*Appendix B*

Wages

The two main sources used in this paper for nominal wages are MAIC-DGS (n.d.) for the period 1862-1878 and MAIC (*ad annum*) for the 1905-1913 period. For the former case, we have collected, for all Italian provinces, but Parma up to 1873, the hourly wages of *terraiolo*, an unskilled worker in the construction sector employed for digging and transporting ground (*terraioli* can possibly be regarded as roughly equivalent to the English ‘navvies’). This source provides also information on the duration of the working day for each province and takes into account if the worker received food or accommodation as part of their salary. The *terraiolo*’s nominal wages MAIC-DGS (n.d.) refers to a single task and it does not change along the year.

The *Bollettino* (MAIC *ad annum*) reports data on wages in different locations within each province for *braccianti* (casual agricultural workers) and *salariati fissi* (permanent staff). We exclude these latter as money wages were only part of more complex wage packages, which included food, lodging and the right to cultivate some land, and because their tasks, such as tending cattle and monitoring, implied some additional skills. Likewise, we use wages for *braccianti* as a measure of the return to unskilled labor for sharecroppers and tenants – i.e. we assume that any additional income of these latter reflected the returns to other factors they supplied (e.g. capital and managerial skills). The *Bollettino* reports monthly wages by specific task – we have found more than one hundred different denominations, which we have collected in sixteen main tasks, plus a residual one.[[1]](#footnote-1) Most of these tasks related to specific crops (e.g. picking fruit) and/or were performed in some months only, while others, such as harvesting, were physically very demanding and thus were paid more than the others. On the other hand, it seems likely that wages were equal across products for the same task in the same month. Thus, the total return to unskilled work for the j-th crop can be written as

Wi = Σnij\*Aj\*wi (1)

where nij is the number of days of work in the i-th task necessary to cultivate an hectare of the j-th crop with the prevailing technology, Aj is the acreage in the j-th crop and wi the wage for the i-th task. The average daily wage for the province (or region or macro-area) would simply be the ratio of the sum of crop-specific returns to the total number of work-days

wT=Σ Wi/ ΣΣnij\*Aj (2)

Unfortunately, a large number of wage-data by province/month/job is missing from the BUL and thus a simple average of the available observations would yield a biased value for wi. As an alternative, we estimate the average wage as:

wT = R1911\* wO (3)

where wO is the wage in most common tasks (*lavori ordinari)* and R1911 is a region-specific ratio of total returns to wages in *lavori ordinari* in 1911. We interpret this coefficient as a sort of skill premium, which pertains to the task, rather than to the workers, as all peasants had the skill to perform any agricultural work (except grafting). We compute it for 1911 because of the coincidence in time with the population census (MAIC 1914-16) and of the publication of the data on acreage from the revamped agricultural statistics service (MAIC 1912). The use of a single coefficient R1911 implies that the crop mix and the technology had remained the same throughout the period. This assumption is clearly quite bold, but it can be defended by noting that these changes would affect also the demand for each task and thus the ratios between task-specific wages would include them.

As a first step, we compute yearly series of wages in *lavori ordinari* (wO) from 1905 to 1911 by province by averaging monthly data for the three most frequent tasks, spading, hoeing and ‘not otherwise specified jobs’, after adjusting for seasonality.[[2]](#footnote-2) Then we weight these data with the share of the province on agricultural workforce in the region from the 1911 Population Census (MAIC 1914-16) to get regional wages.

We compute the ratio R1911 as:

R1911= ΣΣ nij\*Ai\*wij / ΣΣ nij\*Ai\*wijO (4)

where the numerator and denominator differ only for the wage data (task-specific versus *lavori ordinari*). We consider four main crops (wheat, corn, rice and wine and olive oil), which jointly accounted for 47 per cent of the gross output of Italian agriculture (Federico 2000: Tab. 1), and the production of fodder. This latter absorbed most of the total work for cattle-raising, which accounted for an additional 12 per cent of the output: as said, milking and tending was performed by specialized permanent staff. We assume implicitly that the aggregate R1911 could be extended to the omitted products. We estimate regional coefficients to take into account the wide differences in technology and thus in labor input and in wages across regions.

We get data on acreage (Ai) from MAIC (1912). The source reports separate figures for *vigneti specializzati* (vineyards) and *promiscui* (intercropped vines), *oliveti specializzati* and *promiscui* (same for olive trees) and for three different types of meadows: *prati naturali asciutti* (meadows), *prati irrigui* (irrigated meadows) and *prati a vicenda and erbai* (rotation meadows). These different categories needed different amount of labor and thus we treat them as separate products in our estimation.

We estimate the number of days nij by crop and by region, combining the estimates of total labor input by Francesco Angelini (1937) with information on the number of hours for each task from a number of technical sources, roughly adjusting for the different dates of the sources[[3]](#footnote-3). We convert Angelini’s figures in number of hours into number of days by assuming a 8 hours’ workday, which was the standard of the 1930s. Angelini (1937) reports separate figures by gender, while some technical sources distinguish work with animals (oxen, horses), especially for ploughing, from standard work of day laborers. In these cases, we simply sum up the number of days for different categories and we value all of them at the current daily wage for male laborer. This latter is somewhat higher than the wage for women and children and much lower than the wage for laborers with animals, which includes the return to the capital in animals. Our procedure might introduce some bias relative to the ‘true’ labor cost, but any bias would affect both numerator and denominator and thus probably be small and anyway within the margin of error of the exercise. We estimate the labor input for intercropped vines and olive trees by reducing the number of hours in specialized cultivation with a region-specific coefficient ratio from Angelini (1937) and the ratio of yields in 1936-1938, the earliest computable ones with the official statistics.[[4]](#footnote-4) In most cases, our final estimates exceed the data from Angelini by 10-15 per cent, reflecting the labor-saving technical progress from 1911 to 1937. Again, any mistake would affect both sides of the ratio.

The work so described leaves a gap for the period 1879-1904, which we have filled by using different sources for different areas of the country. Since, as explained below, for this period we do not have information for all provinces, the estimation of the welfare ratio for each macro-area, and for the entire country, is based on the weight of the single province on the total of provinces for which we have collected data. It is worth noting that we have done some robustness checks on the potential bias due to this limited geographical coverage calculating the welfare ratio for the periods 1862-1878 and 1905-1913 by using only this limited set of provinces. Reassuringly, the series for Italy and for all areas, except Centre, are coincident with those computed by using the full sample.

 The wages series for the different macro-areas in the period 1879-1904 are calculated as follows.

*North-West*: we have collected agriculture yearly data of hourly wages for Mantua, Milano and Pavia from Paolo Albertario (1931) for the period 1881-1907 and for Novara from Pugliese (1908) for the period 1880-1905. Then we have compared these data, assuming that the working day was of 10 hours, with the ones constructed from MAIC (*ad annum*) for the same provinces for 1905-1907 and applied the resulting indexes of the mean of three years back to these series. Then, we have applied the regional values (Lombardy for Mantua, Milan and Pavia and Piedmont for Novara) of the “heavy tasks” to these series. For the years 1879-1880 we have interpolated these series with the ones from MAIC-DGS (n.d.). Moreover, we have collected daily wages data for Genoa from Felloni (1963) who provided a series of unskilled workers in constructions (*muratore manovale*) for the period 1815-1890. Since this kind of workers are slightly different from *terraiolo*, firstly we have compared the two MAIC-DGS (n.d.) series, those of *muratore manovale* and *terraiolo,* for the period 1876-1878, and then we have applied the three years average of the resulting index to the original series from Giuseppe Felloni (1963) for the years 1879-1890.

*North East*: we have collected agriculture yearly wages data for Piacenza from Parenti (1911) for the period 1880-1907. Then, we have compared this series, assuming that working days were 270 per year as calculated from MAIC-DGA (1876-79), with the one constructed from MAIC (*ad annum*) for the same province for 1905-1907 and applied the resulting indexes of the mean of three years back to this series. Considering that Piacenza (Emilia) cannot be representative of the whole North-Eastern area, we have estimated the wage’s series of Verona (Venetia) by assuming that the wages differences between Piacenza and Verona remained constant along the entire period. In particular, we have calculated the indexes of Verona’s wages in comparison to Piacenza’s wages for two periods: 1876-1878 and 1905-1907. Then, after having calculated the average of the two periods, we have applied to Verona the resulting value starting from Piacenza’s wages. Finally, we have applied the regional value (Emilia for Piacenza and Venetia for Verona) of the “heavy tasks” to these series.

*Centre*: we have collected yearly data for daily wages for Florence from Pierfrancesco Bandettini (1960) who provided a series of unskilled workers in constructions (*muratore manovale*) for the period 1819-1890. Since these kind of workers are slightly different from *terraiolo*, firstly we have compared the two MAIC-DGS (n.d.) series, those of *muratore manovale* and *terraiolo*, for the period 1876-1878, and then we have applied the three years average of the resulting index to the original series from Bandettini for the years 1879-1890. In order to fill the gap from 1891 to 1904, we have used data by Carlo Signorini (1906: 204), who presented wages trends, in benchmark years, in Tuscany for the period 1847-1904. We applied this to the series calculated from Bandettini (1957) starting from 1891 up to 1904.

*South*: we have collected data for Salerno for the period 1881-1907 (Bordiga 1910). Then we have compared these data with the ones constructed from MAIC (*ad annum*) for the same province for 1905-1907 and applied the resulting indexes of the mean of three years back to these series. Then, we have applied the regional values (Campania) of the “heavy tasks” to these series. For the years 1879-1880 we have interpolated these series with the ones from MAIC-DGS (n.d.). Then we have collected information on agriculture wages for all provinces of Calabria (Catanzaro, Cosenza and Reggio Calabria) for the period 1880-1895 from Francesco Arcà (1907). Moreover, we collected data about wages in different provinces (Bari, Campobasso, Chieti, Foggia, L’Aquila, Lecce and Teramo) from *Inchiesta Jacini* (data taken from Paola Maria Arcari 1936) for 1881. For these latter provinces, we calculate the wages for the years 1879-1880 by a linear interpolation and for the period 1882-1904 by applying the trend of the Southern provinces computed using data for Salerno and the three provinces of Calabria. Naturally, also in this case, we have applied the regional values (Abruzzi, Calabria and Apulia) of the “heavy tasks” to these series.

*Islands*: we have collected data for the following provinces: Caltanisetta, Catania, Girgenti, Messina, Palermo, Siracusa and Trapani from *Inchiesta Jacini* (as reported by Arcari 1936) for 1879 and from Giovanni Lorenzoni (1910) for the years 1883-1885 and 1906-1907. Then we have compared these latter data with the ones constructed from *Bollettino* (MAIC *ad annum*) for the same province for 1906-1907 and applied the resulting indexes of the mean of two years back to 1883-1885. Finally, we have applied the regional value for Sicily of the “heavy tasks” to these latter values. In order to fill the gap of the period 1885-1904, we apply the trend of the Southern provinces computed using data for Salerno and the three provinces of Calabria.

Prices

Our basket includes 13 different goods, plus rent, which, following Allen (2001), we add as a fixed 5% to the cost of the basket. We have estimated provincial prices for nine products, accounting on average for about the 95 per cent of the total cost of the basket. Only the *Bollettino* (MAIC-DGS *ad annum*)reports prices for (almost) all the 69 provinces for 1874-1896, and the other main source, MAIC (1914), for 43 cities for 1895-1913 – both with few gaps. The number of markets we have been able to collect from other sources (mostly MAIC-DGS 1886) varies by product from 5 to about 25-26. In both cases, we fill gaps with the average prices of available neighboring provinces.

1. *Bread*: prices are available for 1874-1896 from *Bollettino* (MAIC-DGS *ad annum*) and for 1896-1913 from MAIC (1914). For the period 1862-1873, we estimate bread prices from data on wheat prices on the basis of a ‘bread equation’, representing the relationship between bread and wheat prices in the period 1880-1896. We run the regression with prices of wheat and bread in the period 1874-1896 from *Bollettino* (MAIC-DGS ad annum) and we use the coefficients to extract bread prices from wheat prices in 25-27 cities, from MAIC-DGS (1886), Antonio Petino (1959) and I.nio Delogu (1959).

We include in the regressions year and provincial or regional dummies in order to take account idiosyncratic local factors or specific events affecting the price of bread. Our main estimates are reported in Table B1.

Our results show that the inclusion of more controls in the model, in order to capture specific local or temporal circumstances, produces a reduction of the coefficient of the wheat prices (as one would have expected).

*Table B1. The ‘bread equation’, 1880-1896*

|  |  |  |  |
| --- | --- | --- | --- |
|   | (1) | (2) | (3) |
| Price wheat | 0.682\*\*\*(0.0872) | 0.881\*\*\*(0.0251) | 0.485\*\*\*(0.0676) |
| Region dummies | Yes | No | No |
| Province dummies | No | Yes | Yes |
| Year dummies | Yes | No | Yes |
| Constant | 0.127\*\*\*(0.0293) | 0.136\*\*\*(0.00891) | 0.263\*\*\*(0.0234) |
| Observations | 1,130 | 1,130 | 1,130 |
| R-squared | 0.624 | 0.828 | 0.852 |

Note: the dependent variable is the price of bread. Standard errors in parenthesis. \*, \*\* and \*\*\* indicate levels of statistical significance of 1 per cent, 5 per cent and 10 per cent.

Allen (2001) has obtained a coefficient of transformation of the price of bread in kg. versus the price of wheat in kg of 0.9317. This is consistent with his own interpretation of his bread equation as a cost function where the bread price = cost of raw inputs + wages + rental costs of capital goods (assuming perfect competition in milling and baking). In his equation, wages and rental costs of capital goods are proxied by the wage of mason (which in turn proxies the income of a baker). Our equation does not include estimates for labor and capital costs. This, plausibly, explains the lower coefficient of transformations of our models. Our choice of adopting 0.485 as coefficient of transformation is also motivated by leaving some plausible ‘room’ for capital and labor costs if one would like to interpret the bread equation as a cost function.

2. *Corn*: prices 1862-1873 from MAIC-DGS (1886) for 17 cities, 1874-1896 from *Bollettino* (MAIC-DGS *ad annum*) and from 1897 to 1913 from *Il Sole* (*ad annum*), the leading Italian commercial newspaper, for 13-15 cities.

3. *Beef*: prices 1862-1873 from MAIC-DGS (1886) for 5 cities, 1874-1896 from *Bollettino* (MAIC-DGS *ad annum*), second quality, and 1897-1913 from MAIC (1914).

4. *Wine*: prices of second quality for the period 1862-1873 is from MAIC-DGS (1886) for 5-7 cities, for 1874-1896 period from *Bollettino* (MAIC-DGS *ad annum*) and for 1897-1913 from MAIC (1914).

5. *Olive oil*: prices from 1862 to 1873 for 10-12 cities, from MAIC (1886), Bandettini (1957) and Petino (1959)

6. *Butter*:prices 1885-1889 from *Il Sole* (*ad annum*) for 9-12 cities, 1890-1913 from MAIC (1914). We extrapolate the 1885 prices backwards to 1862 with price of butter from ISTAT (1958).

7. *Eggs*: prices 1897-1913 from MAIC (1914), extrapolated backwards to 1862 with price of eggs from ISTAT (1958).

8. *Fava beans*: We use the nation-wide data (Istat 1958) adjusted on a regional basis with data on prices in the 1850s for Florence (Bandettini 1857), Cagliari and Sassari (Delogu 1959) and Rome (Pinchera 1957). We assume that regional differences remain constant along the period.

9. *Firewood*: 1881-1896 from Bollettino (MAIC-DGS *ad annum*), extrapolated backwards to 1862 and forward to 1913 with prices from ISTAT (1958).

We obtain nation-wide prices for other three other products (soap, candle and lamp oil) from Istat (1958, Tab. 96 and 97). We estimate the price of (five meters of) cotton cloths for 1870-1913 adjusting the price of cotton yarn from Cianci (1933) with data of length per unit of weight from Bankit-FTV dataset on Italian trade. We extrapolate the price of cotton yarns from 1870 to 1862 with the price of raw cotton in the United Kingdom from Mitchell (1988).

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1. The tasks are *Lavori non qualificati* (not otherwise specified jobs), *lavori di scasso* (digging), *aratura* (workers only) (ploughing), *concimazione* (manuring), *vangatura* (spading), *zappatura* (hoeing), *potatura* (pruning), *innesti* (grafting), *semina* (sowing), *falciatura* (mowing grass), *cura della vite* (tending vines), *sarchiatura* (weeding), *mietitura* (harvesting), *trebbiatura* (threshing), *fienagione* (haymaking), *vendemmia* (harvesting grapes), *raccolta frutti* (picking fruits) and *lavori nell’orto* (gardening). We collect all minor tasks in a residual category *altro* (other). It is worth noticing that the 1913 figures refer to the first half of the year and thus are less accurate. [↑](#footnote-ref-1)
2. As many observations are missing, we obtain our monthly data for *lavori ordinari* as average of the three tasks. However, considering that we do not always have information for all months for all provinces, we have estimated an index of seasonality at macro-area level. Indeed, it is worth noticing that there are significant differences in agricultural wages in different seasons: summer and spring wages are higher than those for autumn and winter. Thus, we have constructed an index, for each macro-area, by estimating the ratio between the average value of each month and the yearly value. When for a province we have missing values for some months, we applied the monthly index of seasonality of the macro-area. [↑](#footnote-ref-2)
3. We use for wheat and corn Abeni (1870), Bordiga (1907), Cuppari (1870), MAIC (1905), Comizio Agrario di Bologna (1880), Muzi (1882) and Niccoli (1898); for wine Bordiga (1907), Cuppari (1870), MAIC (1905), Ottavi and Marescalchi (1898), Ottavi and Marescalchi (1907), Ottavi and Marescalchi (1909) and Rigotti (1931); for olive oil Bordiga (1907), Caruso (1885), Cuppari (1870), MAIC (1905) and for meadows Abeni (1870), Bordiga (1907), Cuppari (1870), MAIC (1905), Comizio Agrario di Bologna (1880), Muzi (1882) and Niccoli (1898). We use MAIC (1905) only for the division of total number of days among the different tasks because the total number of hours appears heavily overvalued: for instance, it reports a total of 642 days of work per hectare of wheat for the province of Lecce vs. a region-wide average of 37 days according to Angelini (1937). [↑](#footnote-ref-3)
4. These ratios are 0.70 Abruzzi, 0.60 Liguria and Apulia, 0.50 Piedmont, Campania and Basilicata, 0.25 Tuscany, Marches, Umbria and Latium, 0.20 Lombardy, Venetia and Emilia, and 0.15 Calabria, Sicily and Sardinia for wine, and 0.5 in Tuscany and Basilicata, 0.33 Liguria, Venetia, Abruzzi and Sicily, 0.25 Lombardy, Marches, Umbria, Campania and Calabria, 0.1 Venetia and Sardinia for oil. [↑](#footnote-ref-4)