**Appendix A: the data**

**Prices**

*Bread*

The price of bread in Bologna, Milan, and Florence was calculated using the weight fixed by public authorities (see the next section, ‘The weight of bread’. Given that varying weights were sold at a fixed price (two *soldi* in Bologna, one *soldo* in Milan, and eight *soldi* in Florence), we multiplied the silver value of the *soldi* needed to purchase the loaf by its weight in grams to obtain a price of 1 kg. In Bologna, 20 *soldi* = 1 bolognese *lira* and 1 bolognese *lira* = 5.9 silver grams from 1700 to 1728, 5.31 silver grams from 1729 to 1777, 5.18 silver grams from 1778 to 1785 and 4.96 silver grams from 1786 to 1797;[[1]](#footnote-1) in Florence, 20 *soldi* corresponded to 1 *lira* = 4.5 silver grams from 1700 to 1710, 4.3 from 1711 to 1730, 4.2 from 1731 to 1740, 3.9 from 1741 to 1780, and 3.8 from 1781 to 1797;[[2]](#footnote-2) in Milan, 20 *soldi* corresponded to 1 *lira*, whose value was 3.87 silver grams from 1700 to 1730, 3.75 silver grams from 1731 to 1740, 3.69 silver grams from 1741 to 1750, 3.58 silver grams from 1751 to 1780 and 3.5 silver grams from 1781 to 1797.[[3]](#footnote-3)

*Wine*

In Bologna, the original wine prices were in Bolognese *lire* per *corba* (78.5931 litres). The data were collected from the accounting books of the Salina-Amorini family for the period 1713–1795 and from the books of the S. Francesco hospital for the period 1700-1713, 1717-1745, and 1774-1789.[[4]](#footnote-4) This chronology enabled a comparison of the two price series and confirmed their substantial correspondence.

Florence prices were obtained from Pult Quaglia for 1700–1735;[[5]](#footnote-5) Malanima also used the price series included in this article.[[6]](#footnote-6) However, while Malanima used the series related to the ‘wine from the hills’, we used the one related to the ‘wine from the plain’. This is because the former is qualitatively superior and, therefore, the most expensive wine, approximately two to three times more expensive than the latter. Therefore, it is plausible that the popular classes did not consume them.

Pult Quaglia reports prices until 1735;[[7]](#footnote-7) prices thereafter are an estimate based on the fact that for the period 1700–1735, wine prices were identical to Bolognese ones. We calculated that Florentine prices were, on average, 13 per cent less than Bolognese prices, and, therefore, we completed the series based on this ratio.

De Maddalena reported the prices of *crodello* wine in the eighteenth century.[[8]](#footnote-8) However, *crodello* wine is a high-quality wine obtained from the first crushing of black grapes, extracted from the vats, carefully avoiding bunches on the surface and turbid wine at the bottom. Again, as in the case of the Florentine ‘hilly’ wine, it is unlikely that this wine was consumed by the lower-medium strata of the urban population. To give an idea to consumers, this was the type of wine that peasants ceded to landowners. Indeed, it was more than three times as costly as the ‘popular’ wine in Bologna and Florence. Therefore, we again decided to divide its price by three to obtain the wine’s price series for Milan. Thereby, we obtained a price that was in any case higher than the series of Bologna and Florence (such as the other products included in the CB) but that at the same time was almost certainly closer to the price of a ‘popular’ wine. De Maddalena’s data are in milanese *lire* per *brenta* (1 *brenta*=75.554386 litres). For the calculations, all prices were converted into grams of silver per hectare.

*Meat*

Meat prices are referred to as beef prices and are converted into silver grams per kilogram. Guenzi reports the ten-year averages of beef-fixed prices in Bolognese *lire* per kilogram. This is an approximation, but given the importance of beef in the CBs—slightly more than ten per cent—possible variances of the proposed prices from real prices are almost statistically irrelevant.[[9]](#footnote-9) Milanese prices were quoted by De Maddalena, originally in Milanese *lire* per ten *libbre grosse* (one *libbra grossa* = 0.762517 kg).[[10]](#footnote-10) Regarding Florence, as Malanima did,[[11]](#footnote-11) we used the veil prices in Pult Quaglia;[[12]](#footnote-12) again, Pult Quaglia’s series ended in 1735, and for the remaining period, we observed that the Florentine series for 1700–1735 was approximately 50 per cent higher than the Milanese series. Therefore, we estimated Florentine prices for the period 1736–1795.

*Olive oil*

Olive oil prices were converted into grams per litre of silver. About Milan, De Maddalena reports the prices in *lire milanesi* per ten *libbre grosse milanesi*.[[13]](#footnote-13) Therefore, we first converted it into silver grams per kilogram and then into litres (one litre of olive oil = 0.92 kg). Bolognese prices are the average olive oil prices collected from the ledgers of the S. Croce girls’ school, the S. Maria delle Laudi and S. Maria della Vita hospitals, and the S. Bartolomeo orphanage.[[14]](#footnote-14) Original prices are in *lire bolognesi* per *libbra da olio* (one olive oil *libbra*= 0.39533 litres). For Tuscany, we use data on Pisa from the Allen-Unger Global Commodity Prices Database.[[15]](#footnote-15) Prices in the database have already been converted into silver grams per litre.

*Cheese*

Cheese prices were converted into silver grams per kilogram. In Bologna, prices are reported in the ledgers of the S. Croce Girls’ School and the S. Bartolomeo Orphanage.[[16]](#footnote-16) Prices were originally expressed in *lire bolognesi* per *libbra bolognese* (one libbra= 0.361851 kg) and are called sheep cheese. However, in the same ledgers, there are examples of cow cheese at identical prices. For Milan, we relied on the data proposed by De Maddalena, originally expressed as *lire milanesi* per ten *libbre grosse*.[[17]](#footnote-17) De Maddalena’s prices refer to *Sbrinzio* cheese, an extra-hard cheese produced in central–southern Switzerland, which was exported to the State of Milan. We decided to compensate for the absence of cheese prices in Tuscany using the Bolognese ones (almost identical to the Milanese ones) for Florence, and it is reasonable to suppose that local cheese prices did not differ much, considering the similarities in the prices of other foodstuffs.

*Eggs*

The same applies to eggs: in this case, we collected data only on Bologna and Milan, and hypothesised that Florentine prices were close to the Bolognese ones, therefore using the data series referred to Bologna also for Florence. Considering that eggs supply only approximately 0.8 per cent of daily calories, potential deviations in Florentine prices would not have affected the analysis. Prices were converted into silver grams per unit (g). In Bologna, data came from the ledgers of the Scappi-Ariosti family, S. Francesco Hospital, and S. Maria della Vita Hospital, which were originally expressed in Bolognese *lire* per unit.[[18]](#footnote-18) De Maddalena again supplied the prices for Milan, originally in Milanese *lire* per ten *dozzine* (100 units in total)[[19]](#footnote-19).

*Beans*

Bean prices were converted into silver grams per litre. For Bologna, the data are the average (almost identical) prices in the ledgers of the SS. Trinità and S. Maria della Vita Hospitals, the S. Giuseppe Girls’ School, the S. Bartolomeo Orphanage, and the *Salina-Amorini* and Scappi-Ariosti families.[[20]](#footnote-20) In the ledgers, prices were originally expressed in Bolognese *lire* per *corba* (1 *corba* = 78.6448 litres). For Florence, we used the data referred to Pisa in the Allen-Unger Global Commodity Prices Database,[[21]](#footnote-21) while for Milan, we used the prices registered in Bologna, given the absence of other sources and the similarity in the price trends and levels in the two cities for all other foodstuffs.

*Firewood*

Firewood prices were converted to silver grams per kilogram. In the case of Bologna, wood prices were originally expressed in Bolognese *lire* per *quarto* (one *quarto*=0.0018845 kg), and we used the averages of the (almost identical) prices in the ledgers of the SS. Trinità, S. Maria della Vita, S. Maria dei Servi, and S. Francesco Hospitals; S. Croce and S. Giuseppe Girls’ Schools; S. Bartolomeo Orphanage.[[22]](#footnote-22) For Milan, data were from De Maddalena and were originally expressed in *lire milanesi* per ten *fasci* (1 *fascio* = 76.251714 kg).[[23]](#footnote-23) Data on Florence are lacking; therefore, it is not possible to create a series of wood prices. However, according to Malanima, prices in Florence were the same as those in Milan;[[24]](#footnote-24) therefore, we used the Milanese prices for Florence.

*Rent allowance and clothing*

The cost of CBs should also include expenses for housing and clothing. Given the difficulty of finding reliable data on rent and clothes, we resorted to the common practice of adding a fixed percentage to the final cost of CBs. Following Rota and Weisdorf, among others, we assumed plus five per cent housing expenses.[[25]](#footnote-25) Similarly, we hypothesise that the percentage proposed by Rota and Weisdorf for clothing in Rome (two per cent), which is lower than that proposed by Allen for London (four per cent), is a reasonable figure given the different climatic conditions in the Mediterranean area in comparison with Northern Europe.[[26]](#footnote-26) Therefore, the total calculated cost of the CBs, including bread, wine, meat, olive oil, cheese, beans, and firewood, increased by seven per cent to include rent allowances and clothing costs.

**The weight of bread**

For Bologna, the original data are expressed in *oncie* of a loaf purchased with two *bolognini (soldi)*. The data were converted considering that one *oncia* = 0.03054 kg. Therefore, we estimated the quantity of bread (kg) that could be purchased in lieu of the equivalent silver grams of *bolognini*).[[27]](#footnote-27) The weight of the bread fixed by public authorities was obtained from Guenzi.[[28]](#footnote-28) Changes in weight could also occur during the year. When this occurred, the yearly average was calculated by considering the number of days when a specific fixed weight was valid.

For Milan, the weight of the loaf was calculated using the price of wheat and contemporary tables, indicating the weight of one *soldo* loaf in specific wheat price ranges. For the period of 1700–1771, tables preserved in the Municipal Archives of Milan were used[[29]](#footnote-29). From 1771 onwards, tables for the calculation of bread weight according to the corresponding price of wheat changed, as shown in Grab.[[30]](#footnote-30) Wheat prices up to 1786 are reported in manuscript G. 135 of the Ambrosiana Library in Milan; the data were collected by Renzo P. Corritore. For the period 1787–1795, we used data from De Maddalena.[[31]](#footnote-31) In Milan, the weight of the loaf is expressed *once* (one *oncia* = 0.027233 kg)[[32]](#footnote-32), with a loaf cost of one *soldo*. The weight of the bread was converted to kilograms. There was a gap between 1782 and 1785, because public control of bread weight was abolished during that period.

In Florence, the weight of *piccia* (bread loaf) was expressed *once* and converted into kg, considering that one *oncia* = 0.028295 kg.[[33]](#footnote-33) Each price was eight Florentine *soldi* for each *piccia*. Data on bread weight in Florence were collected from the State Archives of Florence ( ASFi), *Appalti generali delle regie rendite* 1740–1768, folder 1242, and ASFi, *Segreteria di Gabinetto*, folder 100, quoted also in A. M. Pult Quaglia.[[34]](#footnote-34) From 1768 onwards, bread weight was calculated using the price of wheat and a 1767 table indicating the weight of eight *soldi* loaves in specific wheat price ranges. Wheat prices were collected from Gori and[[35]](#footnote-35) the 1767 table was from Cantini.[[36]](#footnote-36)

**Appendix B: Calculations and results**

For the construction of CBs that increase the consumption of wine and half wine, we started from RotaWeisdorf’s CB (Tab. 1).

**Table 1 approximately here**

Next, we calculated, excluding wine, how many other products were counted in the basket (Tab. 2) using the following formula, where W = weight of each product in the basket (per cent), Calt = total calories in the basket, Calw = calories of wine, and Calp= calories/day for each product:

$$W=\frac{Cal\_{p} }{( Cal\_{t}- Cal\_{w})}\*100$$

**Table 2 approximately here**

Thereafter, we increased wine to 365 litres per year/550 calories per day (pure wine), and 182.5 litres per year/275 calories per day (half wine), respectively. The remaining calories required to attain 2,500 calories/day—1,950 in the case of pure wine CB and 2,225 in the case of half-wine CB) were calculated (Tab. 3–4) using the relationship kg/litre/unit-calories used by Rota and Weisdorf, according to the percentage of calories that each product supplied in the Rota–Weisdorf CB—that is, 67.7 per cent from bread, 7.7 per cent from meat, 5.9 per cent from olive oil, 2.3 per cent from cheese, 0.5 per cent from eggs, and 15.9 per cent from beans. The formula used was as follows: C = yearly consumption of each product (kg/litre/unit); Calr = remaining calories to reach 2,500/day; W = weight of each product in the basket (per cent); and Calp = calories of each product (per kg/litre/unit).[[37]](#footnote-37)

$C=\frac{\left(\frac{Cal\_{r}}{100}\*W\right)\*365}{Cal\_{p}}$

**Tables 3 and 4 approximately here**

Table 5 summarises the resulting costs of the CBs, including pure wine and half-wine.

**Table 5 approximately here**

**Appendix C**

**Construction of dynamic baskets**

To construct dynamic baskets (including both pure wine consumption and half-wine consumption), we commenced from the CBs elaborated in Appendix B. Next, we calculated the weight of each product in the CBs, excluding bread and wine. For these two products, we know the daily consumption and caloric supply (i.e. the fixed weight of the loaf and one litre). In other words, we established that among the 630.7 calories/day supplied by the various products, excluding bread and wine, in both the pure wine CB and the half-wine CB, 23.7 per cent came from meat, 18.5 per cent from olive oil, 7.2 per cent from cheese, 1.5 per cent from eggs, and 49.1 per cent from beans. The formula is as follows: where W = weight of each product in the basket (per cent); Calt = total calories of the basket; Calb = calories from bread; Calw = calories from wine; Calp = calories/day from each product:

$$W=\frac{Cal\_{p} }{( Cal\_{t}- Cal\_{b}-Cal\_{w})}\*100$$

Thereafter, we calculated the average annual quantity of bread purchased based on the purchase of a fixed loaf (in Bologna), one loaf for three days (in Florence), or three loaves per day (in Milan) of different weights for a fixed price. As explained in the text, this calculation is based on the assumption that a person purchases the same number of loaves daily. In Florence, a loaf weighs an average of 1.43 kg. Therefore, it represents the quantity consumed in three days (on average, 0.48 kg/day). Pult Quaglia asserts that contemporary estimations suggest a daily consumption between 0.365 and 0.456 kg of bread in the eighteenth century;[[38]](#footnote-38) in Bologna, the loaf consumed every day weighed approximately 0.5 kg. In Milan, loaves weighed on average 0.21 kg; therefore, we assumed that at least two loaves were needed to attain a level of bread consumption, such as in the other two cities—that is, 0.42 kg on average. Calculating the daily purchase of bread (in kg) allowed us to suggest a caloric supply from this product, considering that one kg of bread supplies 2,450 calories.

After calculating the caloric intake from bread and wine (550 calories in pure wine CBs and 275 calories in half-wine CBs), the remaining calories required to obtain 2,500 calories/day were distributed according to the percentages mentioned above. Thus, we calculated a dynamic CB, resulting in the dynamic costs of the CBs themselves, in which the volume of wine (or half wine) consumed varied according to the variations in bread weight. Table 6 shows the final costs of the CBs in Bologna, Milan, and Florence.

**Table 6 approximately here**

1. Mariagi (M. Mariagi, *Moneta e credito a Bologna dal Rinascimento all'Unità Nazionale* (Bologna, 1980), 241) records the exchange ratio between the Bolognese *soldi* and the Roman *Zecchino d’oro*. Then, we calculated the variations in the value of the Zecchino d’oro in terms of silver *lire italiane* (A. Martini, *Manuale di metrologia, ossia misure, pesi e monete in uso attualmente e anticamente presso tutti i popoli* (Turin, 1883), 617-19), and in this way we obtained the silver value of the Bolognese *lira*. [↑](#footnote-ref-1)
2. G. Vigo, *Mille anni di economia italiana. Un profilo storico* (Napoli, 2009), 409. The same conversion of the Florentine *lira* in silver grams has been used also in P. Malanima, ‘When did England overtake Italy? Medieval and early modern divergence in prices and wages’, *European Review of Economic History,* 17 (2013), 45-70, Statistical Appendix. [↑](#footnote-ref-2)
3. G. Vigo, *Mille anni di economia italiana*, 409. [↑](#footnote-ref-3)
4. The Salini-Amorini and S. Francesco hospital’s accounting books are, respectively, in the State Archives of Bologna (hereinafter, ASBo), *Salina-Amorini*, folders 399–419, and ASBo, *Confraternita e ospedale di S. Maria delle laudi poi S. Francesco*, folders 12, 14, and 18. [↑](#footnote-ref-4)
5. A.M. Pult Quaglia, ‘Il patrimonio fondiario di un monastero toscano fra il XVI e il XVIII secolo’, in M. Mirri (Ed.), *Ricerche di storia moderna, vol. 1* (Pisa 1976), 143-208, 203. [↑](#footnote-ref-5)
6. P. Malanima, *La fine del primato. Crisi e riconversione nell’Italia del Seicento* (Milan, 1998), 199. [↑](#footnote-ref-6)
7. A.M. Pult Quaglia, ‘Il patrimonio fondiario’, 203. [↑](#footnote-ref-7)
8. A. De Maddalena, *Prezzi e mercedi a Milano dal 1701 al 1860* (Milan, 1974), 392. [↑](#footnote-ref-8)
9. A. Guenzi, ‘La carne bovina: consumi, prezzi e controllo sociale nella città di Bologna (secc. XVII-XVIII)’, in *Popolazione ed economia dei territori bolognesi durante il Settecento* (Bologna 1985), 537-52, 542. [↑](#footnote-ref-9)
10. A. De Maddalena, *Prezzi e mercedi*, 385. [↑](#footnote-ref-10)
11. P. Malanima, *La fine del primato,* 200. [↑](#footnote-ref-11)
12. A.M. Pult Quaglia, *«Per provvedere ai popoli». Il sistema annonario nella Toscana dei Medici* (Florence, 1990), 218. [↑](#footnote-ref-12)
13. A. De Maddalena, *Prezzi e mercedi*, 405. [↑](#footnote-ref-13)
14. ASBo, *Conservatorio di S. Croce*, folder 156; *Confraternita e ospedale di S. Maria delle laudi poi S. Francesco*, folders 12, 14, 18; *Confraternita e ospedale di S. Maria dei servi*, folders 10, 12, 14, 16; *Arciconfraternita e ospedale di S. Maria della vita (1200–1839)*, folders 38-40, 42, 44, 46, 48, 50; *Compagnia e orfanotrofio di S. Bartolomeo*, folders 147–153. [↑](#footnote-ref-14)
15. [http://www.gcpdfolderinfo/data.html](http://www.gcpdb.info/data.html) (last accessed on May 4, 2022). [↑](#footnote-ref-15)
16. ASBo, *Conservatorio di S. Croce*, folder 156; *Compagnia e orfanotrofio di S. Bartolomeo*, folders 147–153. [↑](#footnote-ref-16)
17. A. De Maddalena, *Prezzi e mercedi,* 388. [↑](#footnote-ref-17)
18. ASBo, *Confraternita e ospedale di S. Maria delle laudi poi S. Francesco*, folders 12, 14, 18; *Arciconfraternita e ospedale di S. Maria della vita (1200–1839)*, folders 38–40, 42, 44, 46, 48, 50; *Scappi-Ariosti*, folders 212, 214, 216, 218, 220, 222, 224. [↑](#footnote-ref-18)
19. A. De Maddalena, *Prezzi e mercedi,* 386. [↑](#footnote-ref-19)
20. ASBo, *Confraternita e ospedale della SS. Trinità*, folder 18; *Conservatorio di S. Giuseppe*, folder 33; *Arciconfraternita e ospedale di S. Maria della vita (1200–1839)*, folders 38–40, 42, 44, 46, 48, 50; *Compagnia e orfanotrofio di S. Bartolomeo*, folders 147–153; *Salina-Amorini*, folders 399–419; ; *Scappi-Ariosti*, folders 212, 214, 216, 218, 220, 222, 224. [↑](#footnote-ref-20)
21. [http://www.gcpdfolderinfo/data.html](http://www.gcpdb.info/data.html) (last accessed on May 5, 2022). [↑](#footnote-ref-21)
22. ASBo, *Confraternita e ospedale della SS. Trinità*, folder 18; *Arciconfraternita e ospedale di S. Maria della vita (1200–1839)*, folders 38–40, 42, 44, 46, 48, 50; *Confraternita e ospedale di S. Maria dei servi*, folders 10, 12, 14, 16; *Confraternita e ospedale di S. Maria delle laudi poi S. Francesco*, folders 12, 14, 18; *Conservatorio di S. Croce*, folder 156; *Conservatorio di S. Giuseppe*, folder 33; *Compagnia e orfanotrofio di S. Bartolomeo*, folders 147–153. [↑](#footnote-ref-22)
23. A. De Maddalena, *Prezzi e mercedi*, 396. [↑](#footnote-ref-23)
24. P. Malanima, *La fine del primato*, 200. [↑](#footnote-ref-24)
25. M. Rota and J. Weisdorf, ‘Italy and the Little Divergence in Wages and Prices: New Data, New Results’, *The Journal of Economic History,* 80 (2020), 931-60, 948. [↑](#footnote-ref-25)
26. *Ibid*. [↑](#footnote-ref-26)
27. For the conversion see the explanation of the silver value of the Bolognese *lira* in page one. [↑](#footnote-ref-27)
28. A. Guenzi, *Pane e fornai a Bologna in età moderna* (Venice, 1982), 64-8. [↑](#footnote-ref-28)
29. Municipal Archives of Milan (hereinafter, MAMi), *Materie*, folder 713, fos. not numbered. [↑](#footnote-ref-29)
30. A. Grab, *La politica del pane. Le riforme annonarie in Lombardia nell’età teresiana e giuseppina* (Milan, 1986), 100. [↑](#footnote-ref-30)
31. A. De Maddalena, *Prezzi e mercedi,* 379. [↑](#footnote-ref-31)
32. A. Martini, *Manuale di metrologia*, 349-67. [↑](#footnote-ref-32)
33. A. Martini, *Manuale di metrologia*, 206-11. [↑](#footnote-ref-33)
34. A.M. Pult Quaglia, *«Per provvedere ai popoli»,* 153-4. [↑](#footnote-ref-34)
35. O. Gori, ‘Mercato e prezzi del grano a Firenze nel secolo XVIII’, *Archivio Storico Italiano* 147 (1989), 525-623, 619-23. [↑](#footnote-ref-35)
36. L. Cantini, *Legislazione Toscana raccolta e illustrata dal dottore Lorenzo Cantini socio di varie accademie* (Florence, 1807), 87-8. [↑](#footnote-ref-36)
37. With the exception of wine—in our calculation it supplies 550 calories/litre—we used the relationship calories per kg/litre/unit adopted by Rota and Weisdorf (i.e., Allen’s): 2,450.5 cal/kg for bread, 2,498.85 cal/kg for meat; 8,183 cal/litre for olive oil; 3,790.4 cal/kg for cheese, 77.2 cal/unit for eggs, and 2,590 cal/kg for beans. [↑](#footnote-ref-37)
38. A.M. Pult Quaglia, *«Per provvedere ai popoli»*, 168. [↑](#footnote-ref-38)