Unequal Growth in Old Regime France

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The following work is an updated extract from my Master's thesis, *The Measure of Disorder: Population, State-Building and Rebellion in Old Regime France, 1661-1789* (2020). Figure numbering refer to the original work, available at the following URL.
`http://piketty.pse.ens.fr/files/Enguehard2020.pdf`

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1 Did the French economy grow?

How did production evolve in France from 1660 to 1789? The measurement of agricultural productivity growth in the eighteenth century has been the subject of fierce debate between the proponents of take-off (Toutain and the work of ISEA) and those of stagnation (Morineau, 1971)[1]. Morrisson (2007) has argued for a synthesis solution in which agricultural production would have grown at an annual growth rate of 0.5 percent from 1715 to 1788, on the basis of which he gets a rate of 0.7 percent for real GDP; both figures are higher than the average annual population growth over the period, which lied between 0.3 and 0.34 percent[2]. As such, real GDP per capita would have increased by 35 percent between 1715 and the Revolution. This increase was drawn up by the rise of manufacture suggested by the work of ISEA, even more by the rise of the commercial sector – and within this sector, by international trade (Daudin, 2005).

However, far less optimistic estimates of the growth of agricultural production were given by Hoffman (1996) on the basis of microeconomic measurement of agricultural TFP growth. According to him, the range of the annual growth rate of food supply was 0.15 to 0.33 percent in the eighteenth century (ibid., Table 4.10). Even though he considers the true value to be closer to the high estimate, this still implies that the growth of food production would not have exceeded population growth in the eighteenth century. On top of that, agricultural productivity growth was extremely heterogeneous across regions: the Paris basin was clearly standing ahead, but stagnation was observed in numerous regions such as Normandy or the West (ibid., p. 132).

To defend his choice of estimate for agricultural growth, Morrisson remarks that stagnating food production per capita does not seem compatible with numerous signs of increasing welfare in the eighteenth century, such as decreasing child mortality or disappearance of deadly subsistence crises. Yet, there is no definitive answer to the preindustrial decrease in mortality: other factors independent of food supply may have been decisive, such as advances in hygiene and

[1] See Daudin (2005) for a sum up of this debate (pp. 24-26).

[2] 0.3 percent is the figure retained by Morrison, based on Dupâquier (1993)'s ten-year averaging of the population series of Lachiver (1991), while Lachiver's figure for 1715 gives 0.34 percent.

medicine, progressive immunization of population, climatic cooling preventing epidemics despite its negative impact on agricultural production (Perrenoud, 1989). It is also worth noting that rebellion data suggests an upsurge in food riots in the 1760s, until the Flour War of 1775, not to mention the peak before the Revolution (Figure 6a). The size-weighted rebellion index also indicates a rise in food rioting from the 1730s to the 1770s that went beyond the peak of 1710 (Appendix Figure B.29a). And yet, Chevet (1993) has shown that France did not experience any deadly subsistence crisis after that of 1709-1710, consistently with Morrison's stance.

2 Moderate shortage and the return of food riots

How to explain the return of food rioting despite the fact that subsistence crises were much less brutal? Of course, it would be simplistic to postulate a simple relationship between both. As shown by Chevet (ibid.), the crisis of 1693-94 war far more deadly than that of 1709-1710, and yet rebellion in general and food riots in particular peaked during the latter, not the former (Figures 5, 6a, B.28 and B.29a). It is likely that excessive stress on the population reduced rebellious initiative, simply because people had to focus on their own situation. It has also been underlined that the gradual "modernization" of agricultural markets in the second half of the eighteenth century, be it of private or state initiative, had encountered harsh resistance (Nicolas, 2002, pp. 378-388).

However, these food riots would not have happened if their participants had experienced food abundance. Therefore, it seems that their breeding ground was that of "moderate shortage", in a context of stagnant agricultural productivity growth. This is consistent with accounts of eighteenth century growth such as Daudin (2005) that mainly emphasize sectors such as manufacture and even more international trade, which were likely to benefit only to a small part of the population[3]. Besides, there was a key difference with the preceding era: improved transportation, growing integration of grain markets and increased state management of grain distribution may have helped to moderate the impact of shortages due to weather shocks. This is consistent with the findings of Weir (1989), that the effect of wheat prices on mortality decreased from the seventeenth to the eighteenth century, to become insignificant in northern France by the mid-eighteenth century.

3 Trends in nominal inequality

The development of a class of land-needing and thus wage-seeking peasants (see section 2.1.3 of the original work) may have explained the decline in wages, which had already been observed by Labrousse (1932) and is confirmed by Ridolfi (2019)'s figures. Figure 10 shows that the nominal wage did not kept up with nominal GPP per capita in the second half of the eighteenth century. And this holds while GPP excludes services, and thus may have grown less than GDP; if this was the case, and if wages in the service sector stagnated like those in agriculture and industry (for which the wage index of Figure 10 accounts), then the gap was even worse. This is not mere speculation. Wages in the service sectors were chiefly those of domestic servants and nurses, and

[3]See Rosenthal (2007)'s review of Daudin's book: international trade accounted at most for 5 percent of the economy (probably less), and its indirect effects on the overall economy remain uncertain.

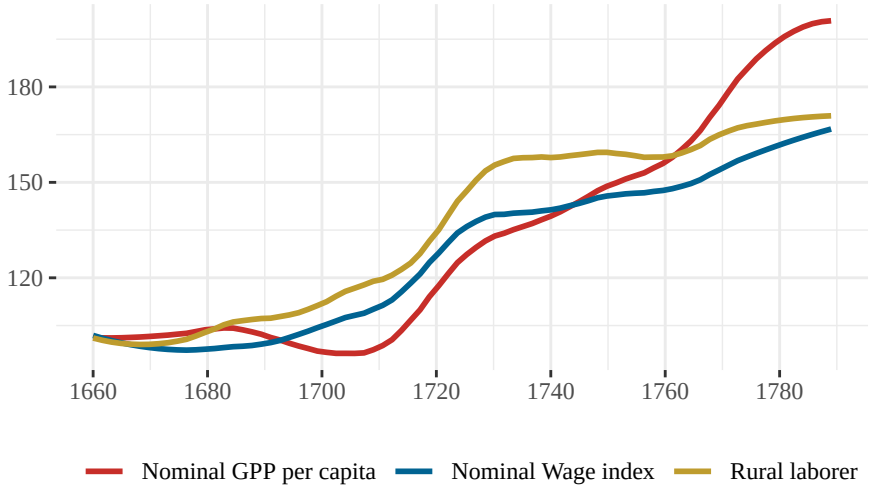

FIGURE 10: *Nominal wage index, nominal wage of a rural laborer and nominal gross physical product (GPP) per capita, 1660-1789 (base 1660 = 100 for all).*

Notes: LOESS based on annual series (span = 0.3).
Sources: Nominal wage index is based on Ridolfi (2019), using urbanization data summarized in Dupâquier and Lepetit (1988, pp. 86-87), and assumptions on sector shares made by Morrisson (2007). Nominal GPP per capita is based on Marczewski (1961) and on the population series of Figure 2, accounting for territorial changes. See section 1.3.1 of original work for more details.

accounts suggest that the use of those services was trickling down in the small bourgeoisie in the eighteenth century, in particular thanks to lower prices (Grenier et al., 1988, p. 484 and Hoffman et al., 2002). This is consistent with an increased supply of unskilled labor in services. Besides, a rise in nominal income inequality could also be observed in tax data based on *capitation*: Morrisson and Snyder (2000, Table 2) find an increase in the share of the top decile between 1748-59 and 1760-90. A rise in unemployment among day laborers probably added to that in the last decades before the Revolution (see footnote 55 in the original work) – accompanied by a rise in labor disputes, as shown in Figure 6e.

4 Trends in real inequality

The trends in inequality becomes even stronger when considering real wages, since the relative price of inferior goods increased. Figure 11 shows that in the long run, the price of bread, as recently estimated by Ridolfi (2019), grew similarly to nominal Gross Physical Product (GPP) per capita. So did the consumer price index, which reflects the consumption bundle of a worker[4]. Figure 11 suggests a simple cointegration relation between bread price (or CPI) and nominal GPP per capita, the linear combination being given by the normalization to 100 in 1660. I check this in Table 3: the stationarity of the difference between bread price and nominal GPP

[4]Ridolfi (2019) uses the same bundle as Allen (2001), but evaluates the cost with his own price series. The full description of this bundle can be found in both papers.

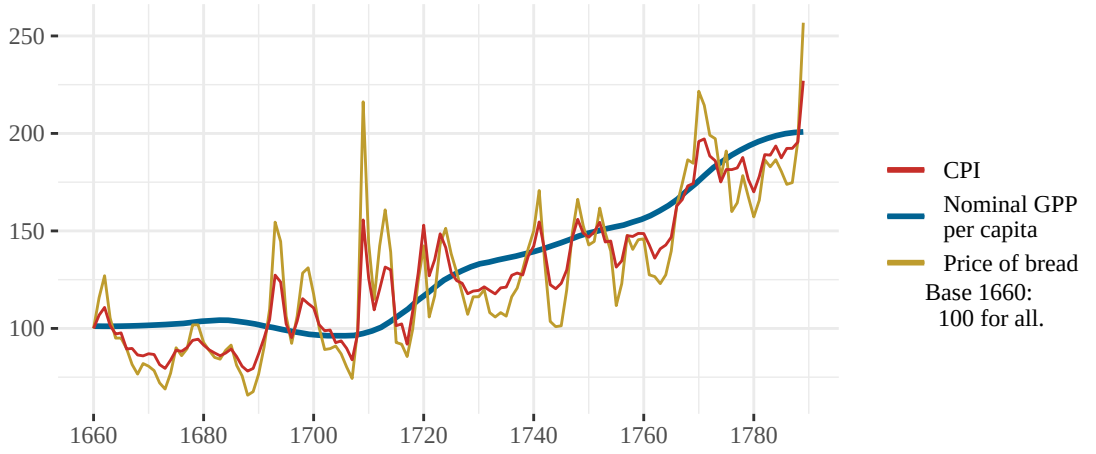

FIGURE 11: *Price of bread, CPI and nominal gross physical product (GPP) per capita, 1660-1789.*

Sources: Price of bread and CPI are Ridolfi's (2019), and accounts for France outside Paris. Nominal GPP per capita is based on Marczewski (1961) and on the population series of Figure 2, accounting for territorial changes, and smoothed by LOESS (span = 0.3). See section 1.3.1 of the original work for more details.

per capita (both normalized to 100 in 1660) is not rejected, and the presence of a unit root is rejected at the 1% level. If y denotes nominal GPP per capita, q production per capita, p the price, i the sector of inferior goods and s the sector of superior goods, this means that $y_t = \alpha p_{it} + u_t$, where u_t is stationary. Results of the tests suggest $E(u_t) \approx 0$, and by definition $y = p_i q_i + p_s q_s$. This implies that in the long run, $q_i < \alpha$. Besides, historical evidence supports positive growth in real manufacturing and superior food output per capita in the eighteenth century (Morrisson, 2007), i.e. $\hat{q}_s > 0$, where $\hat{x}$ denotes the percentage growth rate of x. All of this implies $\hat{p}_i - \hat{p}_s = \hat{q}_s + \hat{q}_i \left(\frac{\alpha}{q_i} - 1 \right)^{-1} > 0$. Unless decreasing per capita production of inferior goods, the relative price of inferior goods rose at least as fast as per capita production of superior goods[5].

Hoffman et al. (2002) have suggested that changes in relative prices were crucial for the rise of inequality in early modern societies. According to their Figure 2B, the cost of living of top income groups decreased relative to the cost of living in the bottom forty percent in the long run in France (1500-1900), and while the period 1650-1750 was characterized by a reversal of the trend – which could be linked to the demographic crisis that characterized most of this period, as explained below – the decrease started again around 1750. Nominal wages were already lagging behind nominal growth of production: rising prices for basic commodities led to a stagnation or even a decline in real wages. This is confirmed by Ridolfi (2019)'s new series of welfare ratios (Figure 7 and Appendix Figure B.30). This is also consistent with the trends in height suggested

[5]In particular, if per capita production of inferior goods stagnated, which may have been the case (see above), $\hat{q}_i \approx 0$, then $\hat{p}_i - \hat{p}_s \approx \hat{q}_s$. The inflation differential between inferior and superior goods is equal to the growth rate of superior good production.

TABLE 3: *Unit root and stationarity tests for the cointegration of prices and nominal production per capita (1660-1789)*

	ADF	PP	KPSS
$Bread_{1660=100} - nGPPpc_{1660=100}$	-5.32***	-37.74***	0.13
$CPI_{1660=100} - nGPPpc_{1660=100}$	-4.47***	-43.32***	0.12

*p<0.1; **p<0.05; ***p<0.01

Notes: $N = 130$. The null hypothesis of the ADF and PP tests is the presence of a unit root, while the null hypothesis of the KPSS test is stationarity. All tests are performed with an intercept and without trend. PP test statistic is $Z(\hat{\alpha})$, following Phillips and Perron (1987). The optimal lag order is chosen according to AIC for ADF, and to the Schwert criterion for PP and KPSS.
Sources: See Figure 11.

by Komlos (2003)'s data: Figure 9 indicates that the height of adult French men increased for those born in the 1690-1710 period, a moment of "respite" between two major subsistence crises (1693-94 and 1709-10); then it decreased again until about 1720, the ending moment of the "years of hardship" described by Lachiver (1991) – and according to his population figures, the moment from which population started to increase again (Figure 2). Then, heights increased again, consistently with demographic recovery, but only until 1740: from this date and at least to the 1760s, they seem to have decreased. The sample does not allow further conclusions, but according to Schubert (2008)'s study of another sample of militiamen and soldiers from the region of Orléans, the decline in height may locally have started even sooner (without recovery in the period 1720-1740), and have gone on after 1760, with a slight increase in the 1770s, then fully compensated by decrease in the 1780s and then (at best) stagnation in the period 1780-1800, if one joins these estimates with those of Weir (1993) (Schubert's Table 6.14). While Weir's Table 2 indicates that the trend in height closely followed that of real GDP per capita in nineteenth century France, this was not the case in the eighteenth century, if Morrisson (2007)'s account of GDP is right. All of this points toward rising real inequality in eighteenth century France.

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