Spanish cities in the Early Modern centuries. Notwithstanding, in these cities, low-income groups predominantly ate low quality wheat bread. It is certain that the weight of rye in the cereal Castilian production increased during the 17th and 18th centuries, but wheat continued to be predominant in this territory (E. LLOPIS, J.A. SEBASTIÁN, V. ABARCA, J.U. BERNARDOS, A.L. VELASCO, *¿Retrocedió el producto agrario por habitante en Europa entre el siglo XVI y la segunda*

The choices made when building consumer baskets are very significant, because relative prices varied considerably during the Early Modern times. Since the structure of family expenditure varied significantly, above all in cities where there was a high skill premium,[56] the consequences of the changes of relative prices were not the same for households depending on the salaries of qualified workers as for those relying on the wages of unskilled workers.

In Europe, we know that the shopping basket of the better-off increased its price at a lower pace than the shopping basket of the poor between 1500 and 1650, that a milder movement in the opposite direction took place between 1650 and 1750, and that during the second half of the 18th century the consumer basket of the poor increased in cost faster than the basket of the rich. In Modern times, the goods and services that became more costly were those that required land intensively (house rents, fuel, and basic staples), absorbing thus a high proportion of the budget of the humblest households. In contrast, luxury products became relatively less expensive, as did those that made an intensive use of labour and capital, which were becoming more affordable.[57] It is indisputable that the changes in relative prices that made staples more costly than other goods contributed to an increase in economic inequality in Early Modern Europe. Nevertheless, we are still unable to determine with accuracy how and when these changes in relative prices led to an increase in the gap between the living standards of skilled and unskilled workers. In order to meet this issue we need to further study the structure of the expenditures of different kinds of households.

Since nominal wages were quite rigid, the precise determination of the changes of living standards depends largely on our ability to gather detailed information on the prices of a wide array of goods and services and on our capacity to choose adequate consumer baskets for each of the social groups being studied. The choices condition noticeably the consumer price indices, as well as the real wages indices, since the values of the different items of the CPIs varied in quite different ways.[58]

Second generation CPIs have indeed improved over *first generation* CPIs: they

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mitad del XVIII?, cit.). Therefore, cultural factors were apparently influential in the families' consumption patterns.

[56] On the "skill premium" in Modern Europe, see J.L. VAN ZANDEN, *The skill premium and the 'Great Divergence'*, in "European Review of Economic History", 13, 2009, pp. 121-153, p. 127; E. LLOPIS, H. GARCÍA MONTERO, *Precios y salarios en Madrid*, cit., p. 307.

[57] P.T. HOFFMAN, D.S. JACKS, P.A. LEVIN, P.H. LINDERT, *Sketching the Rise of the Real Inequality in Early Modern Europe* in *Living Standards in the Past. New Perspectives on Well-Being in Asia and Europe*, R.C. ALLEN, T. BENGTSSON, M. DRIBE eds., Oxford, 2005, pp. 131-172, pp. 158 & 161-162.

[58] A. BLAKEWAY, *The sixteenth-century price rise: new evidence from Scotland, 1500-85*, in "Economic History Review", 68 - 1, 2015, pp. 167-190, p. 170.

have included dwelling rentals, an expenditure that was far from negligible in cities;[59] they have tried to substitute cereal for bread prices;[60] they have incorporated some *new* products; and they have essayed several consumer baskets when important variations of consumer behaviour over time are evident.[61]

How can we elaborate one or several consumer baskets that allow us to build a CPI that is useful for deflating nominal family incomes or the wages of the male heads of households? Our proposal is that we should include all sources of income, not just those of men. We should therefore multiply the salary of the male wage earner by 1.3, at least. We do bear in mind that the ratio between the regular wages of male heads of households and total household income was not constant: eventual sources of income of men themselves, as well as those of women and children, tended to increase when men's real wages decreased.[62] Therefore, this method of calculating the

[59] Allen has estimated that rentals represented about 5% of the expenditures of wage earners, but evidence has shown, at least in several Castilian cities, that the amount of money dedicated to this item was quite a bit higher: 9.5% in Toledo during the 16th century and an even higher—and increasing—figure in Seville between 1541 and 1603 (R.C. ALLEN, *The Great Divergence in European Wages and Prices from the Middle Ages to the First World War*, cit., pp. 426-427; M. DRELICHMAN, D. GONZÁLEZ AGUDO, *Housing and cost of living in Early Modern Toledo,* in "Explorations in Economic History", 54, 2014, pp. 27-47, p. 42; M. GONZÁLEZ MARISCAL, *Población, coste de la vida, producción agraria y renta de la tierra en Andalucía occidental, 1521-1800*, Madrid, 2013, (Universidad Complutense de Madrid. PhD thesis, p. 371)).

[60] It is preferable to use bread prices instead of grain prices, first, because heavy duties were imposed on grain grinding in several places in Europe during Modern times (*e.g.* Holland), and, second, because bread was the actual product consumed by people, and its price was subsidised by cities or princes when shortages occurred. However, we must bear in mind that the actual weight of each loaf of bread changed according to market conditions, and these changes are at times difficult to determine. Therefore, real bread prices varied more intensely than what is suggested by the registers coming from institutions. This substitution is, thus, not suitable.

[61] Jan Luiten van Zanden has pointed out the changes that should be made to build better *second generation* price indices (J.L. VAN ZANDEN, *What Happened to the Standard of Living Before the Industrial Revolution? New Evidence from the Western Part of the Netherlands*, in *Living Standards in the Past. New Perspectives on Well-being in Asia and Europe*, cit., Oxford, 2005, pp. 173-194, pp. 173-182). The index elaborated by Manuel González Mariscal for 16th century Seville incorporates many of van Zanden's remarks and could be a good model for other attempts (M. GONZÁLEZ MARISCAL, *Población, coste de la vida, producción agraria y renta de la tierra en Andalucía occidental,* cit, pp. 353-386).

[62] This was possible from the late 17th century and clearly during the 18th century, when the devolpment of the Atlantic economy, partial liberalisation of commerce, and urban growth generated favourable conditions to industriousness, E. LLOPIS, *España, 1750-1808: crecimiento, cambios y crisis*, in *Iberoamérica y España antes de las Independencias, 1700-1820: crecimiento, reformas y crisis*, J. GELMAN, E. LLOPIS, C. MARICHAL coords., Mexico City, 2014, pp. 389-446, pp. 400-403.

family welfare ratio is still a proposal that needs to be revised and researched thoroughly until we have a sample of a few cities. The figures will probably never reach a high level of accuracy, but we do think that there is enough material waiting for us at national and local archives that can provide a more precise appraisal of the actual income of families.

Having established the thresholds of family expenditures of different types of wage earners in a city, we can now proceed to the next step: how were these various family budgets actually spent? This exercise of estimation of the consumer basket is subject to at least two restrictions:

a) We should include only those goods and services whose price series cover the whole period under consideration, have few gaps, are homogeneous, and don't pose insurmountable problems with the units of measure. Usually, not all the goods that should be included have such series.[63]

b) The calorie intake calculated must be enough not only to survive but also to allow the wage earner to perform the tasks actually needed to receive a salary. The debate on this matter is still open: Allen has raised the threshold to 2,100 kilocalories per person and day, while Malanima has raised the figure even further to 2,500 kilocalories.[64]

Now that we have explained these restrictions, it is important to identify what kind of sources could help us elaborate CPIs that best suit the different kinds of families under survey. Roughly, we can divide these materials into two kinds:

1. Aggregate. They provide annual or multiannual data on the products actually introduced into a city—like tax records for certain items or the records of the animals processed at slaughterhouses—or they contain reasonable estimations of consumption provided by well-informed witnesses of the time, foreign or local. These kinds of sources are very reliable if they meet three criteria: when more than one source is available, since we can cross-check them; when the city's livelihood depended largely on goods coming from other places; and when the duties imposed on consumption were not unconscionable, since very intense fiscal pressure generated important incentives for smuggling. The last was the case in Madrid during the second half of the 17th century.[65]

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[63] Sometimes, good series are not even available for very important items, like bread. Serial data on the prices of lower quality bread, which was consumed by families of unskilled wage earners, are seldom found.

[64] R.C. ALLEN, *Poverty lines in history, theory, and current international practice*, cit., p. 5; P. MALANIMA, *When did England overtake Italy?,* cit., p. 49.

[65] During this time, Madrid was the Spanish city bearing the highest taxes on foodstuffs and beverages (J.I. ANDRÉS, R. LANZA, *Prices and real wages in seventeenth century Madrid*, cit., p. 7).

2. Microeconomic.[66] Food rations, clothing, and footwear provided at hospitals, hospices, colleges, and prisons to its servants, residents, and inmates are of great interest since they allow us to approach consumption patterns, especially in the case of food. Furthermore, if they are serialised, they also allow us to detect alterations over time. However, we do acknowledge that the rations and items given to each individual of these institutions can seldom be considered representative of popular consumption levels in the corresponding cities. This is for several reasons: a) the expenditure level of institutions depended on the magnitude and trajectory of its assets and its sources of income, being perfectly possible that the evolution of the latter does not coincide in one or more stages with the evolution of wages; b) the considerable wealth of some of these institutions allowed them to feed, clothe, and shoe their residents far better than unskilled or even skilled workers could;[67] c) some institutions statutorily limited the maximum number of people they could house in order to guarantee that their residents were properly fed, clothed, and shoed, so that it became evident that the patrons and directors of the city were generously exercising Christian charity;[68] and d) the diets given to children and youngsters included relatively small amounts of certain items or excluded others—like alcoholic beverages. In our view, rations provided to prison inmates are especially useful because it is not likely that such individuals would be supplied with a privileged diet. Therefore, the daily food quantities found at jails, including those with high protein content like meat—as was the case of Mexico City, can be considered as the threshold of per capita consumption of such products by the families of wage earners of the corresponding city.

The following section details how we have built the shopping baskets of Madrid and Mexico City. We just want to point out that all sources listed above have been used for this task. Thus, our consumer baskets are not, like *barebone* baskets, theoretical, but try to reflect actual consumption and expenditure patterns of several groups of families of workers in the aforementioned cities.

What conclusions can we draw from crossing the various sources that provide information on consumption and food rations? Essentially, three:

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66 This taxonomy of aggregate and microeconomic sources comes from A. CALDERÓN FERNÁNDEZ, *Mirando a Nueva España en otros espejos*, cit., p. 134 and *passim*.

67 The daily ration of meat—excluding bacon—at Santa Marta Hospital in Seville ranged between 147 and 160 grammes during the century from 1537 to 1637 (M. GONZÁLEZ MARISCAL, *Población, coste de la vida, producción agraria y renta de la tierra en Andalucía occidental*, cit., pp. 19-20).

68 The rules of the College of San Isidoro of the Cathedral of Seville strictly established that the institution could not house more than 20 students.

1. Families of skilled and unskilled workers in the cities of Southern Europe and New Spain had per capita meat intakes much higher than those supposed by Allen and Allen *et al.*[69] In Madrid, annual per capita consumption of meat, excluding bacon, amounted to 38.7 kilogrammes in 1630, to 31.4 in 1769, and to 30.3 in 1796.[70] In other Castilian cities, the average annual intakes of meat per head were lower but much higher than the figures suggested by the *barebone baskets:* 32.5 kg in Valladolid towards 1645, 22 kg in Toledo in 1746, and 25.7 kg in Avila in 1775.[71] Towards the end of the Enlightenment century, average annual per capita consumption of meat in Mexico City, according to travellers' reports, amounted to no less than 98.5 kg. Prison records corroborate the high intake of this product; thus, the figure of annual per head consumption of meat by the lower classes in 18th century Mexico City lies somewhere between 36.5 and 58.8 kg.[72] It is true that meat consumption was declining in 18th century European cities as well as in many American ones, and that the consumption of this foodstuff was unevenly distributed among the different strata found in them. Nevertheless, we must bear in mind that neither did available figures point to a dramatic reversal of meat intake nor were disparities in food consumption among different urban groups as large as those recorded for income and wealth.[73] Hence, it seems that the annual per capita consumption of meat in Madrid and Mexico City, even among families of unskilled workers, exceeded by far the 5 kg assumed by the Allen, Murphy, & Schneider barebone basket.[74] It is very likely that households of workers with the lowest incomes acquired giblets and offals of cattle and sheep. These were usually sold in Madrid by women called *menuderas* or *mondongueras,* and they were quite a bit cheaper than other parts of livestock.[75]

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[69] R.C. ALLEN, *The British Industrial Revolution in Global Perspective*, cit., p. 37; R.C. ALLEN, T.E. MURPHY, E. B. SCHNEIDER, *The Colonial Origins of the Divergence in the Americas*, cit., p. 873.

[70] J.U. BERNARDOS, *Mercado y abastecimiento, 1561-1850*, in *Madrid. Atlas Histórico de la Ciudad de Madrid, Siglos IX-XIX*, V. PINTO, S. MADRAZO dirs., Madrid, 1995, pp. 232-243, p. 233.

[71] Valladolid's figure comes from A. GUTIÉRREZ ALONSO, *Estudios sobre la decadencia de Castilla. La ciudad de Valladolid en el siglo XVII*, Valladolid, 1989, p. 281; those for Toledo & Avila, from an ongoing work of José Ubaldo Bernardos. We sincerely thank Professor Bernardos for supplying us with these unpublished data.

[72] A. CALDERÓN FERNÁNDEZ, *Mirando a Nueva España en otros espejos*, cit., pp. 134-136.

[73] R. FLOUD, R.W. FOGEL, B. HARRIS, S.C. HONG, *The Changing Body. Health, Nutrition, and Human Development in the Western World since 1700*, Cambridge, 2011, p. 50; A. CALDERÓN FERNÁNDEZ, *Mirando a Nueva España en otros espejos*, cit., p. 133.

[74] R.C. ALLEN, T.E. MURPHY, E.B. SCHNEIDER, *The Colonial Origins of the Divergence in the Americas*, cit., p. 873.

[75] V. LÓPEZ BARAHONA, *Las trabajadoras madrileñas en el siglo XVIII,* cit.

2. The consumption of alcoholic beverages by wage earners of Mexico City and Madrid was relatively common and of some consideration. In the late 18th century, the daily per capita consumption of pulque in Mexico City has been estimated at no less than 1.33 litres. The magnitude of this figure and numerous qualitative evidence suggest that pulque's importance in the diets of New Spaniards of low and medium-low income groups was not marginal.[76] The same is true with regard to wine in cities of Southern Europe. Andrés & Lanza, using tax data, estimated for 17th century Madrid a per capita annual consumption of wine of 110 litres.[77] Quite likely, alcoholic beverages made up one-tenth or even more of total expenditures of urban wage earners, both skilled and unskilled, in New Spain and in Mediterranean Europe.

3. Despite the decline in real wages, during the 18th century the diet of workers in New Spain and Spain was more varied than we have been considering until now. In the cities of New Spain, besides alcoholic beverages, cocoa, sugar, tobacco, and other products were part of the usual consumption of fairly broad sectors of the population.[78] Also in Madrid, although to a lesser extent, consumption of some products such as cocoa and sugar was spreading among some segments the populace.[79]

Therefore, our approach to the consumption of urban families in New Spain and in southern Europe does not support the hypothesis that the vast majority of wage earners on the planet had a very poor diet, almost entirely vegetarian and based on the cheapest available cereal, in which meat and drinks were only incorporated "on ceremonial occasions".[80] In light of the evidence gathered in this and in other studies, we can state that among families of unskilled wage earners in Madrid and Mexico City, consumption of meat, alcohol, and other products was far more important than what *barebone* baskets suggest. Perhaps these discrepancies can be explained by the fact that total family income was clearly higher than the mere wages earned by the male head of the household at his main source of employment. Hence, the unit suitable for the analysis of consumption and living standards is the family, not the male worker heading it. This raises many difficulties, but this change of scope is needed if we really want to understand social realities that were far more complex than the idea that many breadwinners

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[76] A. CALDERÓN FERNÁNDEZ, *Mirando a Nueva España en otros espejos*, cit., p. 139; J.J. HERNÁNDEZ PALOMO, *La renta del pulque en Nueva España, 1663-1810,* Sevilla, 1979.

[77] J.I. ANDRÉS, R. LANZA, *Trabajar y vivir en el Madrid de los Austrias*, cit.

[78] A. CALDERÓN FERNÁNDEZ, *Mirando a Nueva España en otros espejos*, cit., p. 146.

[79] J.U. BERNARDOS, *No sólo de pan. Ganadería, abastecimiento y consumo de carne en Madrid (1450-1805)*, Madrid, 1997 (Universidad Complutense de Madrid. PhD thesis), pp. 565-567.

[80] R.C. ALLEN, T.E. MURPHY, E.B. SCHNEIDER, *The Colonial Origins of the Divergence in the Americas,* cit., p. 872.

around the globe were unable to ensure the survival and reproduction of their families.

It is beyond doubt that in most European regions the purchasing power of wages declined markedly during Early Modern times. How did urban families face this phenomenon? One way was to economise by moving to smaller or cheaper dwellings and by introducing dietary changes aimed at replacing more expensive calories by cheaper ones. That is why some researchers, like Rafael Dobado, have claimed that studies comprising several centuries of living standards should use variable consumer baskets that reflect both changing circumstances and the oscillating purchasing power of the salaries.[81] Van Zanden has stated that workers had a relatively narrow margin by which to modify their shopping basket. Nevertheless, he does acknowledge that meat and herring consumption diminished during Early Modern times and that potatoes allowed, from the second half of the 18th century, the reduction of the intake of bread and vegetables.[82] In the 16th century *Reich*, the partial substitution of meat for vegetables cheapened the consumer basket of workers by 8%; the increasing consumption of *tropical groceries* and potatoes since the middle of the 18th century also contributed to the diminution of the cost of feeding poor families.[83] In Spanish America, where changes in relative prices of goods and services appear to have been particularly intense, it is very likely that the variations in the composition of the baskets of humble urban families were significant during viceregal times.[84]

The modification of the consumption basket was not the only, nor perhaps the most significant, mechanism by which to maintain a balance between income and expenditure in wage-earning urban households. What other adjustments occurred within these economic units? On the income side, to cope with the loss of purchasing power of wages, men, women, and children[85] became more industrious—chiefly in phases of increasing economic activity in the cities. As for the expenditure side, family sizes seem to have been reduced, especially in times when the desire to work more intensely conflicted with a weak demand for labour. This decline in household size could be the result of receding marriages and births, a rise in

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[81] R. DOBADO, *Pre-independence Spanish Americans: poor, short, and unequal or the opposite?,* in "Revista de Historia Económica", 33 – 1 , 2015, pp. 15-59, p. 16.

[82] J.L. VAN ZANDEN, *What Happened to the Standard of Living Before the Industrial Revolution?,* cit., pp. 181-182 & 186-187.

[83] U. PFISTER, J. RIEDEL, M. UEBELE, MARTIN, *Real Wages and the Origins of Modern Economic Growth in Germany, 16th to 19th Centuries*, EHES Working Paper 17, 2012, p. 2.

[84] R. DOBADO, *Pre-independence Spanish Americans,* cit., p. 19.

[85] P. MALANIMA, *Pre-Modern European Economy. One Thousand Years (10th-19th Centuries)*, Leiden & Boston, 2009, pp. 238 & 283-285.

mortality, or, also, an increase in temporary migration instead of permanent emigration to the cities. Temporary migration meant that urban single-person households became more common; in many cases they left their families in rural areas, where the rest of the family continued to work.

In the long run, the drop in height, due to the change from a diet rich in protein to one with a poor content of it, could also help adjust family budgets of workers by diminishing caloric requirements.[86] In western Holland, the stature of males decreased by 4 centimetres between the 14th-15th and the 17th-18th centuries.[87] In any case, this adjustment could not be controlled by families and could only bear fruit in the very long run.

During Modern times, salaries fell more than the total wage income of urban male workers and the latter fell, quite probably, more than the total income of families. However, maintaining a certain balance in the budgets of households appears to have required, at least at certain times, cutting spending by either varying the shopping basket or by reducing the size of families. Furthermore, the deterioration of the quality of diets caused decreases in height and in body mass that entailed decreases in caloric needs and hence helped to equilibrate household budgets. So, the sharp contraction of salaries in most territories of Early Modern Europe forced working-class families to seek other sources of revenue by working more and, sometimes, to change their habits and their consumption patterns to shrink their expenses.

In short, the *Allen methodology* has contributed to establishing an outline of the evolution of living standards of urban workers in different areas of several continents from the late Middle Ages until the 19th century. Nonetheless, to gain precise knowledge of the changes to living standards in the short and medium term, we need to boost research that concentrates on smaller spaces and shorter periods of time, since to attain this goal we need to perform many time- and labour-consuming tasks: build several series of male and female wages, approach the female employment rate and its changes, appraise the variations in the size of working-class families, and collect detailed information that allows us to construct shopping baskets that reflect various consumption patterns with accuracy.

It is chimeric to consider that the achievement of these objectives is within our reach, but we do believe that to deepen our knowledge of *actual* living standards we do need to have a better idea of total income and expenditures of urban wage-earning families. And this will only be possible

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86 "Chronically malnourished populations of Europe universally responded to food constraints by varying body size" (R. FLOUD, R.W. FOGEL, B. HARRIS, S.C. HONG, *The Changing Body*, cit., p. 124).

87 J.L. VAN ZANDEN, *What Happened to the Standard of Living Before the Industrial Revolution?,* cit., p. 186.

if we search for new sources. That is, if we intensify our work in the archives. In other words, we need more traditional economic history.

4. ON THE CONSTRUCTION OF CONSUMPTION BASKETS IN MADRID AND MEXICO CITY.

This section is devoted to developing our proposal of consumption baskets for the cities of Madrid and Mexico City. Coherently with the research proposal mentioned in section 3, our aim in this section is to build CPIs based on consumption baskets for two different social groups: skilled urban workers—bricklayers—and unskilled urban workers—labourers in the construction sector. Thus, the first one could be considered "respectable" and the second one close to "subsistence". Our baskets are based on the advances originated by recent academic debates, on the estimation of a "consumption-possibility frontier" for the different social groups in the 1760s, on quantitative data about the consumption of certain products in that decade in the cities, and on certain evidence available on "household" budgets.

The first important question we wished to consider when we started to construct the baskets was: what products could actually be part of the urban labourers' and bricklayers'—professions for which we have information on wages—consumption basket between 1700 and 1800?

First of all, we know that the main source of calories in the diet of the preindustrial urban population was bread.[88] At least since the diffusion of the second generation of price indexes, the vast majority of CPIs include as a rule the prices, or their estimations, of bread—not the corresponding grain—as the reference good. In the case of Mexico City, maize was as important as wheat and was not transformed into bread; nevertheless, it had transformation costs into an edible product that we must bear in mind and that have been overlooked. For instance, in June 1768, a load (*carga*) of *maíz prieto* (dark maize) cost 3.5 pesos; the next month, a load of the same kind of maize already ground for the *atole*[89] cost 6.25 pesos,[90] that is, 71 per cent more than the unprocessed load. That means that each *arroba* of ground maize cost some 4 1/6 *reales*. If we add the labour and fuel costs of

[88] In Northern Europe in some cases oatmeal has been proposed as a substitute for bread (*e.g.* R.C. ALLEN, *Poverty lines in history, theory, and current international practice,* cit.)

[89] A beverage made of water and ground maize, often seasoned with chocolate, sugar, chilli, or fruit.

[90] AGNM, Bienes Nacionales, 724, 3.

transforming it into *atole*, the cost of each edible *arroba* would be around 5 *reales*. That was not much less than the cost of *cemitas*,[91] the cheapest bread available in Mexico City. Most of the time, wheat and maize prices were not synchronised. Therefore, when there was a price shock in the maize sector, cheap bread became more affordable than maize *transformed* into *atole* or *tortillas*. The costliness of tortilla making is also confirmed by the fact that they are almost totally absent from prison diets, where bread was dominant; when maize was consumed, it was in the form of *atole* rather than tortillas. So, if maize is to be preferred over cheap bread in the consumer basket, it should either incorporate its transformation costs or allow a higher calorie intake for families, so that women have enough energy to process it at home. For all these reasons, we have decided to build our consumer baskets for both skilled and unskilled workers with both wheat bread and maize.

Having said this, how much bread, and which kind of bread, was actually consumed? As it is widely known, different kinds of breads were baked in each city. Both the bread composition and the quality of the ingredients varied. Depending on the case, we can find breads made of wheat flour, or other cereals, with different flour qualities, as well as mixed breads, made of different proportions and qualities of cereals. As has been recently demonstrated by López Losa & Piquero,[92] this difference can play a very important role in the final outcome when we make comparisons among welfare ratios for different cities. Therefore, if we wish to calculate CPI that are actually adjusted to the real models of consumption of the "commoners", our first step should be to get prices for a "subsistence" kind of bread. It is contradictory to construct welfare ratios based on barebone baskets using the price of the bread consumed by the upper class.

In the case of Madrid, our original series[93] are based on data on high-quality bread. With these numbers, we have calculated the cost of a variety of cheap breads widely consumed among the lower classes: the *pan baxo*. Simulations recently conducted on data on different Spanish cities show that brown bread was around one-third cheaper than high-quality wheat flour bread.[94] That is to say that the difference in including an expensive or a cheap kind of bread in a basket in which bread represents 30 per cent of

[91] Considering the average price of a *carga* (load) of high quality wheat (*trigo bueno*) in 1768 of 45 *reales* (V. GARCÍA ACOSTA, *Los precios del trigo en la historia colonial de México,* Mexico City, 1988, p. 130), and considering the production costs available for 1769, an *arroba* of *cemita* bread would have cost 5 ¾ *reales*. If the *cemitas* were made of *trigo inferior* (wheat of lower quality), the price would be even less.

[92] E. LÓPEZ LOSA, S. PIQUERO, *Spanish Real Wages in the North-western Mirror,* cit.

[93] E. LLOPIS, H. GARCÍA MONTERO, *Precios y salarios en Madrid,* cit.

[94] E. LÓPEZ LOSA, S. PIQUERO, *Spanish Real Wages in the North-western Mirror,* cit., pp. 11-12. Data from the Hospital of Santa Marta in Seville show exactly the same ratio. Data kindly provided by Manuel González Mariscal.

total expenses,[95] in the Spanish case, might imply an artificial increase in the total expenditure of 9 or 10 per cent.[96]

In Mexico City, several kinds of breads were baked in the 18th century: the finest and whitest—*floreado especial,* the high quality—*floreado*, the ordinary —*pan común*, and those made of whole flour—the *pan basso* and the *cemita.*[97] We don't have references for the price of each kind of bread, but we do for the price of the flour used for ordinary bread and *cemita.* In 1769, one *arroba* (11.5 kg) of white flour cost 11 ¾ *reales*, while the *arroba* of *cemita* flour cost only 3 ½ *reales*.[98] If we consider that the manufacturing costs for both kinds of bread were rather similar or the same (3 *reales*), the cost of one *arroba* of *floreado* bread was 14 ¾ *reales*, while the cost of the *cemitas* was only 6 ½ *reales* per *arroba*—that is, the price of cheap bread was just 44 per cent of the price of the expensive one.

In terms of the consumed quantities, in the case of Madrid we know that bread consumption of every kind was between 0.5 and 0.6 kg per inhabitant per day during the second half of the 18th century.[99] Therefore, we constructed our baskets under the assumption that both skilled and unskilled workers consumed 200 kg of bread annually (0.55 kg daily). Thus, we assume that the difference in the consumption of this foodstuff among different social groups lay more in the quality than in the quantity of consumption.[100]

In Mexico City, an average of 124.6 kg of bread was consumed annually in the city between 1763 and 1791. In the case of maize, the figure amounts to 119 kg. For our baskets we have considered 110 kg of each product for skilled workers and 70 kg of bread and 150 kg of maize for unskilled workers. A higher figure of maize seems implausible since a not-minor part of the maize introduced into the city was used to feed the numerous pigs

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95 See R.C. ALLEN, *The Great Divergence in European Wages and Prices from the Middle Ages to the First World War,* cit.

96 The opposite case, the aforementioned "oatmeal effect" (E. LÓPEZ LOSA, S. PIQUERO, *Spanish Real Wages in the North-western Mirror,* cit.) has, of course, an impact as well.

97 V. GARCÍA ACOSTA, *Las panaderías, sus dueños y trabajadores. Ciudad de México, siglo XVIII,* Mexico City, 1989, p. 158. Barley was rarely used for making bread; we have references of such practice only during the maize crisis of 1785-86, Archivo Histórico del Instituto Nacional de Antropología e Historia [México], (AHINAH), Hospital Real de Naturales, 25.

98 AGNM, Indiferente Virreinal, 6645, 16.

99 J.U. BERNARDOS, *El consumo en España (1750-1850),* in *El legado económico del Antiguo Régimen,* ed. E. LLOPIS, Barcelona, 2004, pp. 273-300, p. 280.

100 This assumption is coherent with what we know from different testimonies such as the diet in the female prison (0.46 kg/day), hospitals (0.46 kg/day), and the consumption of a rich knight ("*caballero rico*") (0.46 kg of the best quality bread) (J.U. BERNARDOS, *Mercado y abastecimiento,* cit., pp. 232-234; also, IDEM, *El consumo en España,* cit., p. 280).

living in it and its outskirts.[101]

A second essential reference in the budgets is that devoted to legumes. In Madrid, according to toll gate records, in 1789 each inhabitant ate on average about 0.04 kg daily[102] (Bernardos, 1997). Taking into account the daily importance of these foodstuffs—basically chickpeas and beans in Madrid—in the traditional diet of the lower classes, and its minor importance among the rich people being regarded as "the food of the poor", we include 27 kg per adult in both budgets as a reference. In Mexico City, an average of 12.4 kg of beans was consumed per inhabitant during the period 1763-1791; the annual consumption of chickpeas amounted to 3.2 kg per capita. We have thus assigned 10 kg of beans for each basket. Since chili was widely consumed in Mexico City,[103] a consumer basket without it would not be representative. We have assigned, based on the averages of 1763-1791, 5 kg of consumption for both skilled and unskilled wage earners.

With respect to meat, we have to begin considering how much meat and what kind of meat was actually eaten by different social groups. The answer is again relevant because of the key importance of meat in the patterns of urban consumption. In Madrid as in Mexico City, beef was most popular among "commoners" while mutton was customary among the wealthy people and the clergy.[104] However, to be precise, in addition to lean meat, offal and entrails were widely consumed among the "commoners". They obviously had a lower cost, and for Madrid we assume 50 per cent of that of lean meat. We hypothesised that skilled workers ate only lean meat (both beef and mutton) and unskilled ones one-third lean and two-thirds offal and entrails. For Mexico City, along with beef and mutton, pork and its derivates were widely consumed by both rich and poor.[105] Therefore, we have assigned a consumption of 25 kg of beef and 10 kg of pork for both skilled and unskilled workers, and for the former also 15 kg of mutton.

In Madrid average consumption of meat, beef, and mutton fluctuated in a decreasing way between 35 kg and 24 kg per inhabitant per year during the second half of the 18th century.[106] Taking into account the higher

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[101] The figure was estimated as high as 109,500 loads per year, *Gazeta de México,* May 5th, 1789.

[102] J.U. BERNARDOS, *No sólo de pan,* cit.

[103] "The country's own meals are all loaded with chili", F. DE AJOFRÍN (FRAY), *Diario del viaje que por orden de la Sagrada Congregación de Propaganda Fide hizo a la América Septentrional en el siglo XVIII,* ed. V. CASTAÑEDA Y ALCOVER, Madrid, 1958, vol. 1, p. 92.

[104] J.U. BERNARDOS, *El consumo en España,* cit., p. 280; A. CALDERÓN FERNÁNDEZ, *Mirando a Nueva España en otros espejos,* cit., p. 158.

[105] E. QUIROZ, *Res, carnero o cerdo. Carnes populares en el siglo XVIII novohispano*, in "Nacameh", 1, 2007, 2, pp. 142-159, p. 145.

[106] J.U. BERNARDOS, *Mercado y abastecimiento,* cit., pp. 232-234; IDEM, *El consumo en España,* cit., p. 280; IDEM, *La conformación del mercado interior castellano a través del sistema de*

consumption of meat among rich people, we consider a lower intake both for bricklayers and labourers. For other animal products such as pork and its products and poultry, few price series are available and the consumption figures are much more scarce and confusing. Yet, prices for fish—with a significant consumption, around 20 gr daily in 1789, in particular during Lent—and lard—a compulsory item because of its presence in the usual daily stew, whose consumption was slightly below 30 gr daily during the 1760s[107]—are available and these products are included in our baskets. In Mexico City, Quiroz has estimated a daily consumption of 460 gr of meat for the white half of the population and of 163 gr for the Indian and mixed-race half.[108] For a construction labourer, his estimates rise to 250 gr of meat per day.[109] The inmates of the Acordada jail in 1787 were given 345 gr of beef meat daily, and those of the municipal jail of Mexico in 1791 were given an average of 326 gr of the same sort of meat; the latter figure would be even greater if we exclude the Lent period, when their ration diminished to mere 85 gr.[110] We are being nevertheless cautious and our estimation of daily meat consumption for skilled workers has been fixed at 137 gr and at 96 for unskilled workers.

Wine, a staple with a significant importance in the budgets of preindustrial Europe's inhabitants, also shows complexities. The problems are again related to the great diversity of types and/or qualities and the significant price differences among them. In Mexico City *pulque,* a fermented beverage derived from an agave called *maguey,* played a very important role in the diet of its inhabitants, men, women, and children alike. Its importance was even greater for the less-affluent sectors of the population. The average annual consumption per capita amounts to 264.2 litres between 1763 and 1788.[111] We have thus included an estimate of 200 litres of pulque in both of our baskets for Mexico City.

Our process for other foodstuffs merits a brief explanation. For eggs we rely on the average consumption found by Bernardos[112] in Madrid in 1789—74 average units annually—and we assume lower quantities among bricklayers—56 units, or 75 per cent—and labourers—40 units, or 54 per cent—due to their higher intake among the wealthy groups. Regarding olive

abastecimiento madrileño de productos básicos (1560-1850), in "Minius: Revista do Departamento de Historia, Arte e Xeografía", 22, 2014, pp. 53-80.

107 IDEM, *El consumo en España,* cit., p. 280.

108 E. QUIROZ, *Res, carnero o cerdo,* cit., p. 144.

109 EADEM, *La importancia histórica del consumo de carne en México: el mercado interno novohispano y el mercado urbano regulado en el siglo XVIII,* in "Nacameh", 4, 2010, Supl. 1, pp. S22-S32, p. S26.

110 A. CALDERÓN FERNÁNDEZ, *Mirando a Nueva España en otros espejos*, cit., pp. 149-151.

111 F. SEDANO, *Noticias de México,* Mexico City, 1974, vol. 3, p. 56.

112 J.U. BERNARDOS, *No sólo de pan,* cit.

oil, in Madrid we take the annual average consumption found by Bernardos in 1789, 9.33 l. In the case of Madrid, cheese is only appropriate[113] for skilled workers, and the quantities we use, in the absence of better information, are those proposed by Allen.[114] For Mexico City, we are considering lard[115] as the most important source of fat, assuming an annual consumption of 5 kg for skilled and 4 kg for unskilled workers. We have also found an average cheese consumption of 2.6 kg per year in the city between 1763 and 1791, and we have thus assigned a figure of 2.5 kg for skilled workers only.

With respect to salt, we assume for Madrid an average consumption of 8.5 kg based on the annual average consumption found by Bernardos for 1789.[116] In Mexico City, the average consumption from 1763-1791 was 12.4 kg per year per inhabitant. Thus, for our baskets we are assigning 10 kg.

Finally, we include sugar only for skilled workers in Madrid, as a foodstuffs representative of colonial products with 4 kg—slightly below the average of 5 kg in 1789—and 2 kg respectively. In the case of Mexico City, sugar played a much more important role in the diet of its inhabitants. In the period analysed, an annual average of 20 kg per inhabitant was found. Proof that sugar consumption was widespread and adapted to all segments of the market is found in the numerous kinds of sugar present in the city, including, from best to worst: white, white and streaky (*entreverada blanca*), streaky (*entreverada*), ordinary or brown (*corriente, prieta*), chunks (*pedacería*), and powder (*polvo*). Between 1765 and 1778, a *panocha* (a cilinder of condensed brown sugar weighing ½ pound, that is, 230 grammes) cost just ¼ of a real.[117] That meant that a construction labourer could buy 5.5 kg of *panocha* with his earnings of just one day. Therefore, we have included 15 kg of streaky sugar for skilled labourers and the same amount of brown sugar for unskilled labourers. Along with sugar, cocoa was consumed by the inhabitants of Mexico City, although due to its price we have only considered it in the basket of skilled labourers. Considering the average consumption of the city of 6,5 kg per year per person between 1763 and 1791, we have assigned 5 kg to the basket.

Regarding clothes, the existence of fabrics with very diverse qualities and

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113 The consumption of cheese does not seem to be so widespread in Madrid.

114 R.C. ALLEN, *The Great Divergence in European Wages and Prices from the Middle Ages to the First World War*, cit.

115 Lard consumption in the city is not clear, since the only available figure is that provided by San Vicente, and it seems exaggerated (J.M. SAN VICENTE, *Exacta descripción de la magnífica Corte mexicana, cabeza del nuevo americano mundo, significada por sus essenciales partes, para el bastante conocimiento de su grandeza,* in *La ciudad de México en el siglo XVIII (1690-1780). Tres crónicas,* ed. A. RUBIAL GARCÍA, Mexico City, 1990, pp. 133-181, p. 176).

116 J.U. BERNARDOS, *No sólo de pan,* cit.

117 AGNM, Indiferente Virreinal, 643, 18; 687, 2 ; & 3124, 6; Templos y Conventos, 208, 3; & 209, 1.

prices and different patterns of consumption across countries and social classes is also well-known. At the same time, at best, most CPIs usually rely on series of generic categories such as linen wool clothes if not of the raw materials (linen, wool, silk…) they were made of. In our case, at the moment, the only substantial improvement we can make with respect to the standard CPI is the inclusion of small quantities of wool clothes—*paño* in Madrid—as the most widespread sort of fabric in the 18th century in Europe. As for Mexico City, we have considered *bramante crudo*, a linen imported from Europe, and *manta* (cotton fabric made in the realm itself) as a representative consumption for skilled workers and *manta* alone for unskilled workers.

The share devoted to fuels and lighting for Madrid includes lamp oil, tallow candles, and charcoal. Even with no clear quantitative evidence available, we know the two first products were widely used.[118] Regarding charcoal, according to Bernardos,[119] in 1789 the consumption of firewood was one-sixth of that of charcoal. Thus, charcoal is the reference fuel in the consumption basket for Madrid. How much charcoal and firewood could really be used by labourer and bricklayer families? In Madrid, Bernardos estimates for 1789 a daily average consumption of charcoal of 0.65 kg, that is to say 237 kg per inhabitant per year. In Mexico City, the figures of total firewood and charcoal consumption are available for the year of 1785. That year, 291,928 loads of firewood and 320,832 loads of charcoal were introduced into the city.[120] The figure is so important and seems even exaggerated in a city with mild weather like Mexico City, but this has its explanations: first, the great consumption of firewood by the Royal Mint—and to a lesser extent, also charcoal; second, that no forests were near enough to the city so that its inhabitants could gather wood from time to time for cooking and heating their households. Therefore, we have assigned only 2.5 loads of charcoal to the basket of skilled workers and 1.5 to that of unskilled workers.

The last reference to be considered is housing. Regarding Madrid, we have information about the evolution of rents between 1680 and 1800.[121] Based on this evidence, we selected the cheapest rent for a particular room as representative of potential cost of housing for labourers and a slightly more expensive room for bricklayers. For both we assume their rents followed the general trend of rents in the years without information. As a

[118] In the absence of better information we assume the figure proposed by R.C. ALLEN (2001), *The Great Divergence in European Wages and Prices from the Middle Ages to the First World War,* cit., and P. MALANIMA (2013), *When did England overtake Italy?,* cit.

[119] J.U. BERNARDOS, *El consumo en España,* cit., p. 285.

[120] *Gazeta de México,* February 28th, 1786, p. 7.

[121] E. LLOPIS, H. GARCÍA MONTERO, *Precios y salarios en Madrid,* cit.

result, rents got 7.5 per cent of the "consumption-possibility frontier" for unskilled workers and 10 per cent for skilled workers. In Mexico City, all rents in the city in 1796 amounted to 1'418,392 pesos.[122] Sedano[123] states that in the housing census of 1790, which was conducted along with the population census, the value of rents was of 1'719,126 pesos, excluding the 'suburbs', which made up another 286,500 pesos. Considering that the city was smaller at the beginning of the period and that rents didn't begin to increase before 1783,[124] for the general index of 1763-1791 we have assigned a value of 1.2 million pesos for rentals, which accounts for 9,9% of total consumer expenditures. For bricklayers we have assigned a tenement room—*cuarto de vecindad*—costing 10 *reales* a month, and for labourers one of the same kind costing 8 *reales* a month.

To summarise, we have elaborated the consumption baskets shown in Tables 1 and 2 for Madrid and Mexico City labourers and bricklayers. They are the result of our estimations of family incomes, the assumptions about the average size of the families, and the mentioned evidence—and in certain cases assumptions—about real consumption patterns among urban populations.

122 COMISIÓN MONETARIA, *Datos sobre rentas de fincas urbanas en la ciudad de México,* Mexico City, 1903.

123 F. SEDANO, *Noticias de México,* cit., vol. 3, p. 17.

124 A. CALDERÓN FERNÁNDEZ, *Una serie de precios de vivienda*, cit.

TABLE 1. CONSUMPTION BASKETS FOR LABOURERS AND BRICKLAYERS IN THE CONSTRUCTION SECTOR, MADRID 1680-1800

	Bricklayer (skilled worker)			Labourer (unskilled worker)		
	Quantity per year	Kcal/day	Spending share (%)	Quantity per year	Kcal/day	Spending share (%)
Bread	200 kg	1345	30	200 kg	1345	33
Beans/chickpeas	27 kg	266	3,3	27 kg	266	5,5
Beef/offal	13 kg	70	3,5	21,6 kg	116	6,5
Mutton	12 kg	80	4,6			
Lard	9,1 kg	154	4,3	9,1 kg	154	8,5
Olive oil	9,33 l	177,4	3,5	9,33 l	177,4	6,5
Fish/cod	4,5 kg	38,5	1,6	3 kg	17,6	1,6
Cheese	5,2 kg	53	2,5			
Eggs	56 units	12	1,4	40 units	9	0,8
Wine	68,25 l	159	9,5	68,25 l	159	12
Salt	8,5 kg		0,9	6,8 kg		1,4
Sugar	4 kg	40,1	4,5			
Soap	4,2 kg		1,7	2,6 kg		2
Linen	3 m		1,4	1,5 m		1
Wool cloth	3 m		8,1	2 m		6,2
Shoes	1 pair		1,2	1 pair		2,5
Candles	2,6 kg		1	1,3 kg		1
Lamp oil	2,6 kg		1	1,3 l		1
Charcoal			6			3
Housing			10			7,5
TOTAL		**2395**	**100,0**		**2232**	**100,0**

Source: See text.

TABLE 2. CONSUMPTION BASKETS FOR LABOURERS AND BRICKLAYERS IN THE CONSTRUCTION SECTOR, MEXICO CITY 1759-1791

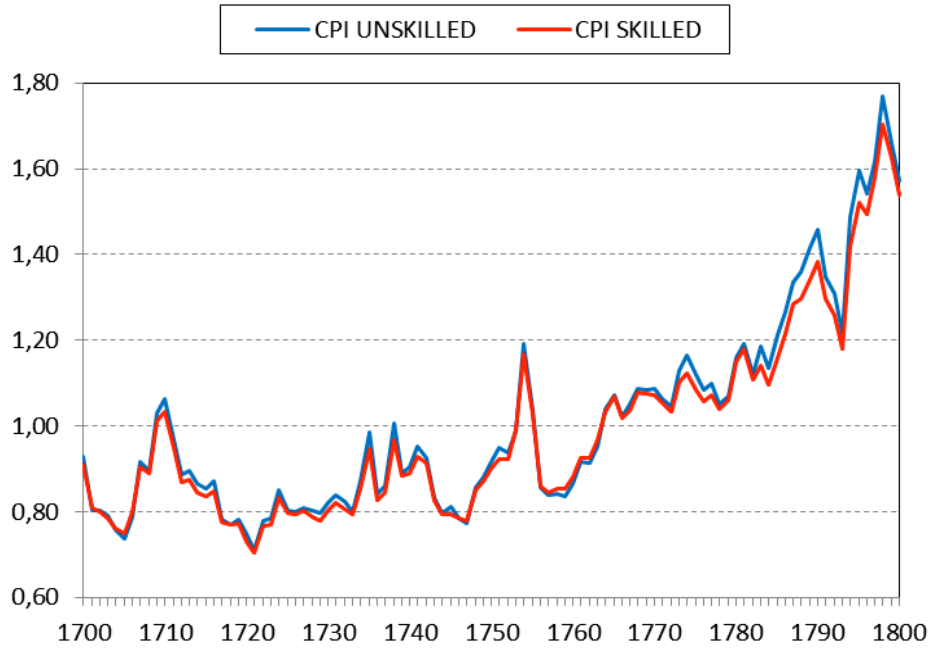
	Bricklayer (skilled worker)			Labourer (unskilled worker)		
	Quantity per year	Kcal/day	Spending share (%)	Quantity per year	Kcal/day	Spending share (%)
Bread	110 kg	723	25,4	70 kg	460	22,5
Maize	110 kg	654	5,7	150 kg	892	10,8
Beef/offal	25 kg	167	2	25 kg	167	2,8
Mutton	15 kg	16	3,3			
Pork	10 kg	11	1,3	10 kg	11	1,8
Lard	5 kg	120	3,1	4 kg	96	3,5
Beans	10 kg	89	0,7	10 kg	89	1
Cheese	2,5 kg	21	1			
Cocoa	5 kg	31	6,9			
Sugar	15 kg	164	4,4	15 kg	164	4,9
Salt	10 kg		2,1	8 kg		2,3
Pulque	200 l	236	14,6	200 l	236	20,3
Chili	5 kg	3	3,5	5 kg	3	4,8
Soap	4,2 kg		1,9	3 kg		2
Linen *(bramante)*	3 *varas*		3,4			
Cotton (*manta*)	3 *varas*		1,4	5 *varas*		4
Shoes	1 pair		1,9	1 pair		2,6
Candles	4 kg		2,6	2 kg		1,8
Lamp oil	1 l		1	,5 l		0,7
Charcoal	2,5 *cargas*		4,3	1,5 *cargas*		3,6
Housing			9,6			10,6
TOTAL		**2235**	**100**		**2118**	**100**

Source: See the text

5. THE CONSUMER PRICE INDEX FOR MADRID

The CPI for Madrid, as Figure 1 shows, reveals that the evolution of cost of living for bricklayers and labourers in the construction sector was almost identical between 1700 and 1800. This was due to the fact that consumption baskets were not very different and changes in absolute prices were much more important than in relative prices in this period. Having said that, a comparison between the trends in the cost of living of a wealthy family and a humble one probably would show more substantial differences. The reason is that certain kinds of goods and services, such as luxury imported goods and domestic manpower, which had significant importance in the budgets of wealthy people, became cheaper in relative and/or absolute terms in the 18th century, in particular during its second half.

FIGURE 1. CONSUMER PRICE INDICES FOR MADRID, 1700-1800



Source: See text.

In the evolution of CPI in Madrid between 1700 and 1800 two main periods can be distinguished: a first one, between 1700 and 1747, with a trend toward stagnation, and a second one, with an upward movement, in the second half of the 18th century. Between 1686-1690 and 1743-1747, the cost of living for bricklayers and labourers in the construction sector grew at an annual rate of 0.07 per cent. However, this period of stagnation was interrupted by short phases of fluctuation. The major shortages before 1750 were registered in 1699-1700, 1707-1713, and 1735-1742.

Between 1743-1747 and 1796-1800, the cost of living for bricklayers grew at an annual rate of 1.31 and 1.35 for labourers. The main shortages in the second half of the 18th century took place in the first four years of the 1750s, in the first half of the 1760s, in the second half of the decade of the 1780s, and in the last years of the century.

In Madrid, during the second half of the 18th century, prices grew at a slower pace than in other Castilian cities. Between 1743-1747 and 1796-1800, the cost of living increased in Palencia at an annual rate of 1.57% and in Seville 1.65%.[125] Probably the intense protection policy for Madrid consumers, which was aimed at avoiding new riots,[126] is the key to explaining why inflation was a bit softer in Madrid in the last third of the 18th century.[127] Within the other Spanish Crown, the Crown of Aragon, in Barcelona, prices in terms of silver increased at an annual rate of 1.71% between the same dates. Thus, in that city, after a relatively strong deflationary period in the first half of the century (an annual rate of -0.8% between 1690-1698 and 1740-1748), the cost of living rose faster than in the Castilian cities.[128]

In a previous work we argued that CPI in terms of silver between 1690-1699 and 1783-1792 rose more in Madrid than in the cities of Northwestern Europe (14.9% in Madrid in front of 7.2% in Amsterdam, 7.7% in Antwerp, and 10.1% in London), a bit more than in Barcelona (12,8%) and a bit less

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125 E. LLOPIS, A. GARCÍA-HIERNAUX, H. GARCÍA MONTERO, M. GONZÁLEZ MARISCAL, R. HERNÁNDEZ GARCÍA, *Índices de precios de tres ciudades españolas,* cit., pp. 62-72.

126 The riots that happened in Madrid in 1766 ("el motín de Esquilache"), which were above all caused by the food shortage, pressed local and crown authorities to intensify the protection of Madrid consumers, see *El impacto de la Corte en Castilla. Madrid y su territorio en la época moderna*, J. M. LÓPEZ GARCÍA dir., Madrid, 1998, pp. 480-481.

127 On the protection policy for Madrid consumers, see C. CASTRO, *El pan de Madrid,* cit., pp. 237-305.

128 Data for Barcelona from G. Feliu, *Aproximaciò a un índex del cost de la vida a Barcelona, 1501-1807*, in *Josep Fontana. Història i projecte social. Reconeixement a una trajèctoria*, Barcelona, Crítica, 2004, vol. I, pp. 161-167; E. LLOPIS, A. GARCÍA-HIERNAUX, H. GARCÍA MONTERO, M. GONZÁLEZ MARISCAL, R. HERNÁNDEZ GARCÍA, *Índices de precios de tres ciudades españolas,* cit., pp. 58-61.

than in Milan (15.8%) and Vienna (15.6%). Thus, Madrid shared the European price pattern during the 18th century. However, Seville, Toledo, and Palencia suffered relatively intense inflation from a European perspective. Between the mentioned decades, the cost of living in silver increased in the first city 24.7%, 32.3% in the second, and 31% in the third.[129] Therefore, within Spain, Madrid shows significant peculiarities with respect to the CPI evolution during the 18th century. It reinforces our view that price history for a country cannot be based only on the history of prices for one single city.

In Madrid, price volatility did not register important variations during the second half of the 18th century: the standard deviation of the logarithmic variation rates in unskilled workers' CPI was 0.689 in 1686-1747 and 0.666 in 1747-1800. The CPI volatility for bricklayers was a bit lower: 12.7 per cent in the first period and 9.1 per cent in the second. This result is not unexpected since the share of the budget devoted to goods with more intense annual variations was a bit higher among unskilled workers than among skilled ones. In short, unskilled workers, in addition to their lower incomes, faced higher instability in their consumption baskets.[130] As a result, different consumption baskets could affect one of the determinants of standards of living, in particular in the pre-industrial world: i.e., the volatility of prices.

In that sense, we compare the evolution in Madrid of the welfare ratios using our consumption basket for an unskilled family and a typical "barebone basket" as proposed by Allen with 2,100 kcal. As can be seen in Figure 2, the volatility in the case of Allen's CPI is significantly higher than in our CPI. Between 1686 and 1800, the standard deviation of the logarithmic variation rates in Allen's CPI is 0.129; for our CPI, this value is 0.069 in the case of the unskilled workers and 0.061 in the case of skilled workers. Therefore, volatility of prices was 89.7% and 111.5% higher, respectively. In our view, the use of Allen's barebone baskets exaggerates the volatility in the CPI, a key component of the material standard of living of the "commoners" in their everyday lives.

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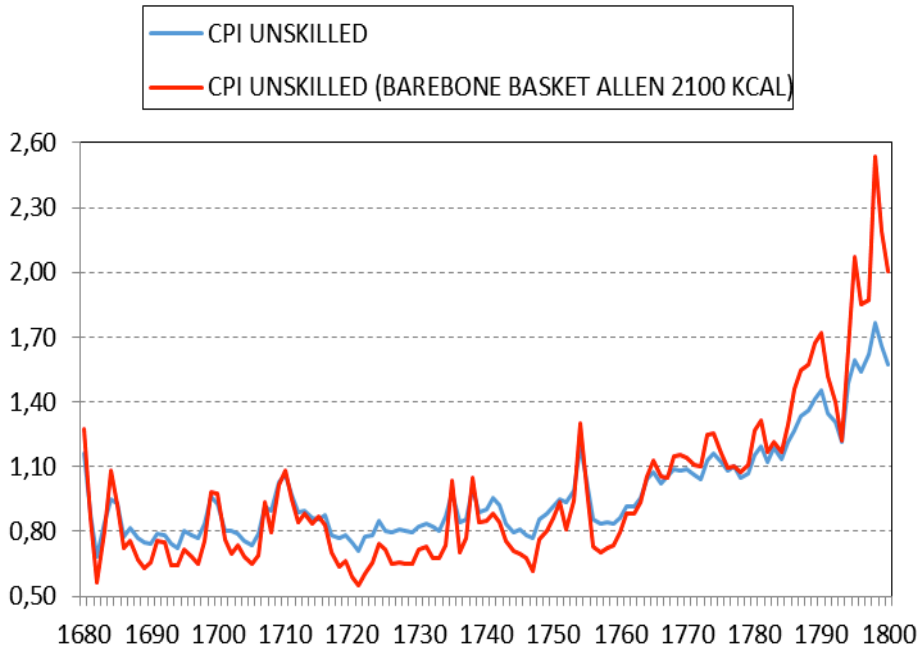
129 E. LLOPIS, H. GARCÍA-MONTERO, *Precios y salarios en Madrid,* cit., p. 301.

130 About the impact of price volatility on the standards of living in pre-industrial societies, see K.G. PERSSON, *Grain markets in Europe, 1500-1900: Integration and Deregulation*, Cambridge, 1999, pp. 23-42.

FIGURE 2. CPI FOR UNSKILLED WORKERS IN MADRID USING OUR BASKET AND ALLEN'S BAREBONE BASKET OF 2100 KCAL, 1700-1800



Source: See text.

6. CONCLUSIONS

The main conclusions of this research are:

1) In order to improve our knowledge on the evolution of standards of living of urban workers we need: a) to build more wage series, both for males and females and for different activities both in the industrial and in the service sectors; b) to try to estimate total family incomes; and, c) to research more intensively on the real composition of consumption baskets for the kinds of workers we are analysing. To this end, it is neccesary to reduce the geographical and temporal dimension of our research efforts in order to achieve a deeper, wider, and more reliable knowledge of the family economies of urban wage earners.

2) In the 18th century, prices evolved in Madrid in a relatively similar way as the large cities of Western Europe.

3) However, in the Castilian context, Madrid's CPI does show a relevant

peculiarity: in the second half, inflation was less intense than in the rest of the Castilian cities.

4) Volatility in the CPI was, in the 18th century, approximately 10% higher for unskilled workers than for skilled ones. Thus, the standard of living for the first ones was lower mainly because of their lower incomes, but also due to the impact of the higher volatility of their CPI.

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