PAOLO MALANIMA

An Age of Decline. Product and Income in Eighteenth-Nineteenth Century Italy

An age of recovery from the deep crisis of the seventeenth century and slow progress towards industrialization and development. This is more or less the view held by most scholars on the eighteenth century Italian economy.[1] In their opinion, at this time population began to increase again after a long period of stagnation and decline. This demographic growth was paralleled by progress both in agriculture and the industry. Sea and land trade networks expanded. During the Enlightenment, according to this standard view, in Italy as in all of Europe, the foundations were laid for a new age of progress not only for the economy, but also for culture and politics. In the eighteenth century, most scholars claim, Italy, after remaining confined to a peripheral position in Europe ever since the beginning of the seventeenth century, finally took the path towards the modernization of its economy and society.

If we look at the economy from an aggregate viewpoint, we cannot but subscribe to this widely accepted opinion. When, as in eighteenth and nineteenth-century Italy, population rises as never before, from 13 million inhabitants in 1700 to 26 million in 1861, agriculture, industry, and services cannot but grow accordingly to support the demographic rise. What else can we expect? The viewpoint, however, changes drastically if we look at the same economy from a per capita perspective. To the question if the average Italian was actually enjoying, in those two centuries, an increase in his/her income and consumption the answer can only be negative. From the middle of the eighteenth century to the country's belated start of modern growth, at the very end of the nineteenth, Italy's growing population faced lower per capita incomes than before. The standard of living

RIVISTA DI STORIA ECONOMICA, a. XXII, n. 1, aprile 2006

kept worsening from 1750 onward, with short-term respites, until some decades after the Unification.[2]

In past agricultural civilizations, people looked at the wealth of a country rather from an aggregate than a per capita viewpoint. An increasingly populous state was regarded, for that very reason, as prosperous and powerful. Our modern economic perspective is different. Today, we speak of growth when production increases faster than population and, as a consequence, the population enjoys increasingly high incomes. Conversely, we speak of decline when the opposite happens, i.e., per capita income is stagnating or diminishes in either absolute or relative terms. In this perspective, we can actually speak of an «eighteenth-century crisis» in Italy.[3]

In the following, I will look at the Italian economy from the modern per capita perspective and try to put some order in the dispersed and contradictory quantitative evidence from the eighteenth and nineteenth century. At the moment we lack a reliable annual price index; wage movement is known superficially; production has been recently reconstructed, but only for the Centre and North and not yearly for the whole period we are dealing with here. Although some scattered time series have been provided by past historians, no attempt has yet been made to collect this information and complete it with original research on archival sources.

I will start with the movement of wages. I will present complete series of wages from 1700 until 1861 – partly based on unpublished archive documents (§ 1) – for both northern and southern Italy, and both the industrial and agricultural sectors. Continuous annual series for this long period have never been compiled before.[4] I will then try to derive from these series an estimate of the Italian product, both per capita and aggregate, in the eighteenth and nineteenth centuries. I will then link this estimate to the series on product in post-Unification Italy until 1913 to obtain a long-term outline (§ 2). It will thus be possible to follow the movement of the Italian economy over two centuries, highlighting Italy's eighteenth century decline and slow late nineteenth century recovery. I will try to model and explain this long phase of the Italian economy in the last paragraph (§ 3). The old and new materials on which I have based this new perspective on the Italian economy are presented and

commented in the appendix, together with the statistical methods I employed.[5]

1. *Wage rates in northern and southern Italy*

The period we are dealing with was characterized by a relatively fast population growth on a world scale. In Italy, population had reached the low level of about 10 million people after the last serious plague epidemic, which had struck the South in 1656-57. From then on population began to rise. At the start of the new century it was 13.6 million; it surpassed 15 million in the mid-1730s; by the end of the century it was 18 million; at the time of the Unification 26 million; in 1900, 33.3 million. The growth rate accelerated especially after the mid-1820s (Fig. 1).[6]

From the 1730s onward, this demographic rise was accompanied, in Italy as in the rest of Europe, by an upward trend of prices (Fig. 2).[7] From that time to 1790-1820, prices approximately doubled. After 1820 they leveled off for about 30 years, to increase again between 1850 and 1880. During the so-called «agrarian crisis» of the 1880s, prices diminished and stabilized at a relatively low level until World War I.

Nominal wage rates[8] stagnated in the North until the end of the eighteenth century, to slightly recover thereafter. They were unable, however, to catch up with the rising trend of prices (Fig. 3).[9] Wage rates diminished dramatically, especially after 1760. In 1800-20, masons' real wage rates in Milan were half what they had been a century before. The same rate of decline is documented, in the North, for wages in Florence, Venice and Genoa,[10] which show a high correlation with the wages in Milan. The 1760-1820 drop did not affect only the industrial sector, but agriculture as well, although not in the same measure.[11]

Southern Italian wages show more or less the same trend (Fig. 4).[12] From the 1760s until the last years of the century they declined, both in the cities and countryside, by about 50 percent; by much more if we compare them to 1700-05 levels. The abundant published material concerning rural wage rates in Apulia confirms this trend.[13]

The correlation of wage rates in North and South Italy, although deflated by means of different price indices (based, respectively, on prices in Milan and Naples), is higher than

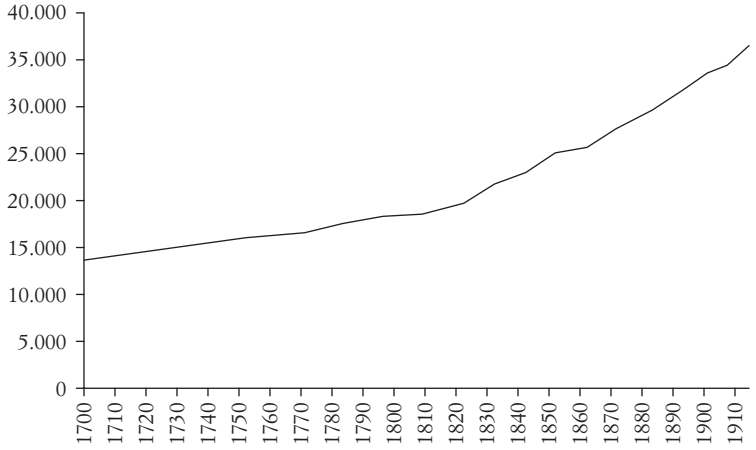

FIG. 1. Italian population 1700-1913.

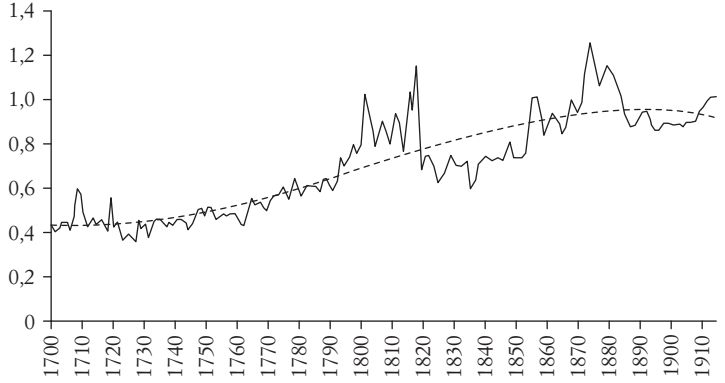

FIG. 2. Consumer price index Italy 1700-1913 (1911 = 1).

one would expect given the low market integration of the two areas. The coefficients of correlation between our northern and southern series are: 0.77 for price indices, 0.75 for building wage rates, and 0.63 for agricultural wage rates.[14] In the South, however, rural wages fell more than in the North.[15]

A recovery took place after 1820. While prices diminished, the levels of real wages gained about 20 percent between 1820 and 1835. This was a European phenomenon,

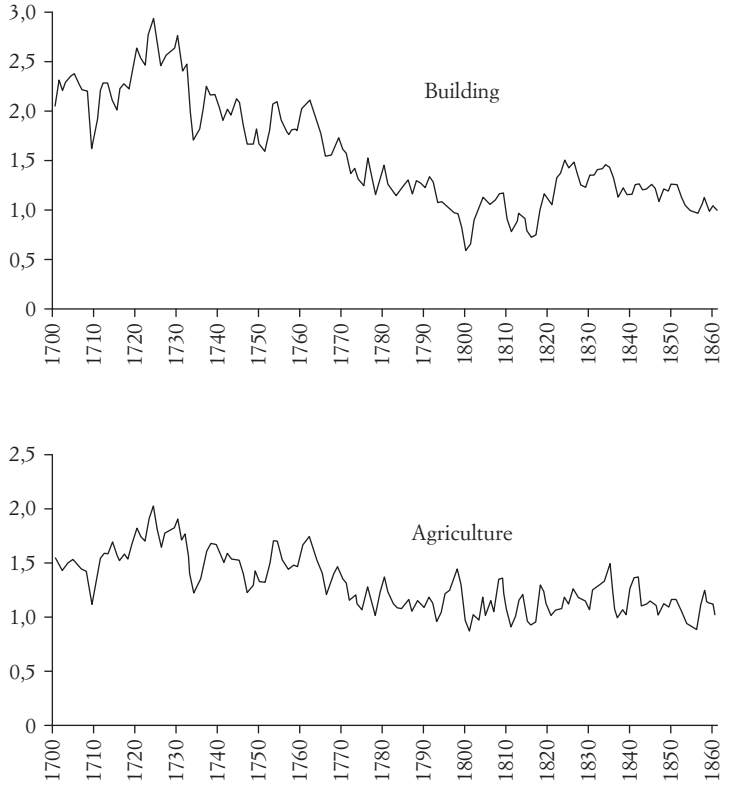

FIG. 3. Real wages in building and agriculture (North 1700-1861) (1861 = 1).

not just an Italian one.[16] Indeed, it marked the start of the European modern growth. Unfortunately for Italian workers, this happy season only lasted some 15-20 years. From 1835 on, wages began to diminish again. Population growth was intensifying, as the discontinuity in the slope of the demographic curve clearly shows. In the same period, agricultural production was undermined by bad cereal harvests (especially in 1836, 1846 and 1853) and, from the late 1840s on, by silkworm and vineyard diseases which brought on a true collapse of these two staple agricultural products for about 15 years.[17] In 1861 Italy, the wage level was the same as at the beginning of the century.

Given the similarity of wage trends, one can obtain a clearer aggregate view by building, at first, two distinct series of wages, one for the North, the other for the South,

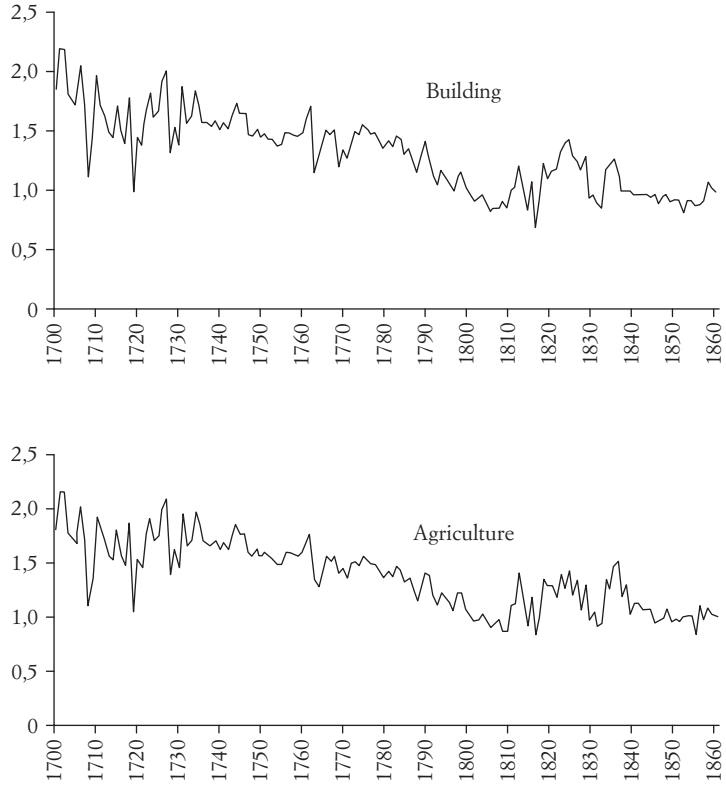

FIG. 4. Real wages in building and agriculture (South 1700-1861) (1861 = 1).

and then combining them into a single series, taking account of the relative size of population in each area.[18] Since for the post-Unification period we have the series developed by S. Fenoaltea,[19] both for agriculture and the industry, and V. Zamagni's research on Italian wages,[20] we can compile a single series representative of the country as a whole from 1700 until 1913. Drawing on Fenoaltea and Zamagni's series, one can put together a long series of hourly wage rates for Italy as a whole (Fig. 5).[21] There is no doubt that a national series conceals the many regional differences existing in a country which reached national unification at a very late date, and still showed remarkable diversities in the annual price movement in different regions in the first half of the nineteenth century.[22] A national series provides, however, a simplified long-term aggregate view of a trend that

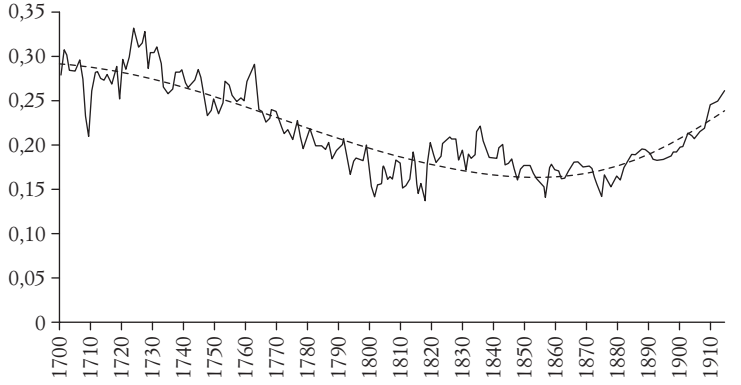

FIG. 5. Per hour real wage rates (1911 prices).

was similar in the different regions of Italy. This comprehensive outline clearly highlights the long-term phases described above. We see the strong eighteenth century decline.[23] The 1820s mark a change. A low level is reached again from 1835 to the end of the 1870s. A more favorable age for Italian workers only began in the 1880s,[24] thanks to the drop of agricultural prices during the so-called «agrarian crisis» and the growth of the secondary sector. After a long age of decline, wage rates rapidly recovered. Only thereafter did the trend remain constantly upward. On the eve of World War I, however, wage rates (but not wages) were still lower than two centuries before.

It is hard to make international comparisons of price and wage levels before relatively recent times. Those proposed by J.L. Van Zanden[25] and R.C. Allen[26] are first attempts to proceed in this direction. Italian wages closely followed the European downward trend until the beginning of the nineteenth century.[27] Yet the loss of workers' purchasing power was higher in Italy than in central and especially northern Europe. At the start of the eighteenth century, Italian workers still enjoyed high wages in a European perspective. It was no longer so at the end of the century (Tab. 1).[28]

As we can see, compared to the North European experience, Italian workers lost buying power in both relative and absolute terms. The width of this gap did not change during the following century, as a comparison of 1800-50 and 1905 wages bears out.

TAB. 1. *Masons' wage rates in some European cities and countries between 1700 and 1905 (London and Great Britain = 100)*

	1700-50	1800-50		1905
Antwerp	100	87	Belgium	6
London	100	100	Great Britain	100
Leipzig	57	56	Germany	67
Paris	58	74	France	66
Florence	84	44	Italy	40

On the whole, the trend of Italian wages from 1700 and 1913 shows a long-term decline until 1817, relative stability from 1818 to 1874, and finally a late recovery at the end of our series.

2. *From wages to GDP*

Wage trends inform us only on the incomes of a part of the population, the labour force. The decline in wage-rates we observed above, however, cannot but be associated with a negative performance of the economy as a whole and, hence, with a decline of product. A country cannot be prosperous and happy, Adam Smith wrote, if the majority of its population, the wage earners, are poor and miserable.[29]

On the other hand, however, non-labour incomes can rise while labour productivity, and hence wages, are falling. The growth of rents, profits and interests can counterbalance a decline of labour incomes. Besides, we only know the wage rates-not the actual wages-of workers in pre-modern societies. The wage trend may be different.[30] We could suppose that, when labour productivity diminishes, many forces are set in motion to offset the decline. The working population begins to work longer hours per day to stabilize its daily income. Children and women enter the labour market to contribute to their family's income, or work harder than before. What we are looking at could be called intensification of labour through increasing self-exploitation. This also applies to land. Every hectare is exploited more and more intensively: a true «land intensification» occurs.[31] In both cases, time and land are exploited not *better*, with more efficient tools and technologies, but merely *more*.

To estimate per capita product from series of wages, we have to calculate the following equation:

$$y = t \cdot w \cdot h \cdot \frac{1}{q} \quad (1)$$

where:
y per capita GDP;
t the ratio between the labour force and the population;
w the average wage rate (per worked hour or day);
h hours (or days) worked per year;
q the ratio of labour incomes to the GDP.

My purpose is to compile a yearly series of GDP spanning the 1700-1861 period. At the moment we have, for this same period, two estimates of the per capita GDP in Italy: one provides decadal data until 1860-70, while the other presents graphs with annual figures, but stops at 1800.[32] Furthermore, both series regard only the Centre and the North.

These two series begin in the fourteenth century, and have been calculated using different methods. Both the trend and the levels are quite similar, especially for the period we are dealing with, viz., the eighteenth century. I will use the decadal series to estimate two parameters (q, h). This will also be a means of checking its reliability.[33]

Among the parameters of the equation, w is already available: it is the wage rate per hour mentioned above.[34] So now we must estimate t, q and h.

The parameter t (the quota of the labour force on the population) can be established directly. For the first decades after the Unification, the structure of the Italian economy was basically the same as in the previous centuries. It was still mainly agrarian, with a 60-70 percent of the labour force employed in the primary sector and 50-55 percent of total GDP produced in agriculture. The overall labour force has been estimated to have amounted to 59 percent of the population in 1861, with a declining trend in the following decades. It was, in fact, 49 percent in 1901 and 47 percent in 1911.[35] We lack estimates for the centuries before the Unification. However, a comparison with the age distribution of populations with the same high mortality and birth rate as Italy indicates that the working population – i.e., between 15 and 65 – amounted in all likelihood to about 60 percent of the total.[36] This is precisely the percentage documented for the 1861-81 period in Italy, when the demographic structure must have still been the same as in the previous centuries.[37] Yet, the percentage of the population actually working could have been different, as is often the case. We

must exclude from this estimate members of rich families, people unable to work, and part of the women. We would have to add, however, working people younger than fifteen and older than sixty-five. A plausible conclusion is that in many pre-modern societies like Italy it is reasonable to assume a labour force amounting to about 60 percent of the population.[38] Unemployment existed in traditional as well as modern economies, especially in towns; however, in traditional economies the overall working time depended much more on the number of working hours per worker than on the expulsion of some workers from production.

In modern growth statistics, the parameter q is often assumed to be 0.70. We do not know, however, what percentage of total GDP aggregate wages represented in pre-modern times. Using pre-existing decadal estimates for y and the gross product, it is possible to evaluate the ratio of wages to GDP. We need, first of all, to compute the equation of the production function in relation to the labour force, assumed to be 60 percent of the population. Then we can calculate the marginal product of labour on a yearly basis and divide it by the gross product, solving the following equation:

$$\frac{MP_L \cdot L}{AP_L \cdot L} = \frac{MP_L}{AP_L} \tag{2}$$

Where AP_L is the average product of labour (which, multiplied by the number of the workers L, gives the total product Y), and MP_L the yearly marginal product calculated as the derivative of Y as to the number of workers L.[39]

This calculation yields an average of 0.70 between 1700 and 1861: more or less the same as in our developed economies. While during the eighteenth century it was about 0.75, it diminished to about 0.60 in the first half of the nineteenth.

To compute h, equation (1) may be transformed into the following:

$$h = \frac{y}{w} \cdot \frac{q}{t} \tag{3}$$

The results, although inevitably approximate, are nevertheless plausible. From 1700 to 1750, working time hovered in the range of 2300-2500 hours per annum. By the end of the century it rose to more than 3000 hours. It decreased to

2300-2400 in the 1830s-40s, and then rose again to 2600 in 1860.[40] The trend of working time describes a general movement towards the intensification of labour. People worked less at the beginning of the eighteenth century than later. To counterbalance diminishing wage rates, people began to work harder and harder every year. Only around the middle of the nineteenth century was there a decrease in working time, probably because of the drop in capital per worker due to the diseases of the silkworms and vineyards.

This estimation coincides, in its last part, with the available first-hand data for the 1880-1913 period. We know that back then average industrial labour time amounted to just short of 3000 hours per worker per year (in the industry, 10 hours per 6 days per 49 weeks).[41] As to working time in agriculture, it varied with the seasons. An average of about 2500-3000 hours does not seem implausible for the same period. After all in Italy there are ca. 5000 daylight hours in a year, and first-hand evidence from investigations[42] on peasant families and their work from the 1880s to 1938 indicates that 3500 and sometimes even 4000 working hours per year were far from exceptional, even for women and children.

On the basis of the above calculations, I developed an annual GDP series from the wage rate series presented above. I then tested the results using two different methods.

My first test consisted in assuming different plausible values for q and h, so as to define a range of potential solutions (Fig. 6).[43] The intermediate estimate, corresponding to the thick line in the graph, is the one I have chosen. Obviously, other solutions would be possible, but the overall trend would remain more or less the same, with relatively small changes in the slope.

I then tested my reconstructed 1700-1860 GDP series by applying a linear regression of per capita GDP in 1835-60 on the wage rates. I used the resulting equation[44] to construct a GDP series for the subsequent 1861-1913 period. To control the correlation with a series built on direct data, a GDP series was utilized for 1861-1913 incorporating the recent revision of the Italian GDP in 1891 and 1911 by G. Federico, S. Fenoaltea and V. Zamagni, G. Federico's still partial data on agriculture in 1861-1913, and S. Fenoaltea's almost final results on industry.[45] The correlation between direct data and my estimates based on the regression is quite high: 0.92. After these tests, I merged the yearly per capita GDP series in 1700-1861 with the 1861-1913 GDP series (Fig. 7).

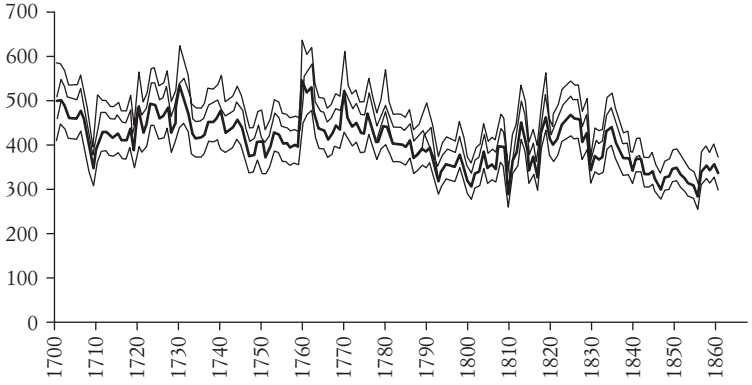

FIG. 6. Per c. GDP simulations 1700-1861 (1911 prices).

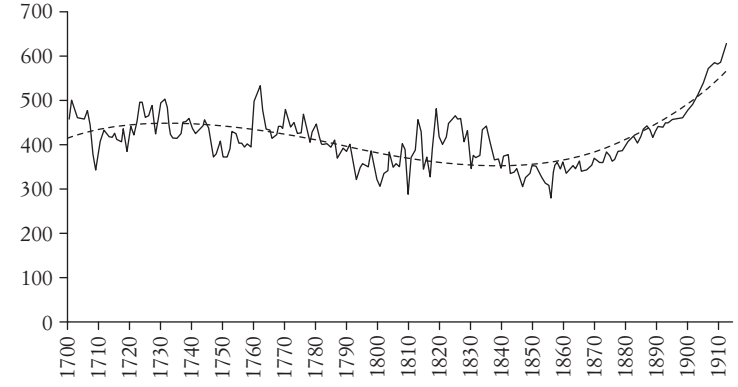

FIG. 7. Per c. GDP in Italy 1700-1913 (1911 prices).

The resulting series shows, first of all, that the data on the Italian product paint a less gloomy picture than wage rates. There were forces in motion – notably longer working hours and the rise of non-labour incomes – capable of counterbalancing the strong decline in wage rates. Although the decline I spoke of above is still evident, on the whole until the end of the nineteenth century variations oscillate within the relatively narrow range of 300 and 500 1911 Italian lire. Thus, the lowest values are about 60 percent of the highest. The 300-500 lire range was surpassed only in 1903, under the impulse of the economic spurt begun in the 1880s. Wage

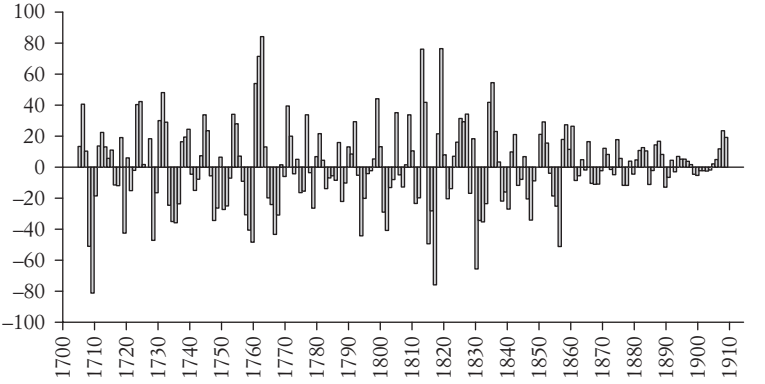

FIG. 8. Deviations of per c. GDP from the trend 1700-1913 (absolute values).

rates were lower in 1913 than in 1700, but not per capita product; which is consistent with what we know about the modern Italian economy. The trend declined from the 1760s until 1817, then a recovery took place, followed by a new decline to especially low values at the middle of the century. In 1854, 1855, and 1856, because of bad cereal harvests and a fall of wine production,[46] values sank back down to the 1790-1817 levels. Immediately before and after the unification of Italy, per capita product was 40 percent lower than it had been in 1730-40. It would also be possible to read the graph of per capita GDP as saying that the eighteenth century crisis, begun in 1760, knew a momentary respite in the prosperous 1820s and early 1830s, then continued until the 1880s.

Some key features of this time series stand out when we look at the short, medium and long run:

1. The volatility of our values around the trend sharply diminishes from the end of the 1870s onward, due to the lower variability of the price index (Fig. 8).[47] Once the trend is removed, we can see that the variance of the series diminishes and the curve is smoother and smoother.[48] A true regime shift is taking place.

2. The data on per capita GDP show, much more clearly than those on wage rates, that there were three 50-year cycles: the first from 1709 to 1752; the second from 1752 to 1801; the third from 1801 to 1856. After 1856 the curve does not show clear-cut 50-years cycles any more.

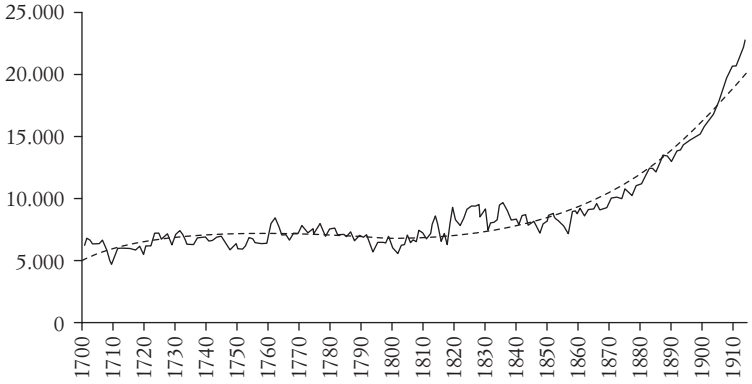

FIG .9. GDP in Italy 1700-1913 (1911 prices).

3. The best interpolating curve is provided by a third degree equation which describes the long decline and the late exponential spurt from the 1880s on.

Since the increase in population was accompanied by a lower per capita product, the result was a higher long-run stability of the Italian gross product compared to per capita income (Fig. 9). In aggregate terms, the point of trend inflection is in the 1820s and not the 1880s.

We could summarize both curves – per capita and aggregate – by saying that the gross product of the Italian peninsula was growing slightly, on the eve of modernization, although the work of each individual was less and less productive, and per capita income and product were very low. A clear turning-point can be perceived only starting from the 1880s.

3. *The theory of growth and the Italian decline*

Until now we have examined separately changes in population, prices, wages, productivity, and product. The next step is to merge all these changes and their relationships in a single model in order to explain the Italian decline and late recovery.

Neoclassical models of growth are especially concerned with capital formation in relation to the exogenously assumed rate of population growth. Although they have never been used to clarify pre-modern growth patterns, they can help reach a better understanding of traditional, agricultural econ-

omies. To work for pre-modern traditional societies, however, these models need some adapting.[49] In these societies, the central variable is not capital formation – which is a constant share of the total product, usually about 3-5 percent[50] – but the demographic growth rate. Thus, I have modified the standard growth theory, as illustrated below. These changes especially concern the role of demographic movement. For simplicity's sake, we can assume that the system is composed of just one sector producing one commodity (cereals, for instance), and that product, consumption, and capital are expressed in calories. The introduction of money would make the model more realistic but, at the same time, more complicated. Such simplified assumptions are quite common in the literature on the subject.[51]

The starting point is the production function:

$$Y = f(L, K)$$

where the product (Y) is a function of labour (L) and capital (K). The intensive form is derived from the production function by dividing it by K. While ordinarily, in growth theory, capital is the nominator, here it is the denominator:

$$\frac{Y}{K} = f\left(\frac{L}{K}, 1\right)$$

The intensive production function is presented in the following graph (Fig. 10). The symbols indicate:

Y/K the product in calories (Y) of capital (K), including in capital agricultural land;

L/K the ratio of labour force to capital (the labour force is assumed here to be equal to the total population);

$Y/K=f(L/K)$ the product (in calories) of capital is a function of the ratio of L to K (the curve is concave towards the horizontal axis because of diminishing returns to labour). Since the slope of the curve declines, the marginal product of labour – wages – declines as well: as soon as the ratio L/K rises, marginal labour productivity falls. Per capita product decreases at the same rate;

$c(Y/K)$ is consumption: a fixed percentage of the product of capital. It is used to keep the population alive and replace capital depreciation. I assume that demographic movement depends directly on consumption, and population is hence an endogenous variable;

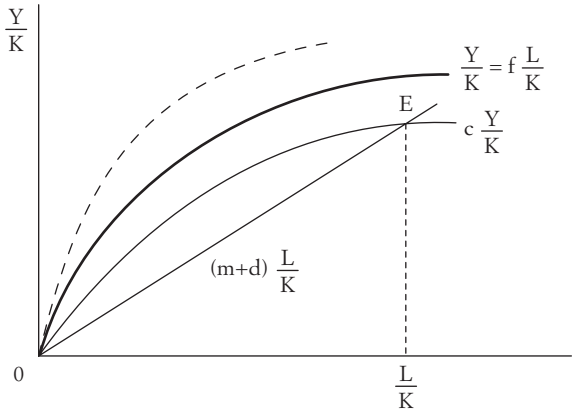

FIG. 10. Production function.

$(m+d)L/K$ m is the value (in calories) of the minimum basket required to support the population, and d is the annual capital depreciation. This straight line cannot move since both the basket and capital depreciation always represent the same quantity of calories. Along this line, the system can reproduce itself, not grow. It can only provide for needs and turn out the same quantity of product year after year. Ordinarily, however, the potential for consumption $c(Y/K)$ exceeds the straight line of simple reproduction and population can grow.

The difference between curves Y/K and $c(Y/K)$ is the annual potential for capital formation beyond depreciation. It is the difference between product and consumption. We could call it surplus. This surplus may be transformed into capital, but not necessarily. It can also be employed in non-productive ways (to feed priests, dancers, warriors...).

Whenever the curve of consumption is higher than the straight line of survival, population rises; the number of workers as a ratio to capital (L/K) increases as well. Capital per worker hence diminishes, as does the productivity of labour, as the derivative of Y/K to L/K. At E, consumption is barely sufficient to support the population. The system can reproduce itself without any growth. Beyond E, the actual rate of consumption allowed by the level of production is lower than the survival line plus depreciation. In this case, forces are set into motion which push population back towards equilibrium at E. These forces are diseases, epidem-

ics, famines. The increase of the mortality rate re-establishes the equilibrium. In the classical version of this model, population depends on the potential for consumption offered by the economy. The economy and the degree of technical advancement define the production frontier (*Y/K* curve in our graph).

The demographic movement and its relationship to the economy deserve special attention. The growth of population beyond carrying capacity, or the decrease of production and, hence, income, does not necessarily result in a decline of population. A decline becomes, however, more and more probable whenever the actual consumption approaches the line of simple reproduction. Changes in the rates of mortality, nuptiality, and fertility allow the reciprocal men-resources adaptation. The alternative means to reestablish the equilibrium is an outward displacement of the production frontier. This, however, was not often feasible in past agrarian economies.[52] For several centuries, or even millennia, the technical basis of these agrarian economies, particularly in the key agricultural sector, did not undergo any sudden change. The technical production frontier was moved forward only from the nineteenth century on, as part of the changes brought on by the transition to a new energy system. This does not mean that technical change did not exist in the traditional agrarian world, but only that the technological basis of the economy was stationary. Innovations were more frequent in secondary and tertiary sectors than in agriculture. The growth of the system was ultimately hampered by the technological immobility of the primary sector, which set a threshold to the potential for economic expansion.

In past agrarian societies, population size was always influenced by the instability of agricultural production, mainly depending on adverse meteorological events. In cases of scarce crop yields, the *Y/K* and *c*(*Y/K*) curves move to the right, and population decline results. Intensification, a typical feature of pre-modern agrarian economies, was the usual method employed to counterbalance this movement. The *Y/K* curve then moves to the left. This displacement implies the displacement of the consumption curve (a stable percentage of *Y/K*) and the displacement to the right of the intersection with the survival line. Population can grow. The scope for intensification, however, is limited by a stable (or relatively stable) technological frontier.

In sum, we can say that:

– whenever the economy moves toward the right, capital per worker, labour productivity, and per capita GDP diminish while the *L/K* ratio rises;

– whenever the system moves to the left, capital per worker, labour productivity and per capita GDP grow. The *L/K* ratio diminishes either as a consequence of the decline in *L* or the increase in *K*.

Now what does this model say about the movement of the Italian economy in eighteenth and nineteenth centuries? Is it possibile to clarify through it the working of the economy during epochs of decline? Can the theory of growth tell us something interesting about decline in past societies?

In the sixteenth and seventeenth centuries, Italy had what we may define as a mature economy.[53] Italy possessed then the array of technical knowledge that characterized past agrarian societies.[54] After all, there were very few meaningful technological advancements capable of drastically modifying the agricultural output. The most significant were the spread of the mulberry tree from the South towards the Centre and North beginning in the late Middle Ages, and the arrival of maize in the late sixteenth century. For a long time, urban innovations in industry, bank and trade since the late Middle Ages gave the Italian economy an advantage over those of the rest of Europe. This advantage, however, was gradually eroded during the early Modern age, as soon as these innovations spread from Italy towards other European regions. Knowledge is a free good. Everybody can take advantage of it.

At any rate, at the beginning of the eighteenth century, the 13 million inhabitants of Italy, 15-20 percent of whom lived in towns,[55] enjoyed the living standards and prosperity of a mature agrarian civilization. Northern European societies were not wealthier than Italy. Urbanization is an important indicator of labour productivity in agriculture as well as industry and trade. In 1700, Italy was more urbanized than Western Europe as a whole, and as much as England; its rate of urbanization being second in Europe only to that of The Netherlands.[56]

It should be noted that, from the mid-fourteenth century onward, plagues contributed significantly to Italy's high living standards. Plague mortality is not directly connected with economy, since it does not depend on deteriorating living standards. It is not food scarcity that causes plague epidemics. Population growth, however, resulting in consumption ap-

proaching the survival line, and increasing density, especially in towns, was conducive to a worsening of hygienic conditions, and hence increased probabilities of infection. Thus, when the Italian population approached point *E* of our model, as in the first half of the fourteenth century and the late sixteenth, it was hit by severe mortality crises. In both cases the population was about 12-13 million.

Things began to change in the last decades of the seventeenth century. Plague disappeared and a sudden population surge bore down on the agricultural economies of the World. The Italian population – which since the late Middle Ages had barely exceeded 13 million inhabitants, and for 1700 years had remained in the range between 7 and 15 million[57] – doubled from 1700 to 1861.[58] As a consequence of this demographic rise, in the model the economic system moved towards the right. This means that capital per worker decreased and so did the slope of the *Y/K* curve. The consequence was a drop in marginal productivity, wage rates, and per capita income. The productivity per unit of capital, on the vertical axis, increased, but its rate of increase diminished year after year.

The diminution of temperatures in the second half of the eighteenth and the first two decades of the nineteenth century is likely to have contributed to the worsening of living conditions.[59] Italy, over 40 percent of whose surface is hill country, was hit especially hard by the temperature drop, which made it more difficult to grow crops on high land. The reduction of agricultural surface tended to depress the production potential and, since the product curve was moving rightward, the intersection of the consumption curve and the line of survival in *E* was moving in the opposite direction. The movement was intensified by the reduction of capital – i.e., arable – per worker on the hills. The worst period was between 1790 and 1817, when rainfall also significantly diminished.[60] The average stature of people born in those years was a few centimeters lower due to lower caloric intake.[61]

At the same time, there were some important changes which counterbalanced the rightward movement of *L/K* under the push of demographic growth. These were:

– The spread of maize. The yield of maize was twice that of wheat and traditional cereals. Since its price was half the price of wheat, the product expressed in money did not increase. Our product curve is, however, expressed in calories,

and hence moves to the left. This means that a denser population was now compatible with the agricultural production capability. The intersection in *E* moved further to the right and the consequences were lower productivity, lower wages, and lower per capita incomes;

– Intensification. People began to work more hours a day both to increase the per hectare product and to exploit new possibilities of income such as protoindustrial activities.[62] Among these activities, the silk sector was especially prominent. Silk throwing and silk manufacture spread rapidly in the Po Valley.[63] Many other collateral activities, including metallurgy and straw manufacture as well as textiles, took hold in peasant homes. Their effect was a leftward displacement of the curve of our production function;

– Capital formation, from 1820 on, also had a reducing effect on the *L/K* ratio.[64] The spread of the mulberry tree in the Po Valley was possibly the main source of fixed capital accumulation. The production of raw silk more than doubled between 1790 and 1824.[65]

All considered, it would seem that, during the second half of the eighteenth century, intensification, and the spread of the mulberry tree and protoindustrial activities, were not able to offset the negative effects of the demographic increase, accentuated by the worsening of climatic conditions. After 1820, instead, the contribution of these innovations to the economy became significant enough to compensate the negative effects.

As we have seen, the upward trend stopped after 1835, due to the rising demographic growth rate, bad harvests and, from the late 1840s on, silkworm and vineyard diseases which resulted in a sudden drop of agricultural production. The *Y/K* curve moved to the right, and as a consequence labour productivity and per capita income declined. Only in the second half of the nineteenth century did technological progress displace the curve of product per unit of capital leftward again. The effects were more consumption, more population, more capital formation, higher labour productivity, higher wages, and higher incomes. The age of the Italian decline was coming to an end.

4. *Conclusion*

In a well-known 1952 article,[66] C.M. Cipolla maintained that the seventeenth century marked a turning point in the history of the Italian economy. Italy, he argued, was rich at the beginning of the century, and poor and backward at its end. Later, however, he reconsidered his position and stressed the low level of Italian economic activity in the first half of the nineteenth century.[67] This second perspective fits the Italian reality much better than the notion of a seventeenth-century crisis.

A distinction is often made between relative and absolute decline.[68] One speaks of relative decline when, although still rising, the growth of the economy is slower than that of other economies. Absolute decline, instead, occurs when per capita product diminishes. Italy probably went through an age of relative decline, coinciding with the loss of its economic primacy, from the seventeenth century onward.[69] At the beginning of the eighteenth century, however, wages and the urbanization rate indicate that per capita income and standards of living were still relatively high in Italy. Things changed after 1750. For more than a century, with very short interruptions, the Italian economy experienced a decline which was at once absolute and relative. Actually, we should speak of an eighteenth rather than a seventeenth century crisis. While the Italian economy grew in the eighteenth century, primarily because of an unprecedented increase in population, incomes and living conditions of the Italian population drastically worsened. Although per capita income started to grow in the 1820s, it dropped again in the late 1830s. At the time of the 1880s spurt, Italy had already accumulated a delay compared to other Western European regions.

Istituto di Studi sulle Società del Mediterraneo (ISSM-CNR)

Appendix
I.

Wages in Northern and Southern Italy 1700-1861

1. *North (Milan): Price index (1861 = 1)* (Fig. 11). The basket I used to build the price index is composed of the following yearly quantities:

Wheat	120 kg
Maize	120 kg
Meat	20 kg
Wine	100 liters
Eggs	50 n°
Butter	3 kg
Soap	2 kg
Oil	5 kg
Textiles	13 lire in 1700-10
Firewood	365 kg
House rent	10 lire in 1700-10

My source for the prices is A. De Maddalena, *Prezzi e mercedi a Milano dal 1701 al 1860*, Milano, 1974. I have compared these figures with data published by A. De Maddalena, *I prezzi dei generi commestibili e dei prodotti agricoli sul mercato di Milano dal 1800 al 1890*, Roma (Archivio dell'Unificazione Italiana), 1957.

2. *South (Naples): Price index (1861 = 1)* (Fig. 12). The basket I used to build the price index is composed of the following yearly quantities:

Wheat	120 kg
Beans	120 kg
Meat	20 kg
Wine	100 liters
Eggs	20 n°
Oil	8 kg
Firewood	365 kg
Charcoal	60 kg
Textiles	58 *grana* in 1730-40

My main sources for these prices are: *1700-33*: M. Mantovani, «Potere d'acquisto della moneta (1647-1860) in lire attuali ed economia pubblica nel Regno di Napoli», in *Politeia*, 69, 2000; *1734-1806*: R. Romano, *Prezzi, salari e servizi*

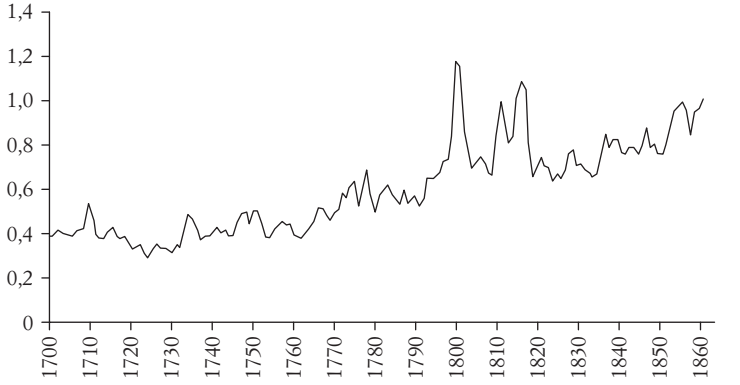

FIG. 11. Price index North 1700-1861 (1861 = 1).

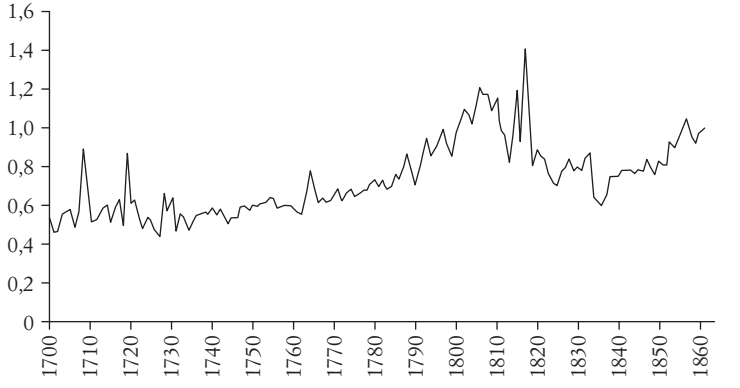

FIG. 12. Price index South 1700-1861 (1861 = 1).

a Napoli nel secolo XVIII (1734-1806), Milano, 1965. Some shortcomings of the latter study have been pointed out by M. Mirri, «Osservazioni in margine a serie statistiche di prezzi e salari», in *Critica storica*, 1966, pp. 539-588. Since the price of wine is missing in R. Romano's series, I used the prices in L. Cagnazzi, «Ragguaglio de' prezzi di varie derrate di prima necessità, ridotti a peso di puro argento, per lo spazio degli ultimi due secoli», in Romano, *Prezzi, salari e servizi*, App. I, and N.F. Faraglia, *Storia dei prezzi in Napoli dal 1131 al 1860*, Napoli, 1878; *1807-15*: Mantovani, «Potere d'acquisto», and ASBN (Historical Archives of the Banco

di Napoli), *Prezzi e salari a Napoli dal 1806 al 1808*; *1816-40*: data from ASN (State Archives in Napoli), *Intendenza di Napoli*, *Monasteri soppressi*, 2938, 186, 4761, 4192, 2478 (years 1806-09). For the price of wheat in 1816-47, I also used data in M.R. Storchi, *Prezzi, crisi agrarie e mercato del grano nel Mezzogiorno d'Italia (1806-1854)*, Napoli, 1991; *1841-61*: Mantovani, «Potere d'acquisto». Since my price index is similar to Mantovani's, I used her price index for some years. Since in Mantovani's basket both the products and the quantities consumed are those of the middle class, I adapted her data by regressing my series on hers for the years when both series coincide and then recalculating of the price index for the missing years.

3-4. *North (Milan): Nominal and real industry wage rates.* Data from De Maddalena, *Prezzi e mercedi a Milano.* For an in-depth discussion of the reliability of Milanese data on wages, see L. Mocarelli, «Wages and the Labour Market in the Building Trade in 18th Century Milan», in *Jahrbuch für Wirtschaftsgeschichte*, 2, 2004, pp. 61-81. Wage rates per day are here expressed in Milan lire and hundreds of lire (the original nominal wages are in *lire*, *soldi*, *denari*; 1 *lira* = 20 *soldi* and 1 *soldo* = 12 *denari*). The wages indicated are those of a *mastro fabbricatore* (master mason). The Milan lira was of silver, and weighed 3.87 gr. in 1700. Its weight was reduced to 3.75 gr. in 1731, to 3.69 in 1741, to 3.58 in 1751, and to 3.50 in 1781. From 1781 to 1861 its weight remained stable. A'Hearn published a graph showing a quite similar series of real wage rates in Milan («Il benessere dell'Italia settentrionale», p. 298).

5-6. *South (Naples): Nominal and real wage rates.* For the 1734-1806 period, nominal wage rates for a master mason are from Romano, *Prezzi, salari e servizi a Napoli*, pp. 44-45, but cross-checked against various archive sources: ASN, *Monasteri soppressi, San Domenico Maggiore*, 486, 487, 488, 490; ASN, *Monasteri soppressi, Donnalbina,* 3307; ASN, *Monasteri soppressi, San Francesco agli Scarioni*, 4323; ASN, *Monasteri soppressi, San Marcellino e Festo*, 2832, 2833, 2835; ASN, *Monasteri soppressi, S. Antonio a Posillipo,* 4290; ASN, *Monasteri soppressi, S. Sofia di Castella*, 1775; ASN, *Monasteri soppressi, S. Nicola alla Carità*, 4248, 4249, 4272; ASN, *Monasteri soppressi, S. Girolamo di Aversa*, 5736. For the period after 1806, data are from ASN, *Monasteri sop-*

pressi, Padri minimi, 4518; ASN, *Monasteri soppressi, S. Lorenzo di Padula*, 5666; ASN, *Monasteri soppressi, S. Spirito di Benevento*, 219; ASN, *Monasteri soppressi, Passioniste S.S. Trinità di Aversa*, 5791; ASN, *Monasteri soppressi, S.S. Trinità della Cava*, 5838. Sometimes the wages are those of workers in the surroundings of Naples. Wages are expressed in *grana* and hundreds of *grana* (1 *grano* = 12 *cavalli*). In the Kingdom of Naples, 1 *ducat* was worth 10 *carlini* and 1 *carlino* 10 *grana*. The weight of the *grano* was 0.197 gr. of silver in 1700-83 and 0.192 in 1784-1861.

7-8. *North (Piedmont): Nominal and real agricultural wage rates (labourers)*. The data on Northern Italy were collected by S. Pugliese, *Due secoli di vita agricola. Produzione e valore dei terreni contratti agrari, salari e prezzi nel Vercellese nei secoli XVIII e XIX*, Milano-Torino-Roma, 1908, pp. 48-49. Since from 1802 onward these wages are expressed in Italian lire, I have also converted the wages of the previous period into Italian lire (1 Piedmont lira = 1.19 Italian lira). The weight of the Italian lira in silver was 4.50 gr. in 1861. I have interpolated some missing data, and used the Milan price index to deflate nominal wages.

9-10. *South (Naples-Apulia): Nominal and real agricultural wage rates (labourers)*. Romano, *Prezzi, salari e servizi a Napoli*, pp. 31-32, col. A e B. The wages referred to are those of *«falciatori e mietitori»* (mowers and harvesters). For the 1700-34 period, I used the wage of a *«potatore»* (pruner) near Naples. After 1805, data on the wages of agricultural labourers in the ASN, *Monasteri soppressi* are scarce; I hence employed them only for comparisons, and used the wage of a pruner in Molfetta instead, which appear to have been the same or close to those of a pruner around Naples, whenever a comparison is possible in the 1788-1806 period. The Molfetta wages are from Palumbo, *Prezzi e salari in Terra di Bari (1530-1860)*, pp. 158-159.

	1	2	3	4	5	6	7	8	9	10
	North Milan price index 1861 = 1	South Napoli price index 1861 = 1	North Milan industry nominal wage mason Milan lire per day	North Milan industry real wage mason 1861 = 1	South Naples industry nominal wage mason Naples grana per day	South Naples industry real wage mason 1861 = 1	North Piedmont agric. nominal wage labourer Piedmont lire per day	North Piedmont agric. real wage labourer 1861 = 1	South Naples agric. nominal wage labourer Naples grana per day	South Naples agric. real wage labourer 1861 = 1
1700	0.39	0.54	1.50	2.05	40	1.86	1.19	1.72	24	1.78
1701	0.40	0.46	1.75	2.32	40	2.19	1.19	1.79	24	2.11
1702	0.42	0.46	1.75	2.20	40	2.19	1.19	1.69	24	2.11
1703	0.40	0.55	1.75	2.31	40	1.82	1.19	1.78	24	1.74
1704	0.39	0.57	1.75	2.35	40	1.76	1.19	1.81	24	1.69
1705	0.39	0.58	1.75	2.37	40	1.72	1.19	1.83	24	1.66
1706	0.41	0.49	1.75	2.27	40	2.06	1.19	1.75	24	1.98
1707	0.42	0.57	1.75	2.21	40	1.76	1.19	1.70	24	1.69
1708	0.42	0.89	1.75	2.19	40	1.13	1.19	1.69	24	1.08
1709	0.53	0.72	1.63	1.62	40	1.40	1.19	1.30	24	1.34
1710	0.47	0.51	1.63	1.83	40	1.97	1.19	1.46	24	1.89
1711	0.39	0.51	1.63	2.19	35	1.70	1.19	1.76	24	1.86
1712	0.38	0.54	1.63	2.27	35	1.63	1.19	1.82	24	1.78
1713	0.38	0.59	1.63	2.27	35	1.49	1.19	1.82	24	1.64
1714	0.41	0.60	1.63	2.09	35	1.46	1.39	1.83	24	1.61
1715	0.43	0.51	1.63	2.01	35	1.72	1.34	1.73	24	1.89
1716	0.39	0.59	1.63	2.21	35	1.49	1.19	1.77	24	1.64
1717	0.38	0.62	1.63	2.27	35	1.41	1.19	1.82	24	1.55
1718	0.39	0.49	1.63	2.22	35	1.78	1.19	1.78	24	1.95
1719	0.35	0.87	1.63	2.43	35	1.01	1.19	1.95	24	1.10
1720	0.33	0.60	1.63	2.63	35	1.45	1.19	2.11	24	1.59
1721	0.34	0.63	1.63	2.53	35	1.40	1.19	2.02	24	1.53
1722	0.35	0.53	1.63	2.47	35	1.66	1.19	1.98	24	1.82
1723	0.31	0.48	1.63	2.75	35	1.83	1.19	2.21	24	2.00
1724	0.29	0.54	1.63	2.93	35	1.63	1.19	2.35	24	1.78

	1	2	3	4	5	6	7	8	9	10
	North Milan price index 1861 = 1	South Napoli price index 1861 = 1	North Milan industry nominal wage mason Milan lire per day	North Milan industry real wage mason 1861 = 1	South Naples industry nominal wage mason Naples grana per day	South Naples industry real wage mason 1861 = 1	North Piedmont agric. nominal wage labourer Piedmont lire per day	North Piedmont agric. real wage labourer 1861 = 1	South Naples agric. nominal wage labourer Naples grana per day	South Naples agric. real wage labourer 1861 = 1
1725	0.33	0.52	1.63	2.62	35	1.68	1.16	2.07	24	1.84
1726	0.35	0.46	1.63	2.45	35	1.92	1.16	1.93	24	2.11
1727	0.34	0.44	1.63	2.56	35	2.00	1.19	2.05	24	2.19
1728	0.33	0.66	1.63	2.60	35	1.33	1.19	2.08	24	1.46
1729	0.33	0.57	1.63	2.63	35	1.54	1.19	2.11	24	1.69
1730	0.31	0.63	1.63	2.75	35	1.40	1.19	2.20	24	1.53
1731	0.35	0.47	1.63	2.40	35	1.87	1.19	1.96	24	2.05
1732	0.34	0.56	1.63	2.48	35	1.57	1.19	2.02	24	1.73
1733	0.42	0.54	1.63	1.98	35	1.63	1.19	1.62	24	1.78
1734	0.49	0.47	1.63	1.70	35	1.84	1.19	1.39	25	2.11
1735	0.46	0.51	1.63	1.80	35	1.73	1.19	1.47	25	1.98
1736	0.42	0.55	1.63	1.99	35	1.58	1.19	1.62	25	1.81
1737	0.37	0.56	1.63	2.24	35	1.57	1.19	1.83	25	1.80
1738	0.39	0.57	1.63	2.15	35	1.55	1.29	1.84	25	1.77
1739	0.38	0.55	1.63	2.16	35	1.59	1.29	1.85	25	1.82
1740	0.40	0.58	1.63	2.06	35	1.51	1.29	1.76	25	1.73
1741	0.43	0.55	1.63	1.91	35	1.59	1.29	1.65	25	1.81
1742	0.41	0.57	1.63	2.01	35	1.52	1.29	1.74	25	1.74
1743	0.42	0.53	1.63	1.96	35	1.64	1.29	1.69	25	1.88
1744	0.39	0.50	1.63	2.12	35	1.74	1.19	1.75	25	1.99
1745	0.39	0.53	1.63	2.08	35	1.65	1.19	1.71	25	1.88
1746	0.45	0.53	1.63	1.81	35	1.65	1.19	1.49	25	1.89
1747	0.49	0.59	1.63	1.68	35	1.48	1.19	1.38	25	1.69
1748	0.49	0.60	1.63	1.66	35	1.47	1.27	1.42	25	1.67
1749	0.45	0.57	1.63	1.84	35	1.52	1.27	1.57	25	1.74

	1	2	3	4	5	6	7	8	9	10
	North Milan price index 1861 = 1	South Napoli price index 1861 = 1	North Milan industry nominal wage mason Milan lire per day	North Milan industry real wage mason 1861 = 1	South Naples industry nominal wage mason Naples grana per day	South Naples industry real wage mason 1861 = 1	North Piedmont agric. nominal wage labourer Piedmont lire per day	North Piedmont agric. real wage labourer 1861 = 1	South Naples agric. nominal wage labourer Naples grana per day	South Naples agric. real wage labourer 1861 = 1
1750	0.50	0.60	1.63	1.64	35	1.46	1.31	1.43	25	1.67
1751	0.50	0.59	1.63	1.58	35	1.48	1.31	1.40	25	1.70
1752	0.46	0.61	1.63	1.74	35	1.44	1.31	1.54	25	1.65
1753	0.38	0.61	1.63	2.06	35	1.44	1.31	1.83	25	1.64
1754	0.38	0.63	1.63	2.09	35	1.38	1.29	1.84	25	1.58
1755	0.41	0.63	1.63	1.92	35	1.39	1.29	1.69	25	1.59
1756	0.44	0.59	1.63	1.82	35	1.49	1.29	1.60	25	1.70
1757	0.45	0.59	1.63	1.76	35	1.49	1.29	1.55	25	1.70
1758	0.44	0.59	1.63	1.81	35	1.47	1.29	1.59	25	1.68
1759	0.44	0.60	1.63	1.80	35	1.45	1.29	1.58	25	1.66
1760	0.39	0.59	1.63	2.01	35	1.49	1.31	1.78	25	1.70
1761	0.38	0.55	1.63	2.07	35	1.58	1.31	1.83	25	1.81
1762	0.38	0.55	1.63	2.11	37.5	1.71	1.31	1.87	25	1.82
1763	0.40	0.65	1.63	1.98	30	1.16	1.31	1.75	25	1.54
1764	0.43	0.78	1.63	1.84	40	1.29	1.31	1.63	25	1.29
1765	0.46	0.67	1.63	1.74	37.5	1.40	1.29	1.53	25	1.49
1766	0.52	0.62	1.63	1.54	37.5	1.52	1.24	1.32	25	1.62
1767	0.51	0.64	1.63	1.55	37.5	1.48	1.34	1.39	25	1.57
1768	0.48	0.62	1.63	1.65	37.5	1.52	1.34	1.49	25	1.62
1769	0.46	0.62	1.63	1.73	30	1.22	1.34	1.56	25	1.62
1770	0.49	0.65	1.63	1.61	35	1.35	1.34	1.45	25	1.54
1771	0.51	0.68	1.63	1.56	35	1.28	1.34	1.40	25	1.46
1772	0.58	0.62	1.63	1.37	35	1.40	1.34	1.23	25	1.60
1773	0.56	0.66	1.63	1.41	40	1.51	1.34	1.27	25	1.51
1774	0.61	0.68	1.63	1.31	40	1.47	1.34	1.17	25	1.47

	1	2	3	4	5	6	7	8	9	10
	North Milan price index 1861 = 1	South Napoli price index 1861 = 1	North Milan industry nominal wage mason Milan lire per day	North Milan industry real wage mason 1861 = 1	South Naples industry nominal wage mason Naples grana per day	South Naples industry real wage mason 1861 = 1	North Piedmont agric. nominal wage labourer Piedmont lire per day	North Piedmont agric. real wage labourer 1861 = 1	South Naples agric. nominal wage labourer Naples grana per day	South Naples agric. real wage labourer 1861 = 1
1775	0.64	0.64	1.63	1.24	40	1.56	1.34	1.12	25	1.56
1776	0.52	0.65	1.63	1.52	40	1.53	1.34	1.37	25	1.53
1777	0.60	0.67	1.63	1.33	40	1.48	1.34	1.20	25	1.48
1778	0.69	0.67	1.63	1.15	40	1.49	1.39	1.06	25	1.49
1779	0.57	0.70	1.46	1.26	40	1.42	1.39	1.24	25	1.42
1780	0.50	0.73	1.46	1.43	40	1.37	1.35	1.39	25	1.37
1781	0.55	0.70	1.46	1.26	40	1.43	1.35	1.24	25	1.43
1782	0.59	0.73	1.46	1.18	40	1.38	1.34	1.16	25	1.38
1783	0.62	0.68	1.46	1.13	40	1.47	1.34	1.10	25	1.47
1784	0.58	0.69	1.46	1.19	40	1.44	1.24	1.11	25	1.44
1785	0.56	0.76	1.46	1.25	40	1.32	1.24	1.16	25	1.32
1786	0.53	0.74	1.46	1.31	40	1.35	1.24	1.22	25	1.35
1787	0.60	0.79	1.46	1.16	40	1.26	1.24	1.08	25	1.26
1788	0.54	0.87	1.46	1.29	40	1.15	1.24	1.20	25	1.15
1789	0.55	0.78	1.46	1.27	40	1.28	1.24	1.18	25	1.28
1790	0.57	0.71	1.46	1.22	40	1.42	1.24	1.14	25	1.42
1791	0.52	0.79	1.46	1.33	40	1.27	1.24	1.24	30	1.53
1792	0.55	0.88	1.46	1.26	40	1.13	1.24	1.17	27.5	1.24
1793	0.65	0.95	1.46	1.07	40	1.06	1.24	1.00	27.5	1.16
1794	0.64	0.85	1.46	1.08	40	1.17	1.34	1.06	27.5	1.29
1795	0.66	0.89	1.46	1.05	40	1.12	1.59	1.15	27.5	1.23
1796	0.68	0.93	1.46	1.02	40	1.07	1.69	1.16	27.5	1.18
1797	0.72	0.99	1.46	0.97	40	1.01	1.88	1.19	27.5	1.11
1798	0.73	0.90	1.46	0.95	40	1.12	2.13	1.27	30	1.34
1799	0.84	0.85	1.46	0.83	40	1.17	2.13	1.12	27.5	1.29

	1	2	3	4	5	6	7	8	9	10
	North Milan price index 1861 = 1	South Napoli price index 1861 = 1	North Milan industry nominal wage mason Milan lire per day	North Milan industry real wage mason 1861 = 1	South Naples industry nominal wage mason Naples grana per day	South Naples industry real wage mason 1861 = 1	North Piedmont agric. nominal wage labourer Piedmont lire per day	North Piedmont agric. real wage labourer 1861 = 1	South Naples agric. nominal wage labourer Naples grana per day	South Naples agric. real wage labourer 1861 = 1
1800	1.18	0.98	1.46	0.59	40	1.03	2.23	0.82	27.5	1.13
1801	1.14	1.03	1.56	0.65	40	0.97	1.98	0.79	27.5	1.07
1802	0.88	1.10	1.63	0.88	40	0.91	1.79	0.97	27.5	1.00
1803	0.77	1.08	1.63	1.00	40	0.93	1.50	0.98	27.5	1.02
1804	0.69	1.02	1.63	1.13	40	0.98	1.63	1.16	27.5	1.07
1805	0.71	1.11	1.63	1.09	40	0.90	1.44	1.04	27.5	0.99
1806	0.75	1.21	1.63	1.04	40	0.82	1.71	1.10	30	0.99
1807	0.72	1.17	1.63	1.08	40	0.85	1.50	1.06	30	1.02
1808	0.67	1.17	1.63	1.15	40	0.85	1.79	1.27	32.6	1.11
1809	0.66	1.09	1.63	1.17	40	0.92	1.79	1.29	22	0.81
1810	0.85	1.16	1.63	0.91	40	0.86	1.79	1.00	25	0.86
1811	1.00	0.99	1.63	0.78	40	1.01	1.81	0.86	30	1.21
1812	0.91	0.97	1.63	0.85	40	1.03	1.81	0.94	29	1.20
1813	0.81	0.82	1.63	0.96	40	1.22	1.83	1.07	33	1.60
1814	0.84	0.96	1.63	0.93	40	1.04	2.00	1.10	30	1.25
1815	1.02	1.20	1.63	0.76	40	0.83	2.00	0.90	30	1.00
1816	1.09	0.93	1.63	0.71	40	1.08	2.00	0.85	30	1.29
1817	1.05	1.42	1.63	0.74	40	0.70	2.00	0.88	35	0.98
1818	0.77	1.07	1.63	1.01	40	0.93	2.00	1.20	30	1.12
1819	0.66	0.81	1.63	1.18	40	1.23	1.62	1.21	30	1.48
1820	0.69	0.90	1.63	1.12	40	1.11	1.50	1.10	32.6	1.45
1821	0.74	0.85	1.63	1.04	40	1.17	1.50	1.02	30	1.41
1822	0.70	0.84	1.96	1.32	40	1.19	1.50	1.16	25	1.19
1823	0.70	0.75	2	1.36	40	1.33	1.50	1.18	27.6	1.46
1824	0.64	0.71	2	1.50	40	1.40	1.50	1.29	20	1.12

	1	2	3	4	5	6	7	8	9	10
	North Milan price index 1861 = 1	South Napoli price index 1861 = 1	North Milan industry nominal wage mason Milan lire per day	North Milan industry real wage mason 1861 = 1	South Naples industry nominal wage mason Naples grana per day	South Naples industry real wage mason 1861 = 1	North Piedmont agric. nominal wage labourer Piedmont lire per day	North Piedmont agric. real wage labourer 1861 = 1	South Naples agric. nominal wage labourer Naples grana per day	South Naples agric. real wage labourer 1861 = 1
1825	0.67	0.70	2	1.42	40	1.43	1.50	1.23	25	1.43
1826	0.64	0.77	2	1.48	40	1.30	1.63	1.34	21	1.09
1827	0.68	0.79	2	1.39	40	1.26	1.63	1.26	28	1.41
1828	0.76	0.84	2	1.25	40	1.19	1.75	1.18	20	0.95
1829	0.78	0.78	2	1.23	40	1.28	1.75	1.16	25	1.28
1830	0.71	0.79	2	1.35	30	0.95	1.50	1.16	20	1.01
1831	0.71	0.78	2	1.34	30	0.97	1.75	1.27	22	1.13
1832	0.68	0.84	2	1.39	30	0.89	1.75	1.32	20	0.95
1833	0.67	0.87	2	1.41	30	0.86	1.75	1.34	22	1.01
1834	0.65	0.63	2	1.46	30	1.18	1.75	1.38	24	1.51
1835	0.67	0.62	2	1.43	30	1.22	2.00	1.48	20	1.30
1836	0.75	0.59	2	1.26	30	1.27	1.67	1.16	25	1.70
1837	0.84	0.64	2	1.13	30	1.17	1.67	1.04	30	1.87
1838	0.78	0.74	2	1.21	30	1.01	1.67	1.12	26	1.40
1839	0.82	0.75	2	1.16	30	1.00	1.67	1.07	30	1.60
1840	0.83	0.74	2	1.15	30	1.01	2.08	1.22	20	1.08
1841	0.77	0.78	2	1.24	30	0.97	2.08	1.32	25	1.29
1842	0.76	0.78	2	1.25	30	0.97	2.08	1.33	25	1.29
1843	0.79	0.78	2	1.21	30	0.97	1.75	1.14	23	1.19
1844	0.79	0.76	2	1.21	30	0.98	1.75	1.15	22	1.15
1845	0.76	0.79	2	1.25	30	0.95	1.75	1.19	24	1.22
1846	0.79	0.78	2	1.21	30	0.97	1.75	1.14	18	0.93
1847	0.87	0.84	2	1.09	30	0.89	1.75	1.03	22	1.05
1848	0.79	0.79	2	1.21	30	0.95	1.75	1.15	20	1.02
1849	0.80	0.76	2	1.19	30	0.98	1.75	1.13	22	1.15

	1	2	3	4	5	6	7	8	9	10
	North Milan price index 1861 = 1	South Napoli price index 1861 = 1	North Milan industry nominal wage mason Milan lire per day	North Milan industry real wage mason 1861 = 1	South Naples industry nominal wage mason Naples grana per day	South Naples industry real wage mason 1861 = 1	North Piedmont agric. nominal wage labourer Piedmont lire per day	North Piedmont agric. real wage labourer 1861 = 1	South Naples agric. nominal wage labourer Naples grana per day	South Naples agric. real wage labourer 1861 = 1
1850	0.76	0.83	2	1.26	30	0.91	1.75	1.19	21	1.01
1851	0.75	0.81	2	1.26	30	0.93	1.75	1.20	21	1.04
1852	0.80	0.81	2	1.19	30	0.93	1.75	1.13	20	0.99
1853	0.88	0.93	2	1.08	30	0.81	1.75	1.02	28	1.21
1854	0.95	0.89	2	1.00	33	0.92	1.75	0.95	25	1.12
1855	0.97	0.95	2	0.98	35	0.92	1.75	0.93	26	1.10
1856	0.99	1.00	2	0.96	35	0.88	1.75	0.91	20	0.80
1857	0.95	1.05	2	1.00	37	0.88	2.13	1.08	35	1.34
1858	0.85	0.95	2	1.13	35	0.92	2.13	1.21	25	1.05
1859	0.94	0.92	1.96	0.99	40	1.08	2.13	1.08	25	1.08
1860	0.96	0.97	2.09	1.04	40	1.03	2.13	1.08	25	1.03
1861	1.00	1.00	2.10	1.00	40	1.00	2.00	1.00	25	1.00

II.

Wages and GDP in Italy 1700-1913

1. *Price index (1911 = 1).* For the 1700-1861 period, the consumer price index is an arithmetic mean of the price indices in the North (Milan) and South (Naples) already presented in App. I, cols. 1-2. For the period after 1861, I used Fenoaltea's «new cost of living index» («Production and Consumption in post-Unification Italy», pp. 282-283, col. 9), which is a revision of the Istat index.

2. *Real Wage Index (1911 = 1).* For the 1700-1861 period, the index is the average of the two indices for the North and South (in previous App. I), each based on a weighted mean of industrial and agricultural wage rates, respectively deflated by the price indices of the North and South. These two series have then been combined in a single Italian weighted mean based on the relative size of the population (0.6 for the North and 0.4 for the South). After 1861, the series is based on those constructed by Fenoaltea, «Production and Consumption in post-Unification Italy», pp. 273-274. While Fenoaltea presented a simple arithmetic mean, the one I present in col. 2 is a weighted average (0.6 for agriculture and 0.4 for industry). The results, however, do not differ significantly.

3. *Per hour real wages (1911 prices).* Fenoaltea's series in «Production and Consumption in post-Unification Italy», pp. 273-274, assumes a working time of 10 hours per day. In the following series, per hour wage rate has been calculated for the period after 1861 simply by dividing by 10 the previous series (col. 2). The subsequent step was to calculate the estimates for the 1700-1861 period by means of the real wage index in col. 2. Whenever possible, I have compared my data with the series in Zamagni, «An International Comparison of Real Industrial Wages, 1890-1913», pp. 107-139.

4. *Per capita GDP (1911 prices).* I explained in the text the criteria I used to construct the GDP per capita series from 1700 until 1861. The index of per c. GDP has been then linked to the GDP 1861-1913 series.

The main source for the 1861-1913 period is Federico and Fenoaltea's series (both not yet definitive) for agriculture and

industry, constructed as part of a project for the revision of GDP historical series sponsored by the Banca d'Italia. Both series have been adjusted to present borders, since the agricultural series is calculated within coeval borders, and the industrial series within 1911 borders (G. Federico, «Le nuove stime della produzione agricola italiana, 1860-1910» and G. Federico, «L'agricoltura italiana: successo o fallimento?», in P. Ciocca, G. Toniolo (eds.), *Storia economica d'Italia*, 3, Roma-Bari, 2003, pp. 99-136; S. Fenoaltea, «Lo sviluppo dell'industria dall'Unità alla Grande Guerra: una sintesi provvisoria», in P. Ciocca, G. Toniolo (eds.), *Storia economica d'Italia*, 3.1, Roma-Bari, 2003; S. Fenoaltea, «La crescita industriale delle regioni d'Italia dall'Unità alla Grande Guerra: una prima stima per gli anni censuari», in *Quaderni dell'Ufficio Ricerche Storiche*, 2001, 1; S. Fenoaltea, «La formazione dell'Italia industriale: consensi, dissensi, ipotesi», in *Rivista di storia economica*, n.s., 2003, XIX, pp. 341-58). A. Carreras, «Un ritratto quantitativo dell'industria italiana», in F. Amatori, D. Bigazzi, R. Giannetti, L. Segreto (eds.), *Storia d'Italia. Annali 15, L'industria*, Torino, 1999, pp. 179-272, provides a very useful overview of debates on the GDP in Italy, especially those concerning the industrial sector. I have based my calculation of the product of the tertiary sector on the relative weight of services in 1891 and 1911, taking account of the Banca d'Italia team's revision of ISTAT data for those benchmark years (V. Zamagni), and on the percentage of 27 in 1861 from Maddison's revision (*I conti economici dell'Italia* 1, 1991; 2, 1992; 3, 2002, 1, G. Rey and O. Vitali (eds.); 2, G. Federico, S. Fenoaltea, M. Marolla, M. Roccas, O. Vitali, V. Zamagni, P. Battilani, G. Rey (eds.); 3, G. Federico, S. Fenoaltea, C. Bardini, V. Zamagni, P. Battilani, G. Rey (eds.), Roma-Bari; A. Maddison, «A Revised Estimate of Italian Economic Growth, 1861-1989», in *Banca Nazionale del Lavoro Quaterly Review*, 1991, pp. 225-241). Intermediate data for services have been linearly interpolated. The estimate of GDP is at factor costs. The resulting series is quite similar to that presented by S. Fenoaltea, «La crescita economica dell'Italia postunitaria: le nuove serie storiche», in *Rivista di Storia Economica*, XXI, 2005, 2; these two preliminary series differ only initially (mine is lower than Fenoaltea's, because of the lower estimate of the service sector).

5. *Population*. No annual series of the Italian populations exist before 1861. The series constructed here – within

current borders – is based on one in L. Del Panta, *Dalla metà del Settecento ai nostri giorni*, in L. Del Panta, M. Livi Bacci, G. Pinto, E. Sonnino, *La popolazione italiana*, Roma-Bari, 1996, p. 134. Del Panta presents, however, a decadal series from 1771 on. For the previous period we only have a decadal series for the Centre-North and benchmarks for 1700 and 1750 (Malanima, *L'economia italiana*, App. 1). The intermediate data were obtained by means of interpolation.

6. *GDP (1911 prices)*. This is the result of the multiplication of the per capita GDP (in col. 4) by the population (in col. 5).

	1	2	3	4	5	6
	Price index 1911 = 1	Real wage index 1911 = 1	Per hour real wages 1911 prices	Per c. GDP 1911 prices	Population (000)	GDP (000,000) 1911 prices
1700	0.43	1.12	0.28	455	13,600	6,194
1701	0.40	1.23	0.31	499	13,640	6,811
1702	0.41	1.19	0.30	485	13,680	6,637
1703	0.44	1.13	0.28	460	13,720	6,307
1704	0.45	1.13	0.28	459	13,761	6,316
1705	0.45	1.12	0.28	458	13,801	6,320
1706	0.42	1.18	0.30	480	13,842	6,641
1707	0.46	1.08	0.27	442	13,883	6,134
1708	0.60	0.92	0.23	376	13,924	5,233
1709	0.58	0.84	0.21	342	13,965	4,781
1710	0.46	1.05	0.26	400	14,006	5,601
1711	0.42	1.12	0.28	428	14,047	6,012
1712	0.43	1.12	0.28	430	14,088	6,056
1713	0.45	1.09	0.27	417	14,130	5,889
1714	0.47	1.09	0.27	416	14,171	5,889
1715	0.44	1.11	0.28	426	14,213	6,054
1716	0.45	1.07	0.27	409	14,255	5,833
1717	0.46	1.07	0.27	408	14,297	5,830
1718	0.41	1.15	0.29	440	14,339	6,306
1719	0.55	1.01	0.25	386	14,381	5,549
1720	0.43	1.19	0.30	441	14,424	6,364
1721	0.44	1.14	0.29	424	14,466	6,132
1722	0.40	1.19	0.30	443	14,509	6,432
1723	0.37	1.32	0.33	492	14,551	7,163
1724	0.38	1.32	0.33	492	14,594	7,187
1725	0.39	1.23	0.31	458	14,637	6,708
1726	0.38	1.24	0.31	462	14,680	6,786
1727	0.36	1.31	0.33	487	14,724	7,175
1728	0.45	1.15	0.29	426	14,767	6,286
1729	0.41	1.21	0.30	450	14,810	6,667

	1	2	3	4	5	6
	Price index 1911 = 1	Real wage index 1911 = 1	Per hour real wages 1911 prices	Per c. GDP 1911 prices	Population (000)	GDP (000,000) 1911 prices
1730	0.43	1.21	0.30	487	14,854	7,238
1731	0.38	1.24	0.31	501	14,898	7,457
1732	0.41	1.19	0.30	478	14,942	7,141
1733	0.45	1.05	0.26	422	14,986	6,320
1734	0.46	1.03	0.26	414	15,030	6,222
1735	0.45	1.03	0.26	414	15,074	6,247
1736	0.45	1.05	0.26	421	15,118	6,371
1737	0.43	1.12	0.28	452	15,163	6,859
1738	0.44	1.12	0.28	451	15,208	6,861
1739	0.43	1.13	0.28	457	15,252	6,975
1740	0.46	1.08	0.27	434	15,297	6,641
1741	0.46	1.06	0.27	426	15,342	6,531
1742	0.46	1.07	0.27	432	15,387	6,646
1743	0.44	1.09	0.27	438	15,433	6,762
1744	0.41	1.14	0.28	457	15,478	7,077
1745	0.43	1.10	0.28	442	15,524	6,865
1746	0.46	1.01	0.25	408	15,569	6,356
1747	0.50	0.93	0.23	373	15,615	5,828
1748	0.51	0.94	0.24	377	15,661	5,910
1749	0.48	1.01	0.25	407	15,707	6,388
1750	0.51	0.94	0.24	372	15,754	5,863
1751	0.51	0.94	0.23	371	15,800	5,863
1752	0.49	0.98	0.25	388	15,829	6,137
1753	0.46	1.08	0.27	430	15,859	6,820
1754	0.47	1.07	0.27	426	15,889	6,762
1755	0.48	1.02	0.26	404	15,918	6,434
1756	0.48	1.01	0.25	401	15,948	6,402
1757	0.48	0.99	0.25	394	15,978	6,288
1758	0.48	1.00	0.25	398	16,007	6,375
1759	0.49	0.99	0.25	394	16,037	6,316
1760	0.46	1.08	0.27	496	16,067	7,963
1761	0.43	1.13	0.28	517	16,097	8,321
1762	0.43	1.16	0.29	531	16,127	8,570
1763	0.48	1.01	0.25	462	16,157	7,469
1764	0.55	0.95	0.24	435	16,187	7,041
1765	0.52	0.95	0.24	434	16,218	7,037
1766	0.53	0.90	0.23	413	16,248	6,703
1767	0.54	0.92	0.23	420	16,278	6,836
1768	0.51	0.96	0.24	442	16,309	7,205
1769	0.50	0.95	0.24	435	16,339	7,114
1770	0.53	0.92	0.23	477	16,369	7,804
1771	0.55	0.88	0.22	458	16,400	7,507
1772	0.57	0.85	0.21	441	16,497	7,274
1773	0.57	0.87	0.22	450	16,595	7,465
1774	0.60	0.82	0.21	426	16,694	7,111
1775	0.60	0.82	0.21	427	16,793	7,166
1776	0.55	0.91	0.23	472	16,893	7,970
1777	0.60	0.83	0.21	432	16,993	7,349
1778	0.64	0.78	0.20	405	17,094	6,923
1779	0.59	0.83	0.21	432	17,195	7,428

	1	2	3	4	5	6
	Price index 1911 = 1	Real wage index 1911 = 1	Per hour real wages 1911 prices	Per c. GDP 1911 prices	Population (000)	GDP (000,000) 1911 prices
1780	0.57	0.87	0.22	445	17,297	7,690
1781	0.58	0.83	0.21	424	17,400	7,375
1782	0.61	0.79	0.20	401	17,449	7,002
1783	0.61	0.79	0.20	402	17,499	7,043
1784	0.60	0.79	0.20	401	17,549	7,029
1785	0.61	0.78	0.19	394	17,598	6,935
1786	0.59	0.81	0.20	411	17,648	7,254
1787	0.65	0.73	0.18	372	17,698	6,585
1788	0.65	0.75	0.19	380	17,749	6,747
1789	0.62	0.77	0.19	394	17,799	7,010
1790	0.60	0.79	0.20	384	17,849	6,857
1791	0.60	0.83	0.21	401	17,900	7,180
1792	0.66	0.75	0.19	362	17,940	6,498
1793	0.74	0.66	0.17	320	17,979	5,761
1794	0.70	0.71	0.18	346	18,019	6,243
1795	0.72	0.74	0.18	358	18,059	6,457
1796	0.75	0.73	0.18	353	18,099	6,388
1797	0.80	0.72	0.18	350	18,139	6,344
1798	0.76	0.80	0.20	386	18,179	7,020
1799	0.80	0.74	0.18	358	18,219	6,516
1800	1.03	0.58	0.15	321	18,260	5,853
1801	1.03	0.56	0.14	307	18,300	5,614
1802	0.92	0.61	0.15	336	18,340	6,154
1803	0.86	0.62	0.16	341	18,379	6,262
1804	0.79	0.70	0.18	385	18,419	7,085
1805	0.84	0.64	0.16	349	18,459	6,437
1806	0.90	0.65	0.16	357	18,499	6,597
1807	0.87	0.64	0.16	351	18,539	6,503
1808	0.85	0.73	0.18	401	18,579	7,455
1809	0.81	0.71	0.18	390	18,619	7,262
1810	0.93	0.60	0.15	288	18,660	5,374
1811	0.94	0.61	0.15	365	18,700	6,831
1812	0.89	0.64	0.16	385	18,779	7,235
1813	0.77	0.76	0.19	459	18,857	8,651
1814	0.84	0.71	0.18	427	18,936	8,082
1815	1.04	0.58	0.14	346	19,016	6,585
1816	0.96	0.62	0.16	374	19,096	7,137
1817	1.15	0.55	0.14	329	19,176	6,301
1818	0.86	0.71	0.18	429	19,256	8,268
1819	0.69	0.80	0.20	483	19,337	9,349
1820	0.74	0.74	0.19	417	19,418	8,093
1821	0.75	0.71	0.18	402	19,500	7,841
1822	0.72	0.74	0.19	417	19,700	8,224
1823	0.68	0.80	0.20	450	19,903	8,965
1824	0.63	0.81	0.20	457	20,108	9,196
1825	0.64	0.83	0.21	467	20,314	9,480
1826	0.66	0.81	0.20	458	20,523	9,401
1827	0.69	0.82	0.21	460	20,734	9,542
1828	0.75	0.72	0.18	406	20,947	8,512
1829	0.73	0.77	0.19	432	21,163	9,150

	1	2	3	4	5	6
	Price index 1911 = 1	Real wage index 1911 = 1	Per hour real wages 1911 prices	Per c. GDP 1911 prices	Population (000)	GDP (000,000) 1911 prices
1830	0.70	0.69	0.17	347	21,380	7,414
1831	0.70	0.75	0.19	376	21,600	8,124
1832	0.71	0.74	0.18	370	21,727	8,029
1833	0.72	0.75	0.19	375	21,854	8,201
1834	0.61	0.87	0.22	435	21,982	9,570
1835	0.61	0.88	0.22	442	22,111	9,782
1836	0.64	0.82	0.20	410	22,241	9,124
1837	0.71	0.78	0.19	390	22,371	8,735
1838	0.72	0.73	0.18	367	22,502	8,249
1839	0.74	0.73	0.18	369	22,634	8,355
1840	0.74	0.73	0.18	348	22,767	7,921
1841	0.73	0.79	0.20	375	22,900	8,598
1842	0.72	0.79	0.20	377	23,083	8,708
1843	0.74	0.71	0.18	337	23,268	7,847
1844	0.73	0.71	0.18	337	23,454	7,907
1845	0.73	0.73	0.18	347	23,642	8,194
1846	0.74	0.68	0.17	322	23,831	7,685
1847	0.81	0.64	0.16	305	24,022	7,322
1848	0.74	0.69	0.17	327	24,214	7,929
1849	0.74	0.70	0.18	334	24,408	8,144
1850	0.74	0.70	0.17	352	24,603	8,669
1851	0.74	0.70	0.18	356	24,800	8,818
1852	0.76	0.67	0.17	339	24,894	8,439
1853	0.85	0.64	0.16	325	24,988	8,119
1854	1.01	0.62	0.16	313	25,083	7,860
1855	1.00	0.61	0.15	308	25,178	7,764
1856	1.01	0.56	0.14	283	25,273	7,152
1857	0.95	0.69	0.17	349	25,369	8,857
1858	0.84	0.71	0.18	359	25,465	9,153
1859	0.88	0.68	0.17	346	25,562	8,855
1860	0.91	0.67	0.17	364	25,659	9,331
1861	0.94	0.63	0.16	336	25,756	8,664
1862	0.92	0.64	0.16	345	25,933	8,938
1863	0.89	0.67	0.17	353	26,110	9,214
1864	0.85	0.69	0.17	346	26,289	9,084
1865	0.87	0.72	0.18	364	26,470	9,638
1866	0.93	0.72	0.18	339	26,652	9,043
1867	1.00	0.72	0.18	341	26,835	9,154
1868	0.98	0.70	0.17	343	27,019	9,275
1869	0.95	0.70	0.17	352	27,203	9,564
1870	0.99	0.70	0.17	369	27,390	10,099
1871	1.13	0.70	0.17	366	27,578	10,090
1872	1.20	0.63	0.15	360	27,748	9,997
1873	1.26	0.60	0.15	359	27,886	10,019
1874	1.17	0.57	0.14	385	27,982	10,783
1875	1.12	0.67	0.16	376	28,258	10,618
1876	1.06	0.63	0.16	362	28,428	10,293
1877	1.12	0.61	0.15	367	28,598	10,481
1878	1.16	0.64	0.16	386	28,768	11,111
1879	1.16	0.66	0.16	385	28,938	11,147

	1	2	3	4	5	6
	Price index 1911 = 1	Real wage index 1911 = 1	Per hour real wages 1911 prices	Per c. GDP 1911 prices	Population (000)	GDP (000,000) 1911 prices
1880	1.12	0.65	0.16	395	29,108	11,488
1881	1.10	0.70	0.17	405	29,278	11,861
1882	1.05	0.73	0.18	414	29,493	12,221
1883	1.01	0.75	0.18	419	29,707	12,462
1884	0.94	0.78	0.19	404	29,921	12,095
1885	0.90	0.77	0.19	416	30,135	12,529
1886	0.88	0.78	0.19	435	30,350	13,201
1887	0.88	0.80	0.19	441	30,564	13,483
1888	0.90	0.79	0.19	435	30,779	13,398
1889	0.93	0.78	0.19	418	30,993	12,963
1890	0.95	0.75	0.18	429	31,207	13,393
1891	0.95	0.74	0.18	443	31,421	13,907
1892	0.93	0.73	0.18	439	31,637	13,900
1893	0.88	0.74	0.18	449	31,851	14,294
1894	0.86	0.74	0.18	450	32,065	14,442
1895	0.86	0.75	0.18	455	32,279	14,684
1896	0.89	0.76	0.19	458	32,493	14,893
1897	0.89	0.77	0.19	460	32,707	15,029
1898	0.89	0.78	0.19	461	32,921	15,180
1899	0.89	0.79	0.20	465	33,134	15,402
1900	0.88	0.80	0.20	475	33,343	15,838
1901	0.89	0.83	0.21	483	33,513	16,178
1902	0.89	0.85	0.21	492	33,695	16,566
1903	0.88	0.84	0.21	504	33,813	17,030
1904	0.90	0.83	0.21	518	34,071	17,658
1905	0.90	0.85	0.21	533	34,192	18,226
1906	0.90	0.87	0.22	551	34,355	18,938
1907	0.91	0.87	0.22	573	34,594	19,832
1908	0.94	0.94	0.23	580	34,930	20,243
1909	0.97	0.99	0.25	586	35,202	20,625
1910	0.98	1.00	0.25	582	35,560	20,706
1911	1.00	1.00	0.25	585	35,905	21,005
1912	1.01	1.02	0.25	604	36,181	21,862
1913	1.02	1.04	0.26	629	36,275	22,818

[1] E.g., A. Bellettini, *La popolazione italiana dall'inizio dell'età volgare ai nostri giorni*, 5, I, pp. 487-532, and A. Caracciolo, *La storia economica*, 3, pp. 508-693, both in R. Romano, C. Vivanti (eds.), *Storia d'Italia*, Torino, 1972 ff.

[2] I discussed this topic in P. Malanima, *L'economia italiana. Dalla crescita medievale alla crescita contemporanea*, Bologna, 2002.

[3] See also P. Malanima, «Le crisi in Italia e la crisi del Settecento», in *Società e storia*, 2003, 100-101.

[4] With the exception of R. 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, who constructed yearly series of prices and wages for Italy as well as other European countries (his annual data are available at www.nuffield.oxford.ac.uk/users/allen). On his series for Italy see P. Malanima, «Wages, Productivity and Working Time in Italy» (forthcoming), where I discussed the series of Italian wages developed by Allen.

[5] I will not discuss the sources I used to build my series in the text. You will find this information in the notes to the Appendices.

[6] The annual series of population from 1700, on which the figure is based, is in App. II, col. 5.

[7] See also the North and South price indices in App. I, cols. 1-2, and figs. 11-12.

[8] In the following pages I will examine wage rates rather than wages. For the sake of brevity, however, I will sometimes use the terms «wage» and «wage rate» interchangeably.

[9] On the data and criteria used to build the series, see App. I.

[10] I examined the available data on Italian wages more in depth in Malanima, *L'economia italiana*, App. 4.

[11] The reasons for this difference may be that in agriculture wages were already much lower than in urban economic activities. If their reduction had been the same as in the industry, it may have pushed wages below the survival threshold. Another reason could be the recovery of the Italian rural economy from 1818 onward (as we will see later).

[12] See App. I.

[13] L. Palumbo, *Prezzi e salari in Terra di Bari (1530-1860)*, Bari, 1979; L. Palumbo, «Notizie intorno a salari di muratori e di contadini pagati a Molfetta nel secolo XVIII», in *Archivio storico pugliese*, XXV, 1972; L. Palumbo, «Il mercato», in L. Palumbo, G. Poli, M. Spedicato (eds.), *Quadri territoriali, equilibri sociali e mercato nella Puglia del Settecento*, Galatina, 1987; C. Massa, «Salarii agricoli in Terra di Bari (1447-1733)», in *Atti dell'Accademia Pontaniana*, XLII, 1912.

[14] I have used two different price indices to deflate northern and southern wage series.

[15] Unfortunately the available data do not allow, at the moment, a comparison between the level of wages in the North and the South.

[16] See the trends illustrated in Allen, «The Great Divergence in European Wages and Prices».

[17] On these events, see M. Romani, *Storia economica d'Italia nel secolo XIX (1851-1882)*, Bologna, 1982 (I ed. 1970), pp. 154 ff.; S. Battilossi, «Annali», in P. Ciocca, G. Toniolo (eds.), *Storia economica d'Italia*, Roma-Bari, 1999, II, pp. 59, 67, 75, 79, 82.

[18] I first constructed separate series for the North and the South, based on a weighted average of industrial and agricultural wages (I derived the weight of non-agricultural sectors from the urbanization rates). I then combined these two series in the Italian hourly series referred to in the text.

[19] S. Fenoaltea, «Production and Consumption in post-Unification Italy: New Evidence, new Conjectures», in *Rivista di storia economica*, n.s., XVIII, 2002.

[20] V. Zamagni, «An International Comparison of Real Industrial Wages, 1890-1913: Methodological Issues and Results», in P. Scholliers (ed.), *Real Wages in 19th and 20th Century Europe. Historical and Comparative Perspectives*, New York-Oxford-Munich, 1989.

[21] The movement of a series of daily wages would obviously be the same.

[22] G. Federico, «On the Economic Causes of the Italian Risorgimento: Market Integration in the 19th Century» (forthcoming).

[23] A similar eighteenth century trend is described by the series by C. Vivanti, «I prezzi di alcuni prodotti agricoli a Mantova nella seconda metà del XVIII secolo», in R. Romano (ed.), *I prezzi in Europa dal XIII secolo a oggi*, Torino, 1967, pp. 419-436 [I ed. 1958].

[24] The same upward trend has been noticed in the industry by S. Fenoaltea, «Production and Consumption in post-Unification Italy», pp. 282-283, and in agriculture by G. Federico, «Le nuove stime della produzione agricola italiana, 1860-1910: primi risultati ed implicazioni», in *Rivista di storia economica*, n.s., XIX, 2003, pp. 359-382.

[25] J.-L. Van Zanden, «Wages and the Standard of Living in Europe, 1500-1800», in *European Review of Economic History*, III, 1999.

[26] Allen, «The Great Divergence in European Wages and Prices».

[27] See especially J. Söderberg, «Real Wage Trends in Urban Europe, 1730-1850: Stockholm in a Comparative Perspective», in *Social History*, 12, 1987, pp. 155-176.

[28] The table is based on Allen, «The Great Divergence in European Wages and Prices», on my data for Florence, and on Zamagni, «An International Comparison» (for 1905).

[29] A. Smith, *The Wealth of Nations*, I, 8.

[30] It is important to distinguish between wage rate – per hour or day wage – and the actual wages, which is equal to the wage rate multiplied by the hours or days actually worked. I stressed differences in the movements of wages and wage rates in Malanima, «Wages, Productivity, and Working Time in Italy (1270-1913)» (forthcoming).

[31] See especially E. Boserup's classical book *The Conditions of Agricultural Growth*, London, 1965.

[32] P. Malanima, «Measuring the Italian Economy», in *Rivista di Storia Economica*, XIX, 2003, pp. 265-295 (decadal series); J.L. Van Zanden, «Una estimación del crecimiento económico en la Edad Moderna», in *Investigaciones de Historia Económica*, I, 2005, 2, pp. 9-38 (annual series). See also the estimate of the agricultural product in G. Federico, P. Malanima, «Progress, Decline, Growth: Product and Productivity in Italian Agriculture, 1000-2000», in *Economic History Review*, LVII, 3, 2004, pp. 437-464.

[33] I assume that the values of the coefficients we are looking for were more or less the same both in the North and South. The Centre and North did not differ, under this respect, from the peninsula as a whole.

[34] Obviously, the formula would remain unchanged if we chose to use daily rather than hourly rates: the result would simply be the number of days rather than that of hours.

[35] *Sommario di statistiche storiche dell'Italia 1861-1975*; V. Zamagni, «A Century of Change: Trends in the Composition of the Italian Labour-force, 1881-1981», in *Historical Social Research*, 44, 1987, p. 56, estimates the Italian active population in 1881 at 52.1 percent. This estimate, however, does not include the work of women employed in the domestic industry for self-consumption. My opinion is that this female work force must be included in estimates. Domestic industry for self-consumption is, after all, a kind of organization of the industrial activity in pre-modern agrarian societies. Its product is included in GDP estimates, and the workers employed in it must be included in the total labour force as well. See also data in A. Maddison, *Dynamic Forces in Capitalist Development. A Long-run Comparative View*, Oxford-New York, 1991, p. 267.

[36] A.J. Coale, P. Demeny, *Regional Model Life Tables and Stable Populations*, New York-London, 1983.

[37] On the basis of data from censuses: ISTAT, *Sommario di statistiche storiche italiane (1861-1955)*, Roma, 1958, p. 14.

[38] We assume 60 percent, as at the end of the nineteenth century, although any other percentage between 55 and 62 could be just as plausible.

[39] I discussed this topic more extensively in Malanima, «Wages, Productivity, and Working Time in Italy (1270-1913)» (forthcoming). I estimate marginal labour productivity as the derivative of the production function as to the number of workers (L) in any decade during the period 1310-1820. I have already presented decadal product series in Malanima, «Measuring the Italian Economy». As to the labour force, as I said above, I assume 60 percent of the Italian population. It is impossible, in this phase, to use the previously calculated wage rates since we do not know yet what the h parameter was (that is, how long a worker actually worked).

[40] I have discussed this topic, too, in Malanima, «Wages, Productivity and Working Time in Italy (1270-1913)».

[41] Zamagni, «An International Comparison», p. 113.

[42] These investigations have been used by Federico, «Contadini e mercato: tattiche di sopravvivenza», in *Società e Storia*, X, 1987.

[43] In figure 6 I show different combinations of q and h. I have assumed values from 0.75 to 0.60 for q, and different labour intensities (10 percent more and 10 percent less as regards the result I reached with the procedure just described).

[44] The equation resulting from the linear regression is:

$$y = 1867.8\ w + 18{,}784$$

(R2 = 0.89; P-value 5.24E-13)

where y is per capita GDP and w is wage rate per hour.

[45] The procedure I followed to reconstruct the per capita GDP from 1861 until 1913, and the sources employed are presented in App. II.

[46] See, for instance, the high prices of cereals and wine on the Turin market in those years reported by G. Felloni, «I prezzi del mercato di Torino dal 1815 al 1890», in Id., *Scritti di storia economica*, Genova, 1999 [I ed. 1957], II, pp. 733-64.

[47] Figure 8 represents the deviations as to a mobile average of 11 terms.

[48] On the issue, however, see Federico, «On the Economic Causes of the Italian Risorgimento» and K.G. Persson, *Grain Markets in Europe 1500-1900. Integration and Deregulation*, Cambridge, 1999.

[49] This possibility of adapting growth models to pre-modern economies was already clear to R.M. Solow, *Growth Theory: an Exposition*, Oxford, 1970, ch. 2.

[50] See the general remarks by S. Kuznets**,** «Capital Formation in Modern Economic Growth (and some Implications for the Past)», in *Troisième conférence internationale d'histoire économique* (Münich 1965), Paris-La Haye, 1968, I, pp. 15-53.

[51] See, for instance, R.M. Solow, *Lezioni sulla teoria della crescita endogena*, by S. Sordi, Roma, 1994, pp. 17 ff.

[52] On this matter, I subscribe to the opinion put forward by E.A. Wrigley in several essays. See especially those collected in *Poverty, Progress and Population,* Cambridge, 2004.

[53] C.M. Cipolla, «Il declino economico dell'Italia», in Id., *Le tre rivoluzioni e altri saggi di storia economica e sociale*, Bologna, 1989, pp. 85-104. The original title of this article referred to the Italian economy as a «fully mature economy».

[54] This topic has been more widely discussed in E. Lo Cascio, P. Malanima, «Cycles and Stability. Italian Population before the Demographic Transition (225 B.C. – A.D. 1900)», in *Rivista di storia economica*, n.s., XXI, 2005, 3.

[55] P. Malanima, «Urbanisation and the Italian Economy during the last Millennium»*,* in *European Review of Economic History*, 9, 2005, pp. 97-122.

[56] Malanima, «Urbanisation and the Italian Economy», p. 106.

[57] Lo Cascio, Malanima, «Cycles and Stability».

[58] See on this new phase A. Bellettini, «L'evoluzione demografica nel Settecento», in Id., *La popolazione italiana. Un profilo storico*, Torino, 1987 [I ed. 1980], and M. Breschi, L. Pozzi, R. Rettaroli, «Analogie e differenze territoriali nella crescita della popolazione italiana, 1730-1911», in *Bollettino di demografia storica*, 20, 1994.

[59] See the graph on Veneto in Malanima, *L'economia italiana*, p. 116.

[60] See the long series concerning Padua from 1725 onward in D. Camuffo, «Analysis of the Series of Precipitation in Padua, Italy», in *Climatic Change*, 6, 1984, pp. 57-77.

[61] B. A'Hearn, «Anthropometric Evidence on Living Standards in Northern Italy, 1730-1860», in *Journal of Economic History*, 63, 2003, and Id., «Il benessere

dell'Italia settentrionale nel secolo e mezzo precedente l'Unità», in *Rivista di storia economica*, n.s., XIX, 2003.

[62] On this subject, see the essays collected in *Istituto A. Cervi. Annali*, 1989, XI and P.R. Corner, *Contadini e industrializzazione. Società rurale e impresa in Italia dal 1840 al 1940*, Bari-Roma, 1993.

[63] G. Federico, *Il filo d'oro. L'industria mondiale della seta dalla Restaurazione alla grande crisi*, Venezia, 1994; F. Battistini, *L'industria della seta in Italia nell'Età Moderna*, Bologna, 2003; Id., «Il setificio italiano alla fine del Settecento: uno sguardo quantitativo», in *Rivista di storia economica*, n.s., XX, 2004, pp. 129-144.

[64] See especially F. Bonelli, «Il capitalismo italiano. Linee generali d'interpretazione», in *Storia d'Italia. Annali 1*, *Dal feudalesimo al capitalismo*, Torino, 1978, pp. 1193-1255, and L. Cafagna in several essays now collected in *Dualismo e sviluppo nella storia d'Italia*, Venezia, 1989.

[65] Federico, *Il filo d'oro*, p. 450.

[66] Cipolla, «Il declino economico dell'Italia».

[67] C.M. Cipolla, *Tre storie extra vaganti*, Bologna, 1994, p. 105.

[68] See, for instance, the essays collected in P. Clarke, C. Trebilcock (eds.), *Understanding Decline. Perceptions and Realities of British Economic Performance,* Cambridge, 1997, and especially those by B. Supple, «Fear of Failing: Economic History and the Decline of Britain», and P. Temin, «Measuring Economic Decline».

[69] P. Malanima, *La fine del primato. Crisi e riconversione nell'Italia del Seicento*, Milano, 1998.