PAOLO MALANIMA

Measuring the Italian Economy. 1300-1861

The work of Seventeenth and Eighteenth century arithmetic politicians has recently been resumed. A new interest has arisen for measuring wealth, income, capital formation, product, productivity in pre-modern agrarian economies. It is now possible for some European regions to draw an outline of per capita product from the Sixteenth century onwards and to define an economic hierarchy. [1] Diverse approaches have been tried in these attempts at a quantification. They range from direct case-studies on specific regions where documents are plentiful and seemingly reliable (for example contemporary estimates of wealth or income for taxation purposes) to estimates by contemporary writers or political men (such as Gregory King's calculations) and to figures derived from specific kinds of income – mainly wages – (such as the ones advanced by Bairoch some time ago). [2] These attempts have proposed a composite mosaic of data with different degrees of reliability.

Our purpose in the following pages is to outline the Italian aggregate and per capita output from the late Middle Ages until the Unification of the country in 1861. The Centre-North will be considered here as stretching from the Southern borders of the current regions of Tuscany, Umbria, Marche to the Alps: 161,000 sq. km. Our final series will be made up of decadal averages from 1300 onwards; as this is the starting point for our basic statistical data.

A new method will be presented. [3] A series of past estimates together with values computed by modern historians will be examined at the beginning to define the possible range of the actual variations (par. 1). Four long-term series – population, prices, wages, urbanization – will then be introduced to obtain a concise view of the product

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movement we are looking for and to provide the background for statistical elaboration (par. 2). It will then be possible from the first three series mentioned to outline the trend in agricultural product (par. 3). The next step will be to add the product of secondary and tertiary sectors to the agricultural product, indirectly through urbanization, to obtain the long-term estimate we are looking for (par. 4) and to define periodization (par. 5). Once defined, the Italian trend will be compared to the somewhat fragmented knowledge available for other European regions and to the few attempts at establishing continuous series for pre-industrial Europe (par. 6).

The method followed here differs from the attempts made until now to quantify pre-modern economic movement. The same method could be usefully employed for other pre-industrial agrarian economies. The ingredients needed to adapt this method to other case-studies are multisecular series of population, prices (both agricultural and non-agricultural), wages (possibly, but not necessarily, non-urban, that is agricultural, wages) and series of urbanization. For Italy these series have only recently been elaborated. [4] The other data we need are usually available in late Nineteenth-early Twentieth century modern national accounts.

Absolute certainty in these attempts regarding remote pre-statistical eras is impossible to reach. Reliable results, with narrow margins of error, are, on the contrary, attainable. After all, in the pre-modern world, changes in consumption, in prices and in product were relatively modest. It is not impossible to identify the range of variations. Transparency in any step may allow the reader to introduce new data and to obtain better results. We cannot but agree with an experienced scholar in this kind of research, Angus Maddison, when he writes that «quantification clarifies issues which qualitative analysis leaves fuzzy. It is more readily contestable and likely to be contested. It sharpens scholarly discussion, sparks off rival hypotheses, and contributes to the dynamics of the research process». [5]

1. *Old estimates*

The older and more recent attempts may help define the range of possibilities. A simple collection of these calculations

TAB. 1. *Prices of an essential basket of agricultural and industrial products and rent in 1360-70, 1460-70, 1580-90, 1770-80, and 1860-70 (in current money and conversion into 1860-70 Italian lire)*

Goods	Quantity (kg. per year)	1360-70 (Florentine lire)	1460-70 (Florentine lire)	1580-90 (Florentine lire)	1770-80 (Milanese lire)	1860-70 (Italian lire)
Wheat	50	2.6	2.5	11.5	14.0	13.8
Minor cereals	170	5.3	4.9	23.0	36.0	27.4
Meat	10	5.2	4.2	10.6	11.7	13.7
Wine	80	3.3	5.6	16.0	28.0	45.4
Olive oil	3	1.0	1.7	3.5	11.9	7.3
Firewood	365	0.9	1.1	2.7	8.4	14.3
Textiles		2.7	3.5	6.4	15.7	10.7
Housing		2.5	2.8	7.4	12.2	15.3
Total (current prices)		23.5	26.3	81.1	137.9	178.1
Total (1860-70 It. lire)		180.4	168.2	159.2	174.9	178.1

is, however, hardly useful without some landmark to guide us in this unknown territory. Our landmark will be what we should call a «line of poverty»: an income, that is, just consistent with survival and with the historically relative needs of pre-industrial Europe. We will measure some available estimates as to this poverty line.

There are many different and contrasting definitions of the poverty line. Here we assume a quantity of food sufficient to provide about 2100-2200 calories daily, some heating, some type of lodging and some clothing. Since, generally speaking, prices for these consumption articles were urban – and therefore higher than in the rural areas, where the wide majority of people lived – and since tastes in the cities were more refined and consequently the standard of living was more expensive than in rural areas, we will assume the lowest prices and the coarsest tastes: bad wine, mainly minor cereals and rough cloth (Tab. 1). [6]

The level we reach is mainly around 170-180 1860-70 Italian lire.

If a society were made up of people only able to buy such essential baskets, inequality would be impossible. If somebody had more than strict necessity, somebody else would be pushed under the poverty line, which is also the line of survival. Let us introduce the inevitable inequality and draw a higher line. This higher line corresponds to a poor society where the richest 10 percent of the population plus State administration controls 40 percent of the yearly

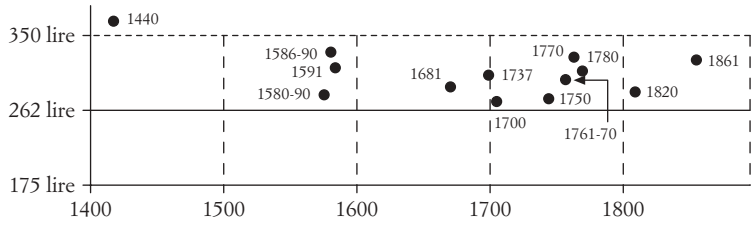

FIG. 1. Estimates of per capita GDP (15th-19th c.).

product. This was more or less the rule in past agrarian societies which were less equalitarian than those in our advanced world. [7] The new line is 50 percent higher than the physiological minimum just calculated. [8] Another yet higher line is drawn to show a sum twice the line of poverty: 350 lire.

We then insert the values available for the six centuries under examination into the graph (Fig. 1). [9] These estimates cluster – with only one exception in the Fifteenth century – between the intermediate line of the social minimum and the highest line which is twice the line of poverty. They suggest, for the early Modern Age, a range between 262 and 350 1860-70 Italian lire. For the late Middle Ages, the only value (concerning Tuscany in the first half of the Fifteenth century), [10] suggests that per capita income could have been higher than in later years.

This first result is quite useful. On its basis, we may suppose that the variation of per capita product along the centuries *probably* moved within a very narrow range. In the 140 years from 1861-2000, per capita product increased in Italy 13-14 times – from 1300 International (1990) dollars to 18,000. [11] In Central and Northern Italy it increased 16-17 times – from 1300-1400 to 23,000. According to this first provisional result, based on fragmented and doubtful evidence, we find that during the 560 years of our investigation, it remained probably between 1200 and 1700-1800 International (1990) dollars. [12] If this were really the case, ours would appear, if not an «immobile», certainly a «scarcely mobile» history.

The main utility of this first collection of estimates is, anyway, the definition of possible values. Sometimes, when dealing with monetary data processed through price indices and deflated series, we obtain values that are inconsistent

with past reality. An initial investigation into what people in the past and recent historians have estimated about the standard of living and a control of their data by means of actual prices and quantities may be a starting point to enable us to make more effective comparisons between reality and our results. This is only the first step.

2. *Four series*

Population series, prices, wages and urbanization may be now introduced into this network of possible levels to indirectly outline trends. [13] This is the second step.

Population. Italy's population has been partially reconstructed through the aggregate method of inverse projection: from 1575 the demographic movement in Tuscany; [14] from 1650 in the Centre-North. [15] Especially for Tuscany, the result describes a more satisfying long-term trend than the ones already available. For Central-Northern Italy as a whole, the trend is more uncertain than for Tuscany. For the period before the Sixteenth century, Italy's population movement is still based on the reconstruction of Karl Julius Beloch. [16] More recent results confirm Beloch's trend. [17] Here decadal values are interpolated from Beloch's figures and from the ones proposed by more recent demographers (Fig. 2). In particular, the late-medieval level could be better specified. [18]

The existing differences between Tuscany, on the one hand, and the Centre-North, on the other, are easily explainable: in the middle of the Fourteenth century, the Black Death was less deadly in the Po Valley than in the densely populated and highly urbanized Tuscany. In the 1629-30 epidemics, mortality was, on the other hand, much higher in Lombardy and Venetia than in Tuscany. After the middle of the Seventeenth century the intensity of the population rise was the same in Tuscany and Po Valley.

From a demographic viewpoint, the beginning of the Fourteenth century brought in a new era. The late medieval increase was over. A long period – about 300 years – of stability and decline was just starting. In particular, the two major plague epidemics, in 1348-49 and in 1629-30, together with other minor, but frequent epidemics, contributed to halt the rising trend. The two main plague outbursts were

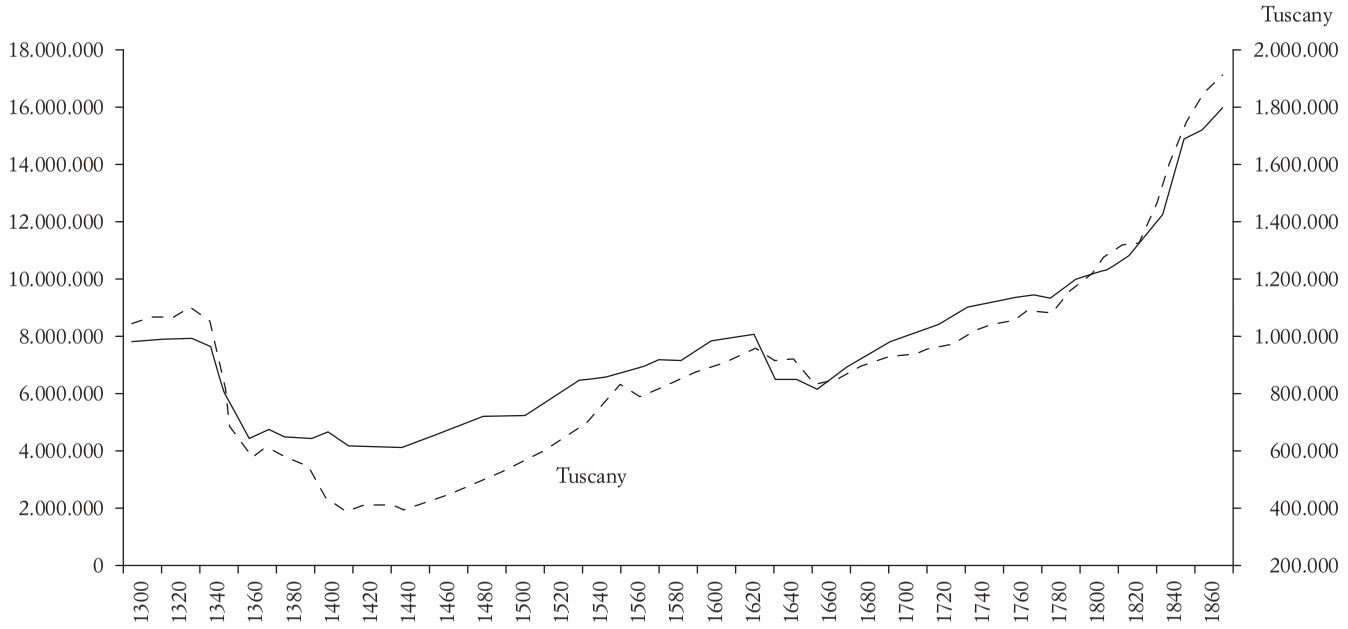

FIG. 2. Popolation in Italy CN and in Tuscany (1300-1860).

separated by a relatively rapid increase from 1450 until about 1575 [19] and then a decline. In the middle of the Seventeenth century, the population of Central-Northern Italy was 1.5 million lower than at the peak of the medieval rise. The modern growth of the population began around 1660-70. It was a European and probably a worldwide demographic change. In Central-Northern Italy the population was 6,230,000 in 1650. It was more than 10 million in 1800; it was 16 million in 1860-70.

Italian demographic trends from the late Middle Ages may thus be divided into two 300-350 year phases: one of relative stability, from 1300 until 1650; and one of rapid increase from 1650 until about 2000.

Prices. Changes in prices were very slow before the Twentieth century; in consumption patterns they were almost non-existent. Prices increased in Italy by less than 0.5 percent a year in the 560 years from 1300 to 1860-70. In consumption, the only meaningful transformations in Cavour's time, compared to Dante's era – and probably even to Virgil's time – were maize and potato, tomato, coffee, tobacco, all introduced in the Sixteenth and Seventeenth centuries. With the exception of maize, they hardly modified the Italian consumption standards. [20]

The price index presented here closely follows the demographic movement from the late Middle Ages until the end of the Nineteenth century (Fig. 3). [21] Certainly, other factors also influenced price trends, first and foremost the availability of precious metals and monetary exchange. However, their importance was, generally speaking, secondary. Prices increased in the late Middle Ages, when the population rose; they decreased and stabilized for a century after the Black Death, they rose with the Sixteenth-century population growth; they decreased after the 1575 epidemics and especially after the 1629-30 plague; they increased again at the end of the Seventeenth century. A change in this correlation took place only after 1820: prices became relatively stable while the population increased. We will return to this significant new trend later. A growing population in this pre-modern world implied an increase in the demand for primary articles, an increase in the velocity of money circulation and often an increase in money stock in the face of a slowly growing supply of agricultural goods. Prices could only rise.

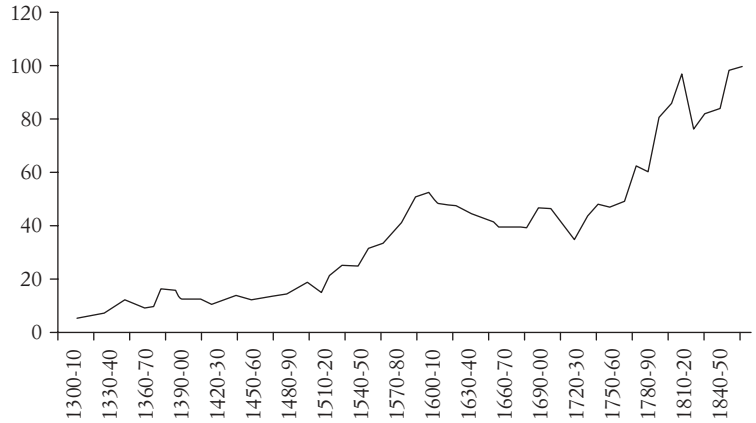

FIG. 3. Italian price index (1300-1870) (1420-40 = 1).

Since the method of estimating agricultural product involves the use of agricultural and non-agricultural prices, we need to distinguish their trends.[22] Agricultural goods increased much more than non-agricultural ones and more than the price index: by 9.20, 2.31 and 8.24 respectively from 1420-40 until 1860-70. While decreasing returns following demographic increases characterized agriculture, in industry and services we find increasing returns from the increasing cooperation and accumulation of knowledge. But since food and materials increased in price, non-agricultural prices inevitably followed suit. The classical and especially Ricardian explanation about the relation between agriculture and industry fits the pre-industrial world well.

Wages. Urban wage rates steadily declined from the late Middle Ages.[23] Their movement shows a clear inverse relation both as regards prices and the population. From their zenith in the Fifteenth century to their nadir between 1800 and 1870 they decreased more than 50 percent in real terms (Fig. 4).[24] Their decline occurred not only in relation to the Fifteenth century, a happy period for salaried workers, but also to the Fourteenth century. Since, as we shall see, per capita output performance was much less negative, the only explanation is that workers worked much less when wages were high and were obliged, instead, to toil much more when wages were low. The ratio between wage

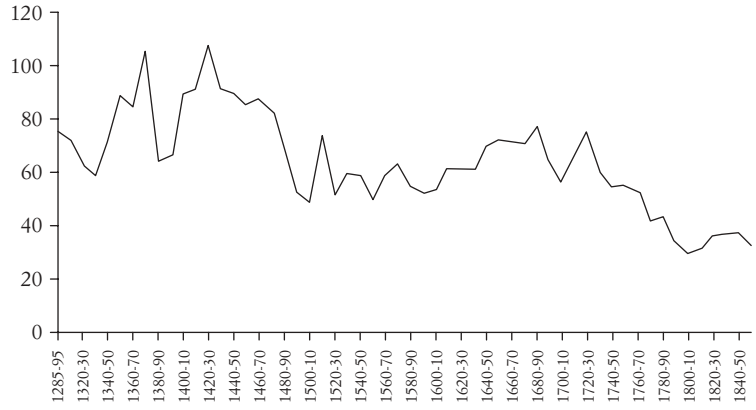

FIG. 4. Builders' wages in Tuscany (1285-1860) (1420-40 = 1).

level and work supply, which is direct today, was inverse in traditional agrarian society. We know very little, at the moment, about real labour earnings. A complete picture should include figures on the working population over time and working hours; topics on which information is still scant and unsatisfactory.

Some clear phases are discernible in the declining trend. A strong rise took place after the Black Death and the late medieval epidemics and lasted until population growth resumed around 1450. Real wage rates rapidly diminished in Italy thereafter; much earlier than in other European regions. They remained low until the Seventeenth century demographic decline, and rose thereafter. A sharp and rapid decline occurred in the Eighteenth century. The lowest level was reached between 1810 and 1820. A very uncertain recovery took place after 1820. On the eve of the First World War, however, Italian wages were still lower than in the late Middle Ages.

Agricultural wages follow the same long-run trends, although the long-term decline was stronger (Fig. 5). [25] They were higher in relation to urban wages in periods of urban difficulty and crisis as during the late Middle Ages, when markets for Italian products and services plummeted because of the decline in the population, and during the first half of the Seventeenth century, another well-known era of crisis for Italy's urban society.

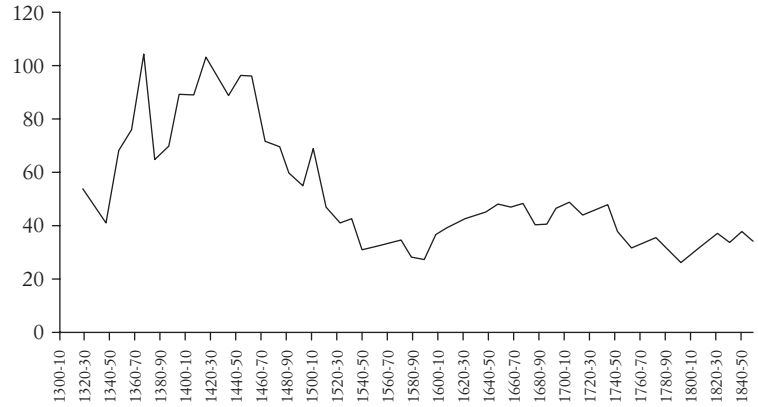

FIG. 5. Agricultural wages in Central-Northern Italy (1320-1860).

Urbanization. Urbanization trends always provide important information about the health of the economy in the pre-industrial world. [26] An increase in the urban population is a symptom of change in the economic structure in favour of the secondary and tertiary sectors, which usually are more productive and innovative than the primary. On the other hand, agriculture too has to be more productive in a highly urbanized system, since fewer workers in the countryside have to feed a higher number of urban inhabitants.

If a relation exists between urbanization and economic performance, then Central-Northern Italy reveals a declining trend in productivity since the movement is clearly downward oriented: from 1300 until 1861 the decline in urbanization was 5 percent if we consider the centres with more than 5000 inhabitants (Fig. 6 and Tab. 2). [27] The fall was sudden and sharp during the late medieval industrial and commercial crisis; recovery, however, was rapid in the second half of the Fifteenth century. A slow downward movement took place from the Seventeenth century; in the first half of the Nineteenth century the decline quickened just when urban populations were increasing in relative terms all over Europe. Italy was, therefore, the only exception, as far as we know, in an urbanizing continent. [28]

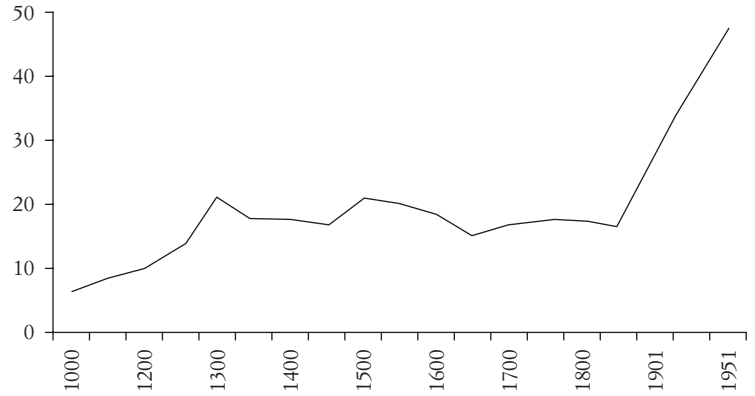

FIG. 6. Urbanization in Italy CN (1000-1950).

TAB. 2. *Urbanization in Central-Northern Italy from 1300 to 1861 (cities with at least 5000 inhabitants)*

	Urban population	Urbanization %
1300	1,657	21.4
1350	992	17.7
1400	829	17.6
1450	752	17.0
1500	1,117	21.0
1550	1,357	20.0
1600	1,438	18.4
1650	947	15.2
1700	1,363	16.9
1750	1,646	17.7
1800	1,788	17.5
1861	2,590	16.2

An initial reconstruction. The four previous series allow us to make an initial reconstruction of Italian economic performance over six centuries.

As regards the aggregate trend, while in the first three centuries of our reconstruction, we can expect stability and, in some periods, a decline in aggregate output, because of the overall stability (with periods of decline) in population, in the period 1650-1861, growth must have taken place. Such a long-lasting demographic rise must have been sustained by an increase in output.

Per capita production trends must have been different. A

long-run increase in the population and in prices and a decline in wage rates and urbanization imply a decrease in productivity and, as a consequence, a decrease in per capita output if the employment structure does not drastically change. While in late medieval and early modern eras, the plague kept the population level low, the pressure on resources increased thereafter. Decreasing returns must have been followed by a fall in per capita income.

The ratio between natural resources and humans inevitably declines when the population rises. Relative scarcity of natural resources may be compensated by an increase in produced resources, that is in capital, by means of new investments. If the rate of increase in capital is higher than the rate of increase in manpower, that is to say, in the population, productivity can grow and per capita product can grow as well. Due to the increase in capital, labour demand is higher than labour supply and wage rates have to rise in real terms together with the population and prices. We can suppose, on the contrary, that in Italy population growth was not followed by a more rapid increase in capital formation (especially in machinery and mechanical power). A long-term population rise must have been followed by a fall in the marginal product of labour and hence in the per capita product (when the activity rate remains unchanged), as wage rates clearly reveal. While in the first long period up to 1650 the plague heavily countered this tendency, keeping population consistent with natural and produced resources, from the late Seventeenth century the rise in population was no longer met by such high rates of recurring mortality. As a consequence, productivity and per capita product must have declined. The stop to the negative trend of real wages from 1820, together with price stability and a sharp rise in the population, implies, on the contrary, a break in the decline, even though the slow but continuous fall in urbanization suggests that the downward trend had not been completely reversed. The decline had only been temporarily halted. The forces of growth, however, were not yet fully at work. A low profile equilibrium still prevailed.

The results of the previous series do not seem easy to put together without the means of this classical theoretical apparatus.

3. *Agricultural product*

Since, for this prestatistical world, we lack sufficient and reliable data on the supply side, we can try to reach our goal of arriving at a concise view of Italian agricultural performance from the demand side.[29] Agricultural gross output could be simply calculated as the result of the product of per capita agricultural consumption – which is relatively well known – by the population. The use of this very simple method[30] depends, however, on two assumptions:

1) the economy must be closed, that is without exports and imports of agricultural products from and towards other regions. Only in this way do consumption and production coincide;

2) everybody must consume the same value of agricultural goods without changes brought on by movements in prices and incomes.

With regard to the first assumption, internal consumption is equal to internal product only if exchanges do not exist between our economy and the outside world. We know, however, that Central-Northern Italy was not isolated from an agricultural viewpoint. The densely populated cities in the Centre and North imported wheat, oil, wine from the South and from non-Italian regions as well, already in the late Middle Ages. Considerable imports of raw materials – silk, wool especially – took place in several periods. From a quantitative viewpoint, however, their importance was not so significant. In a period of intense importation of agricultural goods, like the second half of the Sixteenth century, they accounted for less than 5 percent of the Centre-North's gross product.[31] From the Seventeenth century onwards, agricultural raw materials such as raw silk began to be exported from the North beyond the Alps and, as a consequence, to counterbalance agricultural imports especially from Southern Italy.

Since, on the whole, the value of imports and exports in the period 1300-1861 – which are in any case hard to quantify exactly – were never high enough to modify the substance of our calculations, it is preferable to ignore them.[32]

The situation is different in the case of the second assumption. The movement of prices and real income heavily influenced the consumption of agricultural goods.

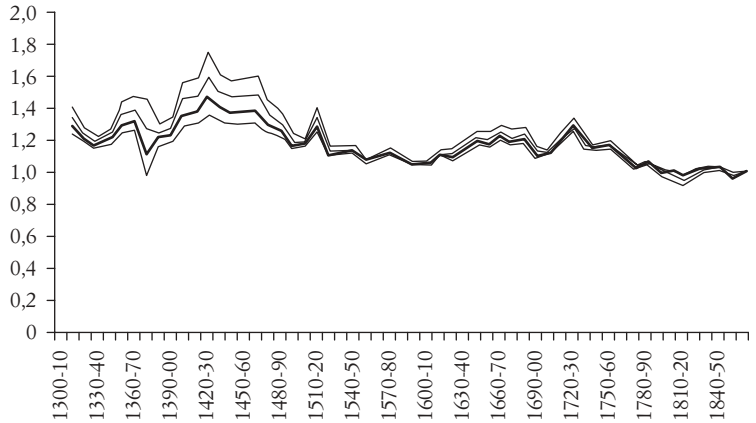

FIG. 7. Per c. agricultural consumption (1300-1860) (1860-70 = 1; different elasticities).

We can not keep consumption unchanged. If we wish to define agricultural product from the demand side, we have to take these conjunctural changes into account. An elasticity coefficient for prices and income is the result of the ratio between a change in the quantity demanded and a change in prices or income or in both. Now, since we are looking for changes in quantity over the centuries, but know, more or less, which coefficients of elasticity are consistent with the economy we are studying and know about prices and wages, we can proceed from elasticity coefficients for prices and wages to estimate changes in agricultural quantities. [33] This method of estimating agricultural product from the demand side has a tradition especially in studies on England and may produce good results. [34]

The problem now is what coefficients to use. We can take the ones worked out for today's backward economies. First of all, we take the four pairs of wage and price coefficients usually employed in such studies. Since the absolute sum of both coefficients must be 1, the combinations of the 8 most frequently used values as price and wage coefficients are only 4. As we can see, if price and wage series do not move far from the chosen benchmark, the results we reach are similar (Fig. 7). Only for the Fifteenth century, when both prices and wages are relatively far from the basis of our indices, do results diverge widely. In a dynamic economy

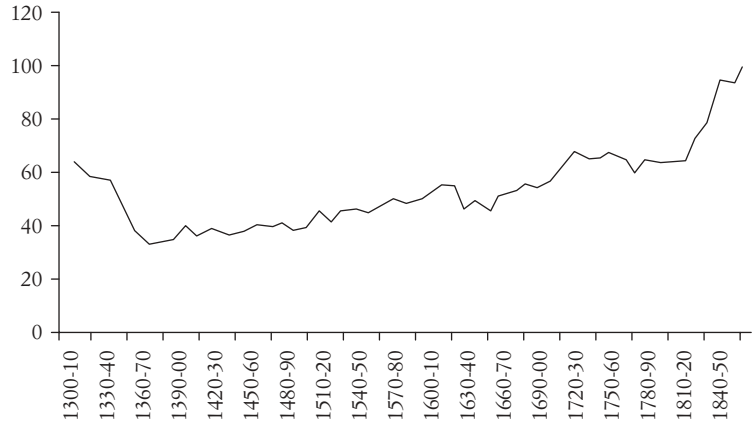

FIG. 8. Gross agricultural product in Italy CN (1300-1870) (1860-70 = 100).

experiencing great changes in the level of per capita agricultural production over time, the method could result in curves that diverge too much. Fortunately this is not the case with Italy.

In the end we have chosen an 0.4 wage elasticity and a –0.6 elasticity for agricultural prices. The use of other coefficients might introduce only marginal variations in our results. The wage series is an average made up of urban and rural wages and not just a series of urban wages, which is usually employed due to the lack of agricultural wage series for many other regions in Europe. Estimates concern changes in quantity consumed – and hence in product – over the centuries. [35] Assuming a real value for per capita agricultural output in 1860-70 from the results of the newly revised version of the Italian national accounts, we may construct a long-term series. [36] Multiplying the series by the population, we can estimate gross agricultural product.

The gross product series is inevitably rising, as we expected, because of the demographic growth. It falls sharply in periods of population decline. It declined, though slightly, in the second half of the Eighteenth century, while the population was increasing (Fig. 8).

Per capita agricultural product falls over the centuries. [37] However the decline was halted when epidemics determined sharp demographic trend reversals, especially during the century 1350-1450 and after 1629-30. As we see, the lowest

level was reached in the second decade of the Nineteenth century. Afterwards there was a slight recovery and then a period of stability. No growth at all took place in Italy at the beginning of Modern European Growth, although the demographic rise was not followed by a decline in per capita product as had always happened before. From a classical perspective, we might suspect that capital formation – especially for agricultural equipment – was then increasing at the same rate as the population.

4. *Industry and services*

Urbanization would suggest that in Northern and Central Italy the typical urban occupations, that is, those pertaining to industry and services, declined in the centuries we are considering, although, as we have seen, with occasional periods of recovery. In the economic structure, industry, trade, banking and other services played a central role at the beginning of the Fourteenth century. This was no longer the case in the period of Unification. In comparison with other European regions, at that time Italy appeared to be a deurbanized or scarcely urbanized country. The conclusion should be that the Italian economic structure was more advanced – that is less agrarian – in the Fourteenth century than at the end of the Nineteenth.

We should bear in mind, however, that all over Europe an increasing dispersion of industrial and commercial activities in the countryside took place from the Seventeenth century on. Protoindustry was in fact characterized by the birth of secondary activities outside the towns. Commercial networks developed in the countryside all over the continent. We might suspect, then, that while in the early Modern Age urbanization was declining in Italy, industrial dispersion in the countryside was counterbalancing urban decline and that, in the end, secondary and tertiary sectors flourished in both the Eighteenth and Nineteenth centuries despite deurbanization. We know, however, that because of the intensity of agricultural labour among peasant families, (as a consequence of the manifold cultivations – wheat but also maize – and especially of trees – vineyards and mulberry trees) that characterized Italian agriculture, protoindustrial activities did not play such an important role in Italy as in Northern European regions. [38] Wool, cotton,

silk and straw industries certainly advanced in small centres in the countryside. Overall, however, they do not seem to have compensated for the relative decline in the cities. The silk industry was the most important secondary sector in the North Italian countryside. On the eve of Unification, however, only about 200,000 workers were employed in processing raw silk; many more were engaged in breeding silkworms and in mulberry tree cultivation (but these were agricultural and not industrial occupations).

In order to quantify the role of secondary and tertiary activities in Italy, we will now identify the relationship between urbanization and the weight of the secondary and tertiary sectors on GDP after Unification, for which direct statistical data are available. If we take the relationship between urbanization and secondary and tertiary sectors in the period between Unification and the Second World War, we may then use the resulting equation to assess the importance of these sectors in previous centuries. In this way, we avoid the problem of secondary activities outside the cities. We do not identify, in fact, cities with industry and trades as we would do if we took the urban population as being made up of workers in secondary and tertiary activities. We simply discover the relationship between urbanization on the one hand and the product from industry and services on the other; whether the product from these two sectors was created within the city walls or outside. In the period from 1861 until 1938 non-urban industrial occupations flourished in Italy and our regression is based on urbanization – the dependent variable – and secondary and tertiary sectors – the independent variable –, widespread in the countryside as well and not only in the cities.

Both urbanization after 1861 and the economic structure are imperfectly known. Data on urban centres stopped being recorded after the 1871 census and demographers and statisticians have only been able to work out series of data that are not wholly comparable to those for the previous centuries. As to the economic structure, only uncertain data are available as the differences among the diverse series worked out by various historians reveal. Fortunately the recent publication of the first results of the revised national accounts at least throws light on the years 1891, 1911 and 1938. We have taken these three years as our benchmarks. The complete reconstruction of industrial output from 1861

TAB. 3. *Urbanization in Italy and the share of secondary and tertiary production in GDP 1861-1938*

	Urbanization	II and III sectors on GDP
1861	16.2	45.5
1871	17.8	45.4
1881	19.6	52.0
1891	20.7	55.7
1901	23.2	56.3
1911	25.9	61.9
1921	26.6	62.1
1931	29.0	66.0
1938	29.3	72.1

TAB. 4. *Estimated proportions of GDP in Italy CN by sectors of origin 1330-1861 (percent)*

	I	II and III
1300	45	55
1350	48	52
1400	55	45
1450	54	46
1500	46	54
1550	48	52
1600	51	49
1650	57	43
1700	54	46
1750	52	48
1800	53	47
1861	53	47

until 1913 helps clarify the movement of a part of non-agricultural product. The series for urbanization and GDP structure are based on the least doubtful among the available data (Tab. 3). [39] The regression of urbanization in relation to the economy is significant from a statistical viewpoint (Fig. 9). [40]

We can now use the equation to estimate the weight of secondary and tertiary activities from urbanization.

The economic structure from the late Middle Ages to Unification does not show profound changes like those we would probably find in other expanding North-European economies (Tab. 4). [41] The weight of agriculture remained between 45 and 55 percent. [42] It is impossible to distinguish the relative weight of industry and services. From the evidence after Unification, we suspect that non-agricultural output was equally divided between them.

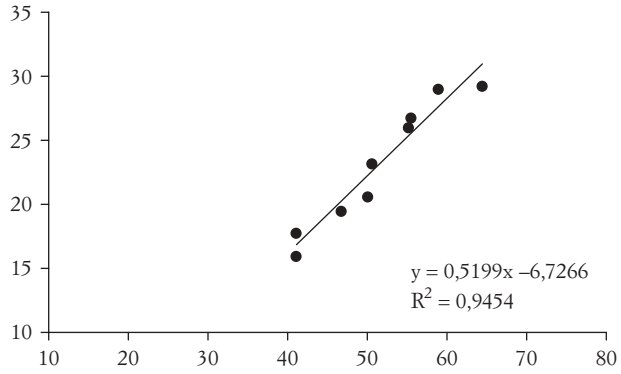

FIG. 9. Urbanization and II and III sectors on GDP.

In the late Middle Ages the Italian economy was, in relative terms, more industrialized than in the mid-Nineteenth century. The presence of services was higher. The arrival of the Black Death, which throughout Europe reduced the number of customers for the Italian secondary and tertiary sectors, led to a decline in urbanization and in the role of non-agricultural occupations, although the decline in urban occupations was compensated for by the expansion of demand for rural labour which was much more productive than before and therefore expensive. Wage rates increased, especially in the countryside. The same levels of per capita product were attained in the Fourteenth and Fifteenth centuries through two very different economic structures. After a secular recovery in the Sixteenth century, from the Seventeenth the weight of agriculture rose beyond 50 percent and remained there until the end of the Nineteenth century. As far as we can see, the variations over time were, generally speaking, relatively weak in the mature Italian agrarian economy.

5. *Trends*

Trends for per capita product (Fig. 10) do not contradict the evidence we find in the literature on the subject or in the already-examined series.

From the late Middle Ages to the end of the Nineteenth century a considerable growth took place in aggregate

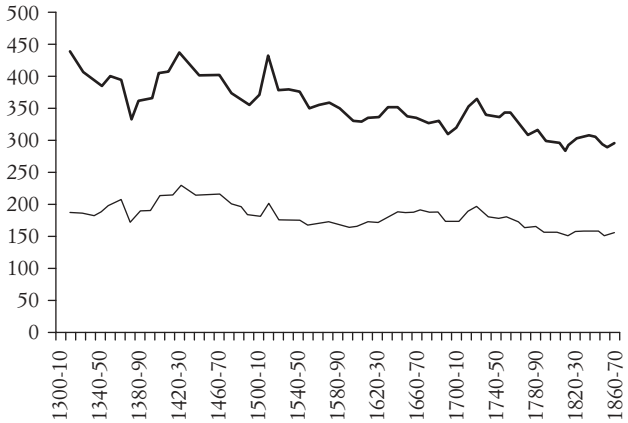

FIG. 10. Per c. GDP in Italy CN 1300-1870 (agricultural-low-and total).

terms. The Northern and Central Italian economy was always able to produce more for the increasing population. This growth was financed primarily by a decline in the standard of living (Fig. 11). Per capita income fell continuously and particularly after the population rise which began in the second half of the Seventeenth century. It reached a very low level in the first two decades of the Nineteenth century and more or less maintained such a low level up to the start of Modern Growth at the very end of the Nineteenth century. [43]

As we can see, per capita product remained, in the early Modern Age, just within the range identified by contemporaries and by historians in their attempts at a quantification: around 260-350 1860-70 Italian lire. [44] In the late Middle Ages it often exceeded the highest level of 350 lire. Our results are consistent with the already mentioned older and more recent attempts at quantification. They allow us to identify a long-term trend amidst the variety of different values.

Considering per capita output, we may therefore distinguish:

– *the golden age*: from the prosperous late Middle Ages to the end of the Sixteenth century when per capita product was around 400 Italian 1860-70 lire;

– *the silver age*: from the end of the Sixteenth century to 1730-40 when per capita product was around 350 Italian 1860-70 lire;

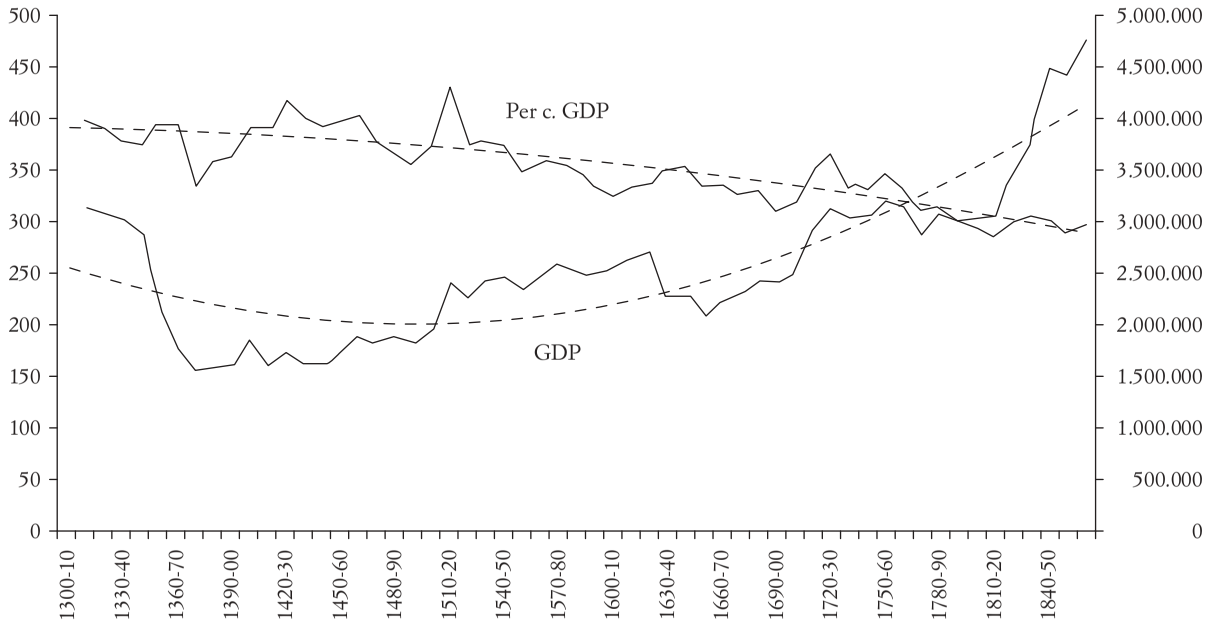

FIG. 11. GDP and per c. GDP in Italy CN (1300-1870).

– *the iron age*: from 1730-40 to the start of Modern Growth, at the end of the Nineteenth century, when per capita product was about 300 Italian 1860-70 lire.

In our developed world, we have been used to thinking that per capita and gross product move in the same direction, albeit with different speeds. This has been the case since the start of Modern Growth. It was not so before: often, when gross product increased, per capita product fell.

We have also been used to thinking that from the late Middle Ages to the present the European economy has moved in the direction of progress. The path followed by Italy shows that, at least in one case, this was not so: long decline and not long progress characterized its economy for 6 centuries.

6. *On the European background*

Data on per capita GDP have been proposed for other European countries in the early Modern Age. Needless to say, the degree of uncertainty is still high. At the moment, only the size may be defined and with several reservations. From the figures collected for some regions, we might draw an initial conclusion that from 1500 until 1800 per capita product *probably* moved mainly [45] in the range of 1000-2000 international (1990) dollars and that the economies did not diverge much. Usually not more than a 20-30 percent difference existed between the best and the worst performer. [46] Things changed in the age of Modern Growth.

Much more uncertain is the relative position of each European economy. For the United Kingdom and the Netherlands, we have more reliable estimates to compare to Italian estimates than for other European countries (Tab. 5). [47]

We will start with the relative position of several Western European countries in the second half of the Nineteenth century and go backwards.

In 1870 some regions exceeded the level of 2000 International 1990 dollars and United Kingdom was at 3200. Italy was relatively backward with less than 1300 dollars. [48] A little higher was the position of the Central and Northern regions, with 1400 dollars. In 1820 the Netherlands and the United Kingdom were the most advanced countries. [49] The distance from the rest of the Western European regions such as Belgium, France, Italy, Denmark, Switzerland, Sweden

TAB. 5. *Per capita product in United Kingdom, the Netherlands and Italy CN. 1700-1870 (International 1990 $ PPP)*

	UK	The Netherlands	Italy CN
1700	1250	2100	1440
1750	1500	2000	1570
1800	1580	1800	1340
1820	1700	1820	1360
1870	3200	2750	1400

(probably Germany), was, however, only 25-30 percent. Italy shared the relative retardation of many followers in a difficult moment for the economies of the whole continent.

During the first part of the Eighteenth century Italy was probably second behind the Netherlands and on a par with the United Kingdom, [50] losing ground only in the second half of the century. Relative levels were not so different in the preceding century, but while the rise in per capita income in the Seventeenth century Italy had been the effect of the decrease in population, in the Netherlands and in Britain it had been pushed forward by the increase in the product. In the ratio between gross product and population, a fall in the denominator had taken place in Italy, while in the Netherlands and in Britain the numerator had risen.

For the late medieval and early modern ages, the data on per capita product are not well grounded. Sometimes excessively low figures have been suggested, which are hardly consistent with population survival. [51] Our «poverty line» presented at the beginning shows that 800 1990 International dollars was, in pre-modern times, hardly consistent with survival (and without inequality). A reconstruction of agricultural per capita product from wages and prices for several European countries suggests a range of 600-1000 dollars in the centuries between 1300 and 1600. [52] If we assume that agriculture accounted for 50-60 percent of gross product, then per capita product had to be at least in the range of 1000-1600 International 1990 dollars: a range consistent with our series.

According to our results, Italy would have been well in the forefront of this hierarchy and perhaps would have occupied first place in the late Middle Ages. Italy was at that time a mature economy: an economy near the production possibilities frontier. It lost increasingly more ground during the early Modern Age both in relative and

absolute terms. While its economy as a whole grew, its level of per capita product fell.

Italy completely missed the First Industrial Revolution, the age of coal, iron and mixed farming. It was impossible to adapt the English model to the available natural resources. The lack of coal, the scarcity of iron and the dry soils of the peninsula, with the only exception of part of the Po Valley, was thus an obstacle too difficult to overcome considering the technological level of the time. The relative backwardness of the peninsula grew during the Nineteenth century. From the late Middle Ages to the end of the Nineteenth century Italy followed the downward curve from a condition of progress to a state of backwardness.

While Italy missed the opportunities of the first wave of Modern Growth, it was able, on the other hand, to exploit the possibilities offered by the Second Industrial Revolution, the age of oil, electricity, chemical fertilizers, whose inception was at the very end of the Nineteenth century. It became possible to import what Italy was lacking (fossil energy sources and agricultural products), to exploit what was available (energy from waterfalls) and to export, thanks to emigration, what Italy had in abundance: people.

7. *Conclusions*

We sum up now the least uncertain points:

1) in the long period from 1300 to 1860, per capita product remained in Central-Northern Italy within the narrow range of between 1300 and 1900 international 1990 dollars;

2) during the six centuries, the trend of per capita output declined, while gross product rose;

3) the relative importance of non-agricultural sectors diminished from the late Middle Ages on (with a short recovery in the Sixteenth century);

4) especially around the mid-Eighteenth century, the Italian economy shifted towards the lower margin of the narrow range of the European per capita product and stayed there until the start of Modern Growth;

5) compared to other Western European regions, the Italian economy was *developed* in the late Middle Ages; it was still *advanced* in the early Modern Age up to the mid-Eighteenth century; it was *backward* from then until the end of the Nineteenth century.

Appendix

Sources: The following series are based on Malanima, *L'economia italiana*, and Federico, Malanima, *Labour Productivity in Italian Agriculture*.

I
Indices (base 1860-70)

1) Price index;
2) Agricultural wages index;
3) Urban wages index;
4) Per capita agricultural product index;
5) Gross agricultural output index;
6) Per capita GDP index;
7) GDP of Central-Northern Italy index.

	1 *Price Index*	2 *Agricultural Wages*	3 *Urban Wages*	4 *Per c. agr. Product*	5 *Gross agr. Output*	6 *Per c. GDP*	7 *GDP*
1300-10							
1310-20	6.2		162.0	128.0	63.2	147.9	74.3
1320-30	7.2	142.5	147.0	119.6	59.0	138.2	69.4
1330-40	8.2	125.5	130.9	116.3	58.2	134.4	68.4
1340-50	9.3	110.6	126.7	118.8	57.2	130.8	64.1
1350-60	12.4	180.6	189.1	128.8	45.1	135.5	48.3
1360-70	11.0	204.6	206.9	132.2	37.2	133.2	38.1
1370-80	10.1	282.2	280.4	111.5	33.5	112.4	34.3
1380-90	16.3	174.8	173.4	120.5	33.9	121.5	34.8
1390-1400	16.2	188.2	185.4	123.0	34.6	123.8	35.5
1400-10	13.0	241.4	239.6	136.0	40.1	136.7	41.1
1410-20	13.2	239.1	238.6	137.1	36.4	137.6	37.2
1420-30	11.2	280.7	280.1	146.9	38.6	147.4	39.4
1430-40	13.2	259.5	255.5	140.0	36.8	140.6	37.6
1440-50	14.4	237.5	236.4	137.1	36.4	136.7	37.0
1450-60	13.2	259.5	252.9	137.5	38.0	136.2	38.3
1460-70	13.2	259.5	253.8	138.1	40.8	135.8	40.9
1470-80	14.1	195.0	198.0	129.3	40.0	127.1	40.0
1480-90	14.6	188.5	187.4	125.8	40.9	123.7	40.9
1490-1500	17.2	160.4	156.7	116.6	38.3	120.1	40.1
1500-10	18.5	147.5	142.9	115.8	38.4	125.2	42.3
1510-20	15.6	186.1	187.4	127.4	45.1	144.9	52.3
1520-30	22.8	127.4	128.6	111.6	42.2	127.0	48.9
1530-40	25.7	109.1	118.5	111.9	45.2	127.4	52.4
1540-50	25.6	114.4	122.1	112.5	46.4	126.3	53.1
1550-60	31.8	83.6	92.5	106.3	45.1	117.7	50.8
1560-70	33.3	87.3	100.6	109.6	47.3	119.8	52.6
1570-80	39.3	88.3	104.0	111.1	50.0	121.5	55.7
1580-90	43.0	93.0	102.6	108.1	48.7	118.2	54.2
1590-1600	51.5	74.5	86.8	105.0	49.2	112.5	53.7
1600-10	52.3	73.3	85.0	104.9	51.3	110.3	54.9

1610-20	48.5	98.6	109.5	109.7	54.7	113.1	57.4
1620-30	47.9	107.0	116.3	110.3	55.8	113.8	58.6
1630-40	45.5	112.7	121.0	114.9	46.7	118.5	49.0
1640-50	44.0	116.5	127.8	119.5	49.3	118.8	49.9
1650-60	42.7	120.1	130.2	118.1	46.0	113.3	44.9
1660-70	39.9	128.6	137.0	122.2	51.2	113.2	48.2
1670-80	40.4	127.0	135.3	119.5	52.3	110.7	49.3
1680-90	39.5	129.8	140.3	120.2	55.6	111.4	52.4
1690-700	47.6	107.8	116.6	111.5	54.4	105.2	52.2
1700-10	47.0	109.2	114.7	111.6	56.2	107.3	55.0
1710-20	40.5	126.6	133.4	119.8	61.9	117.3	61.7
1720-30	35.1	131.4	141.5	125.9	67.9	123.3	67.7
1730-40	43.5	116.6	123.0	116.6	65.6	114.2	65.4
1740-50	48.4	122.0	125.1	114.1	65.3	112.8	65.7
1750-60	46.8	130.3	132.6	116.9	67.9	116.7	69.0
1760-70	49.3	99.1	105.8	111.4	65.8	112.3	67.5
1770-80	62.7	84.1	88.1	103.7	60.3	104.5	61.8
1780-90	60.5	88.0	92.2	106.0	64.5	106.8	66.2
1790-1800	80.0	97.4	96.1	100.6	63.2	101.1	64.7
1800-10	85.1	84.3	83.5	99.5	63.5	99.7	64.8
1810-20	97.4	68.9	71.1	96.5	63.9	96.5	65.1
1820-30	77.2	77.2	79.7	101.0	72.0	101.0	73.3
1830-40	82.0	91.5	92.5	102.9	79.0	102.9	80.4
1840-50	84.5	100.2	99.8	102.5	94.8	102.5	96.5
1850-60	99.3	89.3	88.5	97.7	92.8	97.7	94.5
1860-70	100.0	100.0	100	100.0	100.0	100.0	100.0

II
Series in 1860-70 Italian lire

1) Population in Central-Northern Italy;
2) Per capita agricultural product;
3) Per capita GDP;
4) Gross Domestic Product;
5) Per capita GDP in 1990 International dollars PPP.

	1 *Population CN (000)*	2 *Per c. agr. Product*	3 *Per c. GDP*	4 *GDP (000)*	5 *Per c. GDP in $ 1990*
1300-10	7750				
1310-20	7900	188.2	398.4	3,147,066	1808
1320-30	7900	187.5	390.6	3,085,920	1773
1330-40	8000	182.4	380.0	3,040,274	1725
1340-50	7700	186.2	376.5	2,899,040	1709
1350-60	5600	201.9	396.4	2,219,904	1799
1360-70	4500	207.3	395.6	1,780,171	1795
1370-80	4800	174.9	333.7	1,601,835	1514
1380-90	4500	189.0	360.7	1,623,053	1637
1390-1400	4500	192.9	362.1	1,629,648	1643
1400-10	4720	213.2	393.9	1,859,232	1788
1410-20	4250	215.0	390.9	1,661,204	1774

1420-30	4200	230.3	418.7	1,758,673	1900
1430-40	4200	219.6	399.2	1,676,754	1812
1440-50	4250	215.0	394.0	1,674,664	1788
1450-60	4425	215.7	398.4	1,762,946	1808
1460-70	4730	216.6	403.3	1,907,549	1830
1470-80	4950	202.7	377.4	1,868,188	1713
1480-90	5200	197.3	367.4	1,910,692	1667
1490-1500	5250	182.8	356.6	1,872,167	1618
1500-10	5310	181.6	371.8	1,974,477	1687
1510-20	5670	199.7	430.4	2,440,394	1953
1520-30	6050	175.0	377.1	2,281,448	1711
1530-40	6460	175.5	378.3	2,443,781	1717
1540-50	6600	176.4	375.1	2,475,934	1702
1550-60	6785	166.7	349.6	2,372,360	1587
1560-70	6900	171.8	355.8	2,454,954	1615
1570-80	7200	174.3	360.8	2,597,571	1637
1580-90	7200	169.6	351.0	2,527,455	1593
1590-1600	7500	164.7	334.2	2,506,526	1517
1600-10	7828	164.5	327.5	2,563,711	1486
1610-20	7980	172.0	335.9	2,680,613	1524
1620-30	8100	173.0	337.8	2,736,266	1533
1630-40	6500	180.2	351.9	2,287,402	1597
1640-50	6600	187.4	352.7	2,327,873	1601
1650-60	6230	185.2	336.4	2,095,772	1527
1660-70	6700	191.5	336.0	2,251,525	1525
1670-80	7000	187.4	328.7	2,301,234	1492
1680-90	7400	188.5	330.7	2,446,931	1501
1690-700	7800	174.9	312.5	2,437,320	1418
1700-10	8051	175.0	318.6	2,565,054	1446
1710-20	8270	187.8	348.4	2,880,982	1581
1720-30	8630	197.4	366.3	3,160,801	1662
1730-40	9000	182.8	339.1	3,051,634	1539
1740-50	9150	179.0	335.1	3,066,311	1521
1750-60	9300	183.3	346.5	3,222,358	1572
1760-70	9450	174.7	333.5	3,151,132	1513
1770-80	9300	162.6	310.3	2,885,659	1408
1780-90	9740	166.1	317.1	3,088,256	1439
1790-1800	10,050	157.8	300.3	3,018,286	1363
1800-10	10,212	156.0	296.1	3,024,044	1344
1810-20	10,600	151.3	286.6	3,037,561	1300
1820-30	11,400	158.4	300.0	3,420,556	1362
1830-40	12,280	161.3	305.5	3,752,062	1387
1840-50	14,800	160.7	304.4	4,505,239	1381
1850-60	15,200	153.2	290.1	4,409,047	1316
1860-70	15,716	156.8	297.0	4,751,349	1348

1 Per capita product reconstructions for some European countries have been proposed in: A. Maddison, H. Van der Wee (eds.), *Economic Growth and Structural Change*, Atti dell'XI Congresso internazionale di storia economica, Milano, 1994; J.-L. Van Zanden, «Early Modern Economic Growth. A Survey of the European Economy, 1500-1800», in M. Prak (ed.), *Early Modern Capitalism. Economic and Social Change in Europe, 1400-1800*, London-New York, 2001, pp. 68-87; A. Maddison, *The World Economy. A Millennial Perspective*, Paris, 2001.

2 P. Bairoch, «Ecarts internationaux des niveaux de vie avant la Révolution industrielle», *Annales (ESC)*, 34, 1979; Id., «Estimations du revenu national dans les sociétés occidentales pré-industrielles et au XIXe siècle», *Revue économique*, 18, 1977. See the critical comments by F. Braudel, *Civilisation matérielle, économie et capitalisme (XVe-XVIIIe siècle)*, Paris, 1979, III, ch. 4.

3 I used this same method (with slightly different results) in P. Malanima, *L'economia italiana. Dalla crescita medievale alla crescita contemporanea*, Bologna, 2002, App. 5.

4 These series are extensively presented in Malanima, *L'economia italiana*. In the following pages only some rapid hints will be made at the basic data of these series and at their construction.

5 Maddison, *The World Economy*, p. 18.

6 Sources: *1360-70*: Ch.-M. De La Roncière, *Prix et salaires à Florence au XIVe stècle*, Roma, 1982; *1460-70*: R.A. Goldthwaite, *The Building of the Renaissance Florence*, Baltimore and London, 1980 and S. Tognetti, «Prezzi e salari nella Firenze tardomedievale: un profilo», *Archivio Storico Italiano*, 153, 1995; *1580-1600*: prices for Florence are from G. Parenti, *Prime ricerche sulla rivoluzione dei prezzi a Firenze*, Firenze, 1939 except for wheat and minor cereals (from P. Malanima, *Wheat Prices in Tuscany*, International Institute for Social History in Amsterdam www.iisg.nl, and Id., *Grain prices and Prices of Olive Oil in Tuscany*, International Institute for Social History in Amsterdam www.iisg.nl); *1770-80*: A. De Maddalena, *Prezzi e mercedi a Milano dal 1701 al 1860*, Milano, 1974; *1860-70*: prices for Milano are from A. De Maddalena, *I prezzi dei generi commestibili e dei prodotti agricoli sul mercato di Milano dal 1800 al 1890*, Roma, 1957. Note: the conversion into 1860-70 Italian lire is based on the price index presented in the Appendix. The conversion also needs the passage from Florentine and Milanese into Italian lire based on the silver weight in 1861 of Florentine lira (3.8 gr.) and Milanese lira (3.45 gr.). The Italian lira was then 4.5 gr. The price of *minor cereals* is half the wheat price per kg. in 1360-1590 and maize price afterwards; *meat* is beef meat*; textiles* correspond to the price of half bedsheet and half blanket; *housing* is from De Maddalena, *Prezzi e aspetti di mercato in Milano*, p. 335 (for 1460-70 and 1580-90 housing has been calculated as 10 percent of the whole basket). For comparisons of these values in time and space, Italian 1860-70 lira is 4.538 International 1990 dollars PPP.

7 See the data in J.G. Williamson, *Inequality, Poverty, and History: The Kuznets Memorial Lectures*, Oxford, 1991, ch. 1.

8 If Y_1 is subsistence level and Y_2 is per capita income when 10 percent of the population owns 40 percent of gross product, to find Y_2 we have to solve: $90\ Y_1{:}100\ Y_2 = 60{:}100$. The result is $Y_2 = 1.5\ Y_1$. This result would suggest that per capita income in a society characterized by the ordinary pre-industrial inequality is 50 percent higher than the subsistence income.

9 I reported these same estimates with their sources in P. Malanima, «Risorse, popolazioni, redditi: 1300-1861», in P. Ciocca, G. Toniolo (eds.), *Storia economica d'Italia*, *1. Interpretazioni*, Roma-Bari, 1999, pp. 105-108. These estimates are mainly based on contemporary evaluations, tax assessments and calculations by historians.

10 The estimate was proposed by a contemporary, around 1440: L. Ghetti, «Inventiva d'una imposizione di nuova gravezza», in G. Roscoe, *Vita di Lorenzo*

De' Medici detto il Magnifico, Pisa, 1816, I, Appendice n. 1. The text by Ghetti was commented by V. Rutenburg, «A proposito del prodotto lordo fiorentino, un progetto d'imposta del primo Quattrocento», in A. Guarducci (ed.), *Prodotto lordo e finanza pubblica secoli XIII-XIX*, Firenze, 1988, pp. 865-870. For almost the same period see also the estimate by R.W. Goldsmith, *Pre-modern Financial Systems. A Historical Comparative Study*, Cambridge, 1987, ch. 9, which suggests the same level on the basis of the 1427 Florentine Catasto.

11 See especially A. Maddison, *Monitoring the World Economy 1820-1992*, Paris, 1995.

12 On international comparisons in Purchasing Parity Power (PPP) see especially I.B. Kravis, A. Heston, R. Summers, *World Product and Income. International Comparisons of Real Gross Product*, Baltimore and London, 1982. Since many series of national accounting are in International (1990) dollars PPP, here we sometimes make use of this currency to make comparisons easy. The series of per capita GDP for Italy is also converted into this currency in the Appendix II.

13 Except urbanization (presented in Tab. 2) the other series are in the Appendix.

14 M. Breschi, *La popolazione della Toscana dal 1640 al 1940. Un'ipotesi di ricostruzione*, Firenze, 1990 and M. Breschi, P. Malanima, «Demografia ed economia in Toscana: il lungo periodo (secoli XIV-XIX)», in *Prezzi, redditi, popolazioni in Italia: 500 anni (dal secolo XIV al secolo XIX)*, Udine, 2003.

15 P. Galloway, «A reconstruction of the population of North Italy from 1650 to 1881 using annual inverse projection with comparisons to England, France and Sweden», *European Journal of Population*, 10, 1994.

16 K.J. Beloch, *Bevölkerungsgeschichte Italiens*, Berlin-Leipzig, 1937-1961.

17 See in particular L. Del Panta, M. Livi Bacci, G. Pinto, E. Sonnino, *La popolazione italiana dal Medioevo a oggi*, Roma-Bari, 1996.

18 Data for the early Fourteenth century population are still uncertain.

19 In 1575 plague struck many Northern Italian cities.

20 Potatoes became an important consumption item in Italy only after the Unification.

21 For the construction of this price index see Malanima, *L'economia italiana*, App. 3.

22 Agricultural prices used to estimate agricultural consumption and hence production are relative prices: agricultural prices divided by the price index.

23 Malanima, *L'economia italiana*, App. 4. Although computed with different methods and different price indices, the series of building wages presented here is almost the same as that presented by R.C. Allen, «The great divergence in European wages and prices from the Middle Ages to the First World War», *Explorations in Economic History*, 38, 2001. If 1400-50 averages are 100, the result for Allen's wages in 1800-50 is 35, while in my series it is 37.

24 Since the Italian wages curves – reconstructed for Florence, Genoa, Milan and Venice – reveal only marginal differences in the long-run, we preferred to exploit, in our attempt, the best and longest series: the one concerning Florence and Tuscany.

25 The series is built on data concerning Tuscany – until 1610 – and Piedmont. The construction is explained in Malanima, *L'economia italiana*, App. 4.

26 I discussed this problem in P. Malanima, «Italian cities 1300-1800. A quantitative approach», *Rivista di Storia Economica*, 14, 1998.

27 Malanima, *L'economia italiana*, App. 2.

28 See especially J. De Vries, *European Urbanization 1500-1800*, London, 1984, p. 45 for a comparison with Italy between 1800 and 1850.

29 The movement of agricultural production is the object of a wider examination in G. Federico, P. Malanima, *Labour Productivity in Italian Agriculture 1000-2000*, paper for XIII International Congress of Economic History, Buenos Aires, July 2002 (now in the proceedings of the congress on CD).

30 See, for instance, P. Deane, W.A. Cole, *British Economic Growth 1688-1959*, Cambridge, 1962, pp. 62 ff.

31 P. Malanima, *La fine del primato. Crisi e riconversione nell'Italia del Seicento*, Milano, 1998, pp. 70-75.

32 It is impossible to use the same method after Unification because of the increasing imports of agricultural products.

33 As we state later, an average of urban and rural wages has been used in the calculations for the estimate of agricultural consumption and product.

34 The same method has been recently used by R.C. Allen, «Economic Structure and Agricultural Productivity in Europe, 1300-1800», *European Review of Economic History*, IV, 2000.

35 The calculation of agricultural consumption and hence product from elasticity coefficients implies the use of the following formula:

$$c = W^a \cdot Z^b$$

where c is per capita consumption of agricultural goods, W are real wages, Z is the relative prices of agricultural products (agricultural prices divided by the price index), and a and b are the elasticities. The sum of a and b must equal 1.

36 See the reconstruction in Federico, Malanima, *Labour Productivity in Italian Agriculture 1000-2000*.

37 See Figure 7.

38 I examined these problem for Tuscany in P. Malanima, *La decadenza di un'economia cittadina*, Bologna, 1982.

39 Sources: for urbanization Malanima, *L'economia italiana*, App. 2; for GDP structure the years 1861, 1871, 1881, 1921, 1931, are from A. Maddison, «A Revised Estimate of the Italian Economic Growth, 1861-1989», in *Banca del Lavoro Quaterly Review*, 177, 1991; year 1891 is from N. Rossi, A. Sorgato, G. Toniolo, «I conti economici italiani: una ricostruzione statistica, 1890-1990», *Rivista di Storia Economica*, n.s., 10, 1993.; the years 1891, 1911, 1938, are from G. Rey (ed.), *I conti economici dell'Italia*, Roma-Bari, 1, 1991; 2, 1992; 3, 2000. Note: to check the changes in the GDP structure see the recent S. Fenoaltea, «La crescita industriale delle regioni d'Italia dall'Unità alla Grande Guerra: una prima stima per gli anni censuari», *Quaderni dell'Ufficio Ricerche storiche* (Banca d'Italia), 1, 2001, and Id., «Lo sviluppo dell'industria dall'Unità alla Grande Guerra: una sintesi provvisoria», in P. Ciocca, G. Toniolo (eds.), *Storia economica d'Italia*, 3, Roma-Bari, 2003, pp. 137-193. Since data for the Italian economic structure refer to the whole country, data on urbanization have been adjusted to the level of urbanization in the Centre and North in 1861 (cities with more than 5000 inhabitants) from the increase on the Italian urbanization on the whole. Urban percentages are from C. Carozzi, «Il processo di urbanizzazione», in G. Germani (ed.), *Urbanizzazione e modernizzazione: una prospettiva storica*, Bologna, 1975, pp. 321-347.

40 In the regression, our dependent variable is urbanization and the independent variable is the share of I and II sectors in the gross product. The result is $y = 0.5199x - 6.7266$, where y is urbanization and x the share of sectors I and II in GDP. P-value (1.134E-05) is low, R^2 (0.9454) is high, and the b coefficient is between 0.41 and 0.63 with 95 percent confidence. We do not need any lag in our time series since urbanization and growth of non-agricultural sectors are contemporary in decadal data such as those set out in Table 3.

41 Since data on urbanization have been calculated every 50 years (see Table 2) the series estimated through the preceding regression has been smoothed by means of a three terms mobile average. As we can see, comparing Table 4 to Table 3, in 1861 the estimated value by means of the regression (47) is different from the result (45.5) in national statistic accounts because of standard errors in the estimated equation.

42 A higher weight of agriculture on GDP proposed for some preindustrial European regions – even 70 and 80 percent – usually derives from an underestimate of services.

43 Maddison, *A revised estimate*, and Id., *Monitoring the World economy*, proposed for 1820 the estimate of 1092 Int. 1990 dollars PPP. Our higher estimate may depend on the different economic conditions in the Centre and the North, where probably per capita product was actually higher than in the South. Our estimates are, on the contrary, far from the ones proposed for Venetia and Lombardy, from 1836 to 1857, by R. Pilcher, *Die Wirtschaft der Lombardei als Teil Österreich. Wirtschaftspolitik, Außenhandel und industrielle Interessen*, Berlin, 1996, pp. 266 ff. and esp. p. 273 (the proposed estimates are too low and the dynamism of both Venetia and Lombardy does not correspond to the economic reality).

44 See Figure 1.

45 We refer here to average levels during decades. Naturally, in many short-term crises, per capita income fell below those levels.

46 An increasing divergence, based on wage series, throughout the early Modern Age, has been suggested by Allen, *The great divergence*.

47 Data in Table 5 are based especially on Van Zanden, *Early Modern Economic Growth*, and on Maddison, *The World Economy.* A similar picture emerges in J. De Vries, A. Van der Woude, *The First Modern Economy. Success, Failure, and Perseverance of the Dutch economy, 1500-1815*, Cambridge, 1997, pp. 699 ff.

48 Data in the Table 5 refer to the Centre and North of Italy and not to the country as a whole.

49 The more advanced position of the Netherlands emerges from the revised Dutch national accounts in J-P. Smits, E. Horlings, J.L. Van Zanden, *Dutch GNP and Its Components, 1800-1913*, Groningen, 2000. See also the comments by J. De Vries, «Dutch Economic Growth in Comparative-Historical Perspective, 1500-2000», *De Economist*, 148, 2000.

50 England already enjoyed a higher per capita GDP than Italy. The difference was, however, small.

51 See, for instance, J. Bradford De Long, *Estimating World GDP, One Million B.C.-Present*, in www.j-bradford-delong.net and R. Hanson, *Long-Term Growth as a Sequence of Exponential Modes*, in www.hanson.gmu.edu.

52 This is the result of a few calculations based on Allen, *Economic Structure*.