Were French Republicans serious about equality?

Convergence in real wages, literacy, and the biological standard of living

in France 1845-1913

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In his famous 1869 Belleville speech (then a working class neighbourhood of Paris), Léon Gambetta set out the guidelines for a future republican government–which he himself was to proclaim after the defeat of the Second Empire a little over a year later:

> "The very aim of a republican government is to bring about social equality with regard to the law as well as in living conditions and habits."

Twenty-three years later, during the debate on his notorious tariff bill, Jules Méline emphasized that the bill's complexity was inspired by an equally noble concern:

> "We believe that, with regard to tariff policy, the republic ought not treat regions and industries differently."[1]

Equality figured of course prominently in the republican ideology and discourses of the time. While it was interpreted essentially in a political sense – the admission into the political ambit of the "new social strata" heralded in Gambetta's speech, as well as the equal treatment of individuals, it is legitimate to ask whether and to what extent various regions have tended to converge or diverge in material welfare as well once a regime dedicated to its promotion came to power.

Even before Eugene Weber identified the Third Republic as the crucible in which 'peasants' of various hue were moulded 'into Frenchmen' (the title of his 1987 book), questions about

convergence towards a national standard and the persistence of regional disparities have inspired a number of scholarly works. In a study spanning a full 90-year period (1864-1954) Delefortrie and Morice identified the long-term factors underlying the redistribution of income and wealth among France's 90 departments. On the basis of his reconstruction of departmental value added in agriculture, Toutain has traced the ups-and-downs of agricultural performance over two centuries (Toutain, 1981, 1992).[2] The differential impact of the 'great depression' on agricultural performance and incomes has been the subject of a study by Auffret, Hau and Lévy-Leboyer (1981). More recently the darling of Marxist histories (relative or absolute immiseration ?) has popped up again in questions about the standard of living during industrialization. The 'leisurely path' of France's restrained industrialization seems responsible for the country having been spared the worst evils associated elsewhere with 'dark satanic mills'. Here is an observation, which would have delighted Jules Méline and his followers who always railed against the 'excesses' of modern industry.

However, while the most recent studies have added to the traditional arsenal of welfare measures other hitherto underused indicators (especially stature and caloric in-take) with regard to the question of convergence, assessments are based on nationwide indicators of income, consumption or stature during the Second Empire and the Third Republic (see Van Merteen 1990). In a country where industry remained in that period regionally concentrated, the use of national averages seem particularly ill suited to assess the impact of industrialization on income. Studies on regional inequality suffer for their part of other shortcomings, two of the most serious being the use of wages unadjusted for differences in purchasing parity and the calculation of average stature on the basis of truncated samples (omission of the size a sizeable number of draftees). Both these problems are addressed here: by using a shortcut method derived from the methodology of Allen (2001) we estimate PPP adjusted wages; and by measuring the sensitivity of average stature to alternative assumptions, we produce more meaningful data regarding the height of the population.

In the present paper we investigate the process of welfare convergence by relying on three indicators measured for benchmarks years set at regular ten (then five) year intervals and for 87 districts or departments): PPP adjusted real wages, stature (average height), and accumulation of human capital (estimates of average school years of conscripts). Our purpose is twofold; first, we want to evaluate to what extent low-income, 'peripheral' districts, or regions where literacy and biological welfare were at low levels, benefited from the new

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[2] Unfortunately Toutain's data base was apparently destroyed during a change of location.

political environment established (albeit progressively) after 1870; second, we use pooled cross section data in order to uncover whether a causality is running from income to stature, and what role played the improvement in education. In this way we hope to improve on recent findings on the positive relationship between nominal wages and stature identified by Weir (1997) and that between milk consumption per capita and the biological standard of living (Baten, 1999) as well as offer a more regionally differentiated picture of French economic development and confirm whether there was indeed a closing gap between Paris and the "provinces" during this cardinal period (Sicsic, 1995).

II. Regional inequality in stature and human capital accumulation

Conscription data summaries have been used extensively for estimating the secular trend in average male height. Weir (1995) also made extensive use of department level data based on conscription reports. Average height can be thus estimated by relying on the proportion of individuals at each interval of stature. However, as the intervals differ in breadth, it is difficult to ascertain that the individuals are normally distributed across different intervals. Overall, it seems that excessive trust has been laid on the reliability of French regional data. In this section, we scrutinize department level information from conscription reports for the period 1875-1913 and investigate the distortion that may result from the incomplete coverage of stature data in a number of departments. We also take advantage of information on the level of education of conscripts for estimating schooling years.

Annual conscription reports provide information for the distribution of the individual of each age group (or "*classe*") among interval of stature, with two open tails, but this information is indicated as missing for an amazingly high proportion of individuals in the cohort (a supplementary column was used for this purpose with the label "Number of people for whom the height could not be ascertained". This proportion is generally above 10% for France as a whole, but it is well above 20% in a number of peripheral and presumably poor regions (such as Brittany and Corsica) where stature appears lower than the national average, but also in several departments where the measured average height was above the national average, such as Charentes, in Poitou, and Gard, in Languedoc. In 1910, for instance, this proportion reached 36% in the department of Morbilhan (southern Brittany), while it was less than 1% in the Department of Var (in Provence) and about 9% in the department of Seine (Paris and suburbs).

As the number of individuals in the lower open tail is generally small, one may suspect that the conscripts whose stature is unreported were perhaps particularly short. But the lack of correlation between departmental average stature measured using the information available on the number of individuals at each interval and the percentage of individuals for which the stature was not measured suggests that the absence of reporting does not influence the estimation (meaning that these individuals were normally distributed). But it appears also that, in most departments, the average tended to fluctuate over time, indicating that this lack of information was neither primarily due to the sloppiness of the local officials in charge of the measurement operations, nor to any other systematic bias. For this reason, it seems worth considering the extent of the discrepancy between average stature calculated by ignoring those individuals whose stature is unknown and the alternative measure that would be based of the assumption that all these individuals were in the lower tail.

At the national level, the difference is only about 1 cm, but at the department level it can reach 3 or 4 cm in the departments where the share of unreported heights was particularly high. The adjustment operation carried out tends to reduce the upward secular trend (Figure 1) and to alter the pattern in regional dispersion in stature measured by calculating the coefficient of variation for department-level stature (Figure 2). If we admit that this procedure does indeed yield more realistic indicators, it follows that the stature of French conscripts barely improved during the first decades of the Third Republic, although the trend for the early 20th century suggests a gradual improvement. Furthermore, regional inequality in stature appears to have been on the rise during the last two decades of the 19th century. If we consider that stature at age 20 (age of measurement for conscripts) capture the positive and negative impact related to the quality and quantity of nutritional intake and health condition since the intrauterine period, it seems that the last Second Empire was comparably a more favourable period with a more regular upward trend in stature and a decline in regional inequality.
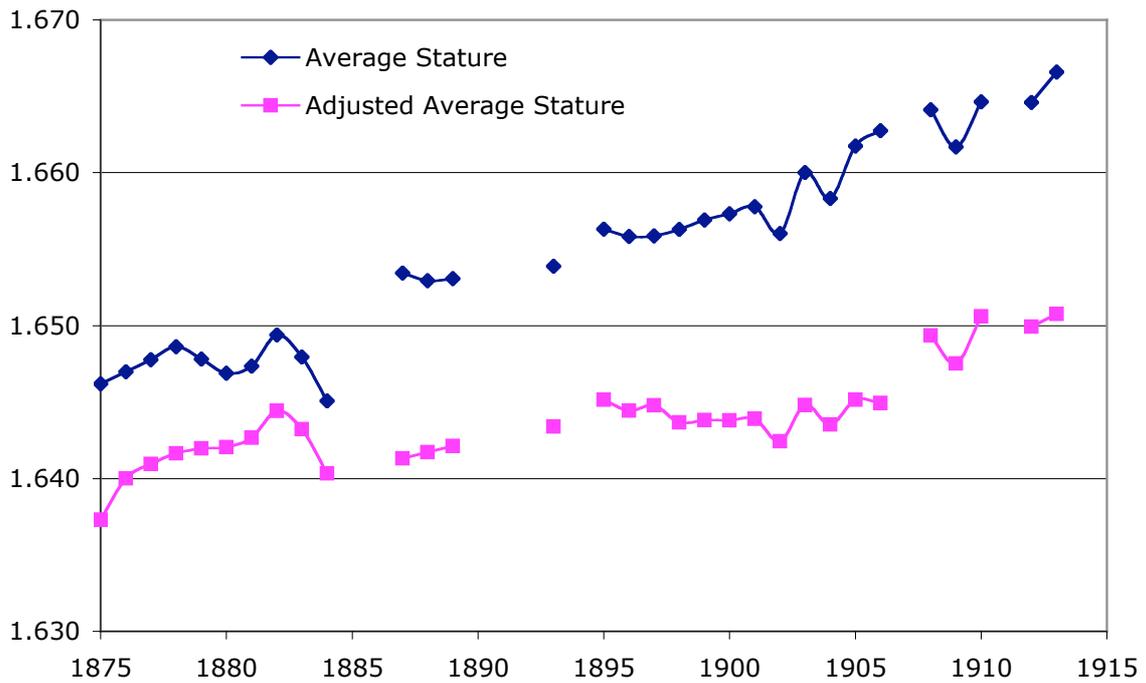
Figure 1: Estimates of unadjusted and adjusted national average of stature of French conscript (year of measurement)
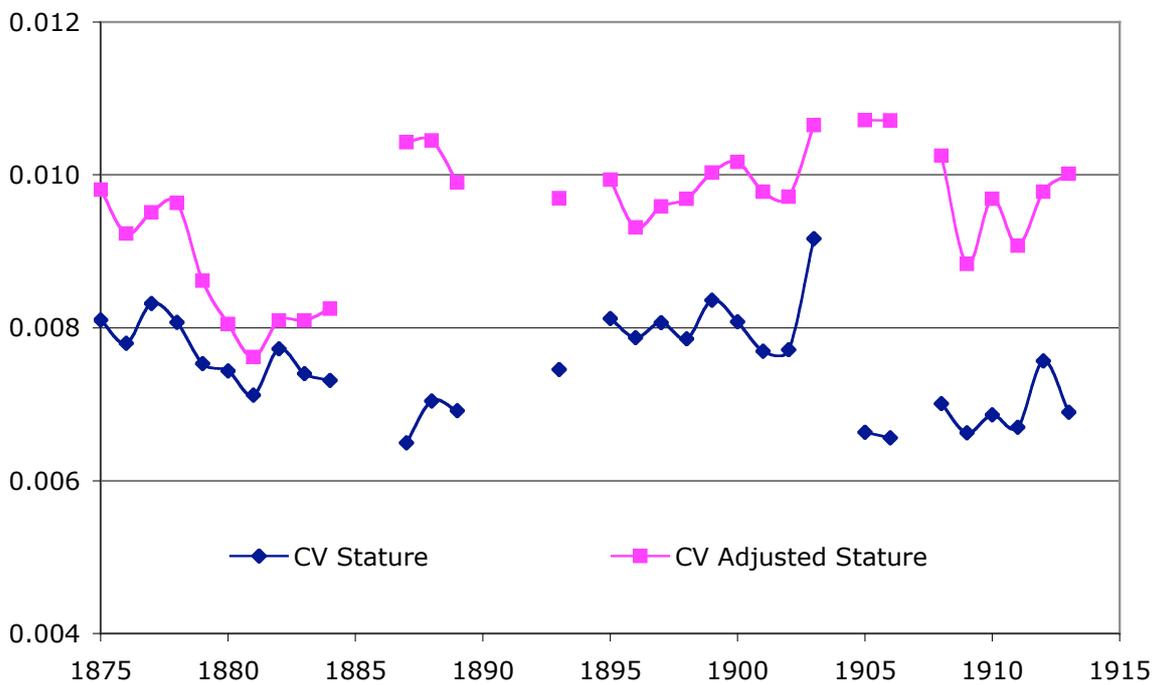

Figure 2: Estimates of CV of department level unadjusted and adjusted average of stature of French conscript (year of measurement)

In addition to stature, conscription reports also specify the level of education of draftees at the department level for the same cohorts. This information is processed in order to generate at the department level (and the national level) an estimation of the average number of schooling years. It is assumed that illiterate conscripts never attended school, that those able to read only attended school for 2 years, those able to read and write attended the full 6 years of primary school; *baccalauréat* graduates (the degree conferred to secondary school graduates), 12 years seems in order (by 1914 *bacheliers* represented only about 5% of their respective cohort nation-wide). From 1894 onwards, we can also rely on the number of those qualified for the certificate of primary education (a degree taken at the end of the primary school introduced by law of June 1865) and for those we assume that they attended school for 9 years. Here again for a sizeable percentage of the cohort, the level of education is undocumented (with formula conscripts "whose level of instruction could not be ascertained"). We assumed that they were illiterate.

The results obtained for each department are used for measuring a CV. In addition to the national average, an average of schooling years is calculated for non-French speaking departments, i.e. for departments located in regions, which were not predominantly French-speaking before 1914. Especially in rural areas, population had a very limited command of written or spoken French, their native language being Alsatian, Basque, Breton (either gallic or gallo), Corsican, Provencal or Occitan. It is believed that, despite the education effort and official ban on the use of dialects, dialect-speakers accounted for over 30% of the total French population.

Figure 3 plots the trends for the different variables between 1875 and 1913. A decline in regional inequality is noticeable but the apparent improvement remained limited. The gap between French speaking and non-speaking departments is on average very minute, in spite of the prominence of relatively low living standards in most non-speaking regions. Teachers were paid on the public purse after 1881, but the other costs of primary education (buildings) were borne by municipalities.
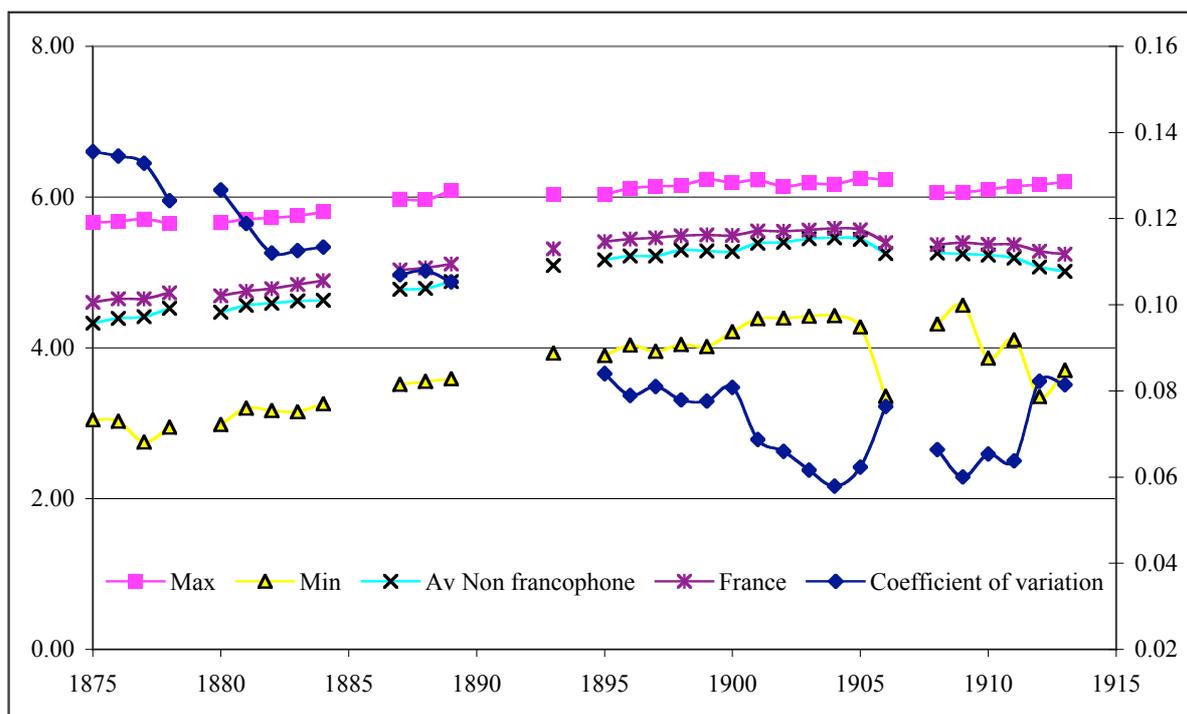
Figure 3: Estimates of average schooling years for the period 1875-1913 for France, non-French speaking regions, maximal and minimal values observed (left-hand scale, in years) and coefficient of variation for department level figure (right-hand scale)

III. Regional inequality in nominal and PPP adjusted wages

This section investigates the degree of correlation between nominal and PPP adjusted wages and the extent of the convergence observed during the period 1845-1906. We rely on department level information for benchmark years for nominal wages and price. Nominal wage data are available for 1845, 1853, 1857, 1865, 1874, 1882, 1891, 1892, 1896, 1901, 1906 and 1911. At the present stage of the research, we have been able to estimate PP adjusted wages for 1853, 1857, 1874, 1891, 1896, 1901, and 1906.[3]

Data on French 19th Century wages are relatively abundant but disparate. The statistical agency started to collect wage rates from municipalities and arbitration courts under the Second Empire in the 1850s. These concerned from between 25 to 46 male categories of artisans or small industry workers and 10 female professions. This series became systematic after 1871 and local authorities were asked to compute a local wage rate usually the unweighted average of the rates at their disposal. It was supplemented by wage data in manufacturing (so-called "large industries"), mostly in the textile trades, and the annual

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[3] Provisional, some price data unavailable and were proxied using information for adjacent department; also, wages for 1853 adjusted with prices in 1852; W 1874, P 1872; W 1891, P 1892; W 1896, P 1896; W 1901, P 1902; W 1906, P 1906; W 1911, P 1912.

money income of in-door and out-door servants and shop attendants. Industrial enquiries (1840-45, 1861-65 and 1873) as well as agricultural surveys (six of them between 1840 and 1912) also supply wage rates for different categories.

There are, of course a number of problems associated with these data. Representativeness figured prominently among the concerns of Simiand (1932) and his followers (Rougerie, 1970) who tried to design an index valid for the whole of France. The contemporary national "average" computed by the SGF (the statistical agency) focused on the first category, that of employers of the craft sector, representing ca. 20% of the whole working population; it is also predominantly a male wage rate. What are the possible justifications for taking up this particular indicator at regular intervals?

• in addition to being impractical, agricultural money wages, despite the size of the sector in the economy (40-50% of the labour force) cannot be taken as representative given the importance of self-employment, the seasonal character of employment and the importance of truck (payment in kind) for agricultural workers;

• while daily wage rates for artisans may introduce an upward bias (due to the high proportion of skilled jobs), their level for unskilled worked is very close to those paid in manufacturing industries (almost identical in the textile trades). Factory workers – this was the main difference – tended to work longer hours i.e. the total number of working days was higher in large industries than in the shops. This validates the assumption that for a large number of unskilled positions, small industry and large industry workers had similar opportunity costs.

• by taking on board only male wage rates, we assume the pervasiveness of the "male breadwinner family" pattern; particularly low wage rates for female workers (typically less than 50% of male equivalent) and especially the temporary nature of their employment in many trades over the year (fairly well documented in the literature) suggest a marginal impact of female income for the average family (the same is applicable to children employment).

• for the bulk of service sector employment (especially transport and domestic service) compensation was aligned on comparable position in the production sector. In 1914 the respect extended to elementary school teachers was not based on their earning potential!

• in the computation of national average the Paris-Province gap completely disappears. It is of little concern for us here but suffice it to mention that for all its might Paris' population represented then only about 5% of the national total.

• the use of departmental wage rates of artisans therefore recommends itself for balancing the defects of the other alternatives; a comparison (see Figure 4) between the national average and the miners' wage rate (usually taken as representative of the typical unskilled proletarian)

confirms the broad representativeness of the wage series selected (miners, however, in part thanks to collusion were very early on able to secure attractive pay deals).

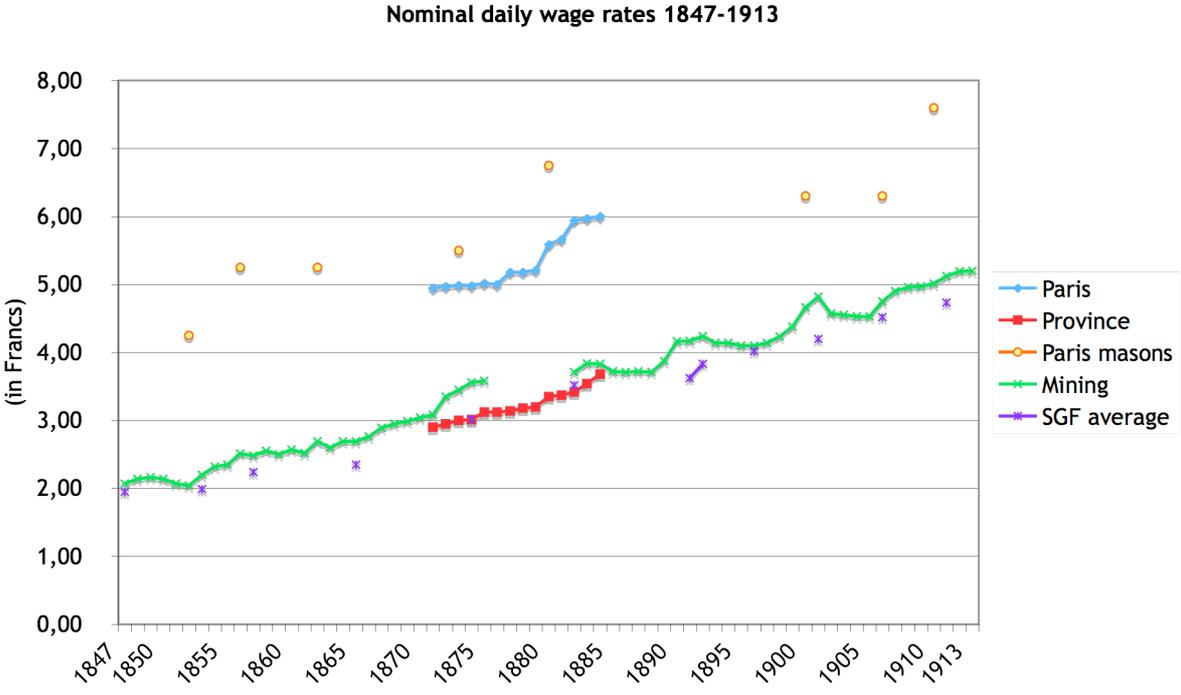**Nominal daily wage rates 1847-1913**

Figure 4. Alternative series of nation-wide wage rates 1847-1913

Ideally, we would like to calculate PPP coefficient at the departmental level by taking into account regional differences in consumption patterns. The method employed by Allen (2001) in his comparison of living standards in northern and southern Europe, from the medieval period to 1913, can be applied in our case. Allen devised a northern and southern basket of similar content in term of nutrient or alcohol content for major food-items, and identical quantities for non-food items; olive oil and wine consumed in southern Europe was regarded as equivalent to butter and beer used in northern Europe.

The major difficulty of measuring the cost of living in France at the departmental level, consists in the unavailability of price data for a number of items. In order to insure consistency in the coverage across regions and over the entire period under investigation, we have to rely exclusively on the food items (fuel price, i.e. the price of wood, charcoal and coal, were only found for a few benchmark years at the present stage of our research). The food items are bread (first and second quality), pork, beef, mutton, and wine. Price data for most produce were supplied by municipalities and based on weekly or monthly observations at local markets and are therefore retail prices; the price for wine by contrast was given at the farm (for fairly large quantities-hectolitre). We assumed that retail margins were similar

across regions and that micro-regional difference in unit-prices can be neglected. It is likely that lower income households living in small town were able to purchase some food items at producer prices. As bread, meat and wine were generally purchased in small quantities, we should not be too much concerned.

All these goods were extensively traded and they accounted for a large share of consumption expenditures of working class households (estimated at 55% in 1913). Bread and meat were fairly homogenous goods in the 19th century; regional differences in the quality of wine certainly existed, although not as large as nowadays. Still, as wine price data are not adjusted for difference in alcohol content, it is likely that we tend to underestimate the cost of living in the Languedoc (departments of Audi, Gard and Herald) that was the major producer of low quality and low alcohol content wine (and to overestimate the cost of living in Champagne and Burgundy).

This basket is akin to a kind of 'late 19th century French Big Mac.' It is made up of the following quantities: 750 g of bread (50/50 1st and 2nd quality), 200 g of meat (100 g pork, and 50 g each for beef and mutton). The implied caloric and protein contents are 2550 calories and 115 g of protein per day. The allocation for bread is close to observed average consumption, that for meat is fairly generous, but the implied wine consumption is lower than the average per capita intake. Nevertheless, these weights are convenient as each of the three components (bread, meat and wine) accounts for about one third of the cost of the basket for all benchmark years.

The price of this food basket is combined with information on prices in order to measure real wage indices suitable for departmental and inter-temporal comparisons. These data can also be used for generating welfare ratios that are comparable to the series constructed by Allen (2001), and that allow further inter-country comparisons. Allen (2001) used a broader basket including other food and non-food items (butter or olive oil, cheese, eggs, fuel, linen, soap, lamp oil). He calculated welfare ratios assuming that the total income of the representative household was equal to wages received for 250 days worked per year (of a male unskilled or unskilled worker) and that the total consumption expenditures of the household were equivalent to three times the cost of the annual consumption basket (3 adult-equivalent). In order to take into account differences in basket composition and underestimation of cost due to the use of wholesale prices (for wine), we can compare Allen's series for Paris and a welfare ratio calculated using our wage and price data for the department of the Seine (Paris and its suburbs; but based on wage and price data measured in Paris). The cost of our basket is about 40% lower that the one used by Allen. Our series of welfare ratios could therefore be

upwardly biased in the same proportion for all departments and all benchmark years; unsurprisingly, the results suggest that the French average was below the levels computed by Allen for Milan and Madrid, which were the lowest among European cities in the early century and barely higher that the level measured for Tokyo around 1913. The comparatively low French level indicates deviation from the average implies that average level were close to subsistence in the poorer departments – quite the opposite of the received wisdom of French preference for food consumption (Lévy-Leboyer & Bourguignon, 1990).

In order to assess the incidence of local prices on regional differences in living standards, we measure the coefficient of variation (CV), for nominal and PPP adjusted wages at regular intervals, as well as the correlation between both indicators (Table 1). For the sake of consistency, the coverage excludes the 6 departments that were not French territories during part of the period studied (border changes in borders occurred in 1860 and 1870).[4] It appears that the regional dispersion of wages, as measured by the coefficient of variation (CV), was fairly stable over the period when one relies on nominal wages but slightly declining when using PPP adjusted wages. Still, the figures are fairly close for all benchmarks. The decrease in CV for PPP adjusted wages indicates a tendency toward a lower degree of regional inequality in living standards, but the results for the earlier benchmark years suggest that this trend started during the Second Empire and is apparently unrelated to the change of regime in 1870. As could be expected on the basis of the CV indicators, the correlation between nominal and PPP adjusted wages (Cor.) was on a rising trend during the second half of the 19th century but had already reached a relatively high level in the 1850s.

Table 1: Coefficients of variation and correlation for nominal and PPP adjusted department level wages

	1845	1853	1857	1865	1874	1891	1892	1896	1901	1906	1911
CV_{NW}	0.17	0.20	0.17	0.20	0.18	0.21	0.18	0.19	0.22	0.20	0.20
CV_{PPPW}	na	0.22	0.20	na	0.20	0.19	na	0.17	0.17	0.17	na
Cor.	na	0.81	0.83	na	0.85	0.89	na	0.94	0.91	0.92	na

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[4] In 1860, *Nizza* and *Savoia*, that were until that date part of the Kingdom of Piedmont were transferred to France as a price paid for the French support to Piedmont's successful annexation of former Austrian territories (or quasi-protectorates) in northern and central Italy, and became three new departments of *Savoie, Haute Savoie* and *Alpes Maritimes* (the later corresponding to the region of Nice and his mountainous hinterland was actually merged with what was until then the eastern border region of the department of Var). These departments had already existed, until 1815, as a result of the conquest and occupation of Piedmont's territories by French revolutionary armies. In 1870, Germany annexed the three departments of *Bas Rhin, Haut Rhin* and *Moselle* that reverted to France in 1918.
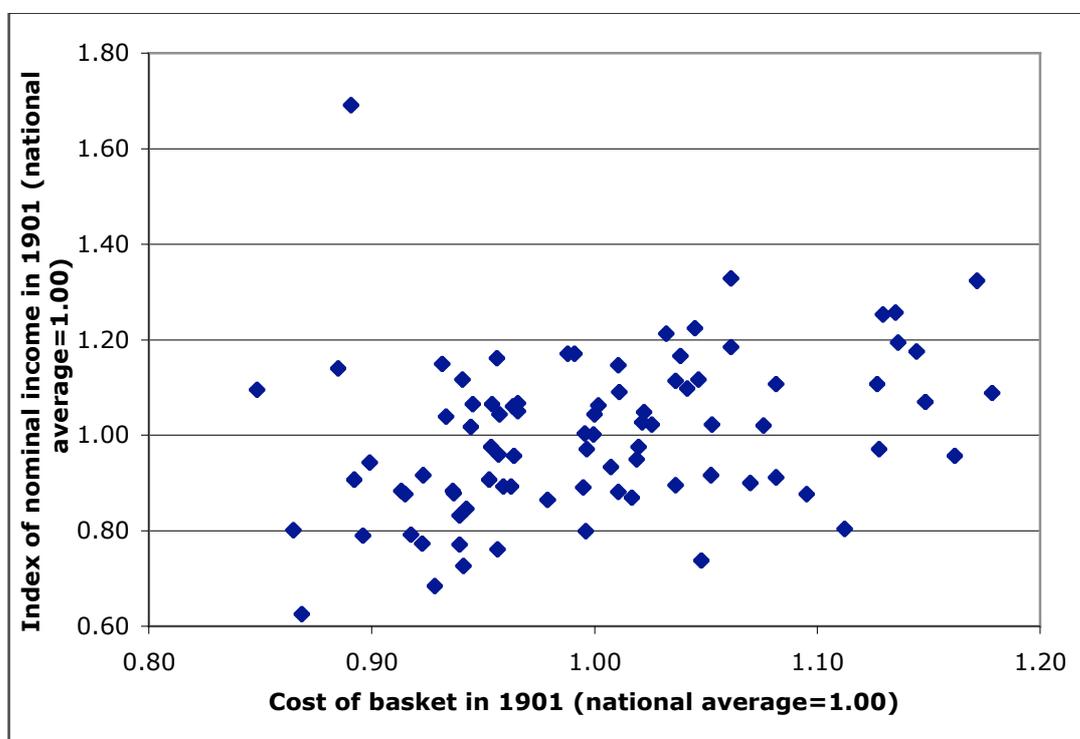
Figure 5. Relationship between department nominal wages and the cost of the food basket (indices; national average not weighted by population)

However, this correlation also records to a large extent regional inequalities in nominal wages and does not specify the relationship between nominal wages and the price of the basket. We would expect to find low nominal wages and low price levels in remote departments cut off from the major national urban markets, a predicament which tended to prop up transportation costs for both workers and goods. Figure 5 plots this information for benchmark year 1901. Although suggesting a vaguely positive relationship, the scatter also points towards a wide dispersion of the observations. The correlation is only 0.32 in 1901 (low levels are also observed for other benchmark years). Paris appears in a position of outlier (the 'top dot') with high nominal wages and low cost of the food basket. Absolute prices were indeed low in Paris, by French standards, a consequence of economies of scales in the provision of food, but rents and services were also more expensive in the capital city. Nevertheless, other department in the vicinity of Paris also enjoyed relatively cheap food while prices were comparatively high in several remote and rural departments where nominal wages exhibited among the lowest French levels (for instance Haute Loire in the Auvergne province, or Corsica). This low correlation between nominal income and price levels reveals that adjustment for differences in the cost of living is required when investigating the regional convergence in wages or when using cross-section department level data for analysing the relationship between wages and other indicator of the biological standard of living.

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IV. Comparing the trends in regional convergence

This section compares the trends in regional convergence for stature, education, nominal wages, and real wages. The pattern of convergence is measured by the variation for each indicator in percentage, during the period 1875-1913, in relation to the level in the year of origin (for wages 1853-1874 and 1974-1906). The results are presented in Figures 6, 7, 8, 9 and 10.

With regard to human stature, the dispersion observed in figures 6 and 7 suggests that there was not much regional convergence in late 19th century France. The results are only slightly better when stature is not adjusted for missing observations. By contrast, an impressive regional convergence is observed in the level of education, measured by department level estimates of schooling years (table 8). However, this achievement should be considered in a long-term perspective. The rising trend in education standards as well as the regional convergence in welfare is detectable for conscripts aged 20 in 1875-1880. Assuming that the effect of universal schooling affected these individuals in their young age (around 10), the conclusion is that the improvement occurred during the Second Empire (1852-1870). By contrast, the apparent regional convergence after 1880 does not appear to be linked with substantial improvements in education achievement at the national level.

As far as real wages are concerned (here measured as welfare ratios), the regional convergence occurred mostly between 1874 and 1896, that is during the 'great depression' of falling prices for basic commodities and rigid wage rates; before 1874 and after 1896, a large dispersion is observed (Figures 9,10 and 11).
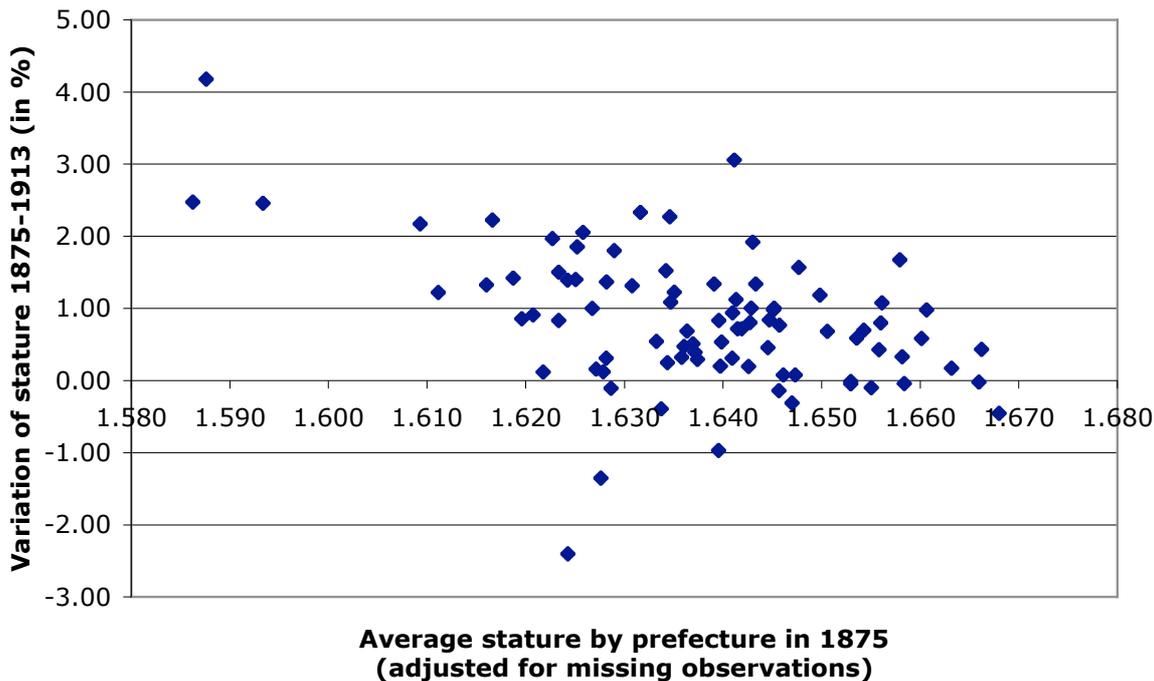
Figure 6. Convergence in department level average stature (adjusted for missing observations, assuming that all individuals who were not measured were in the lower open tail; correlation: -0.45)
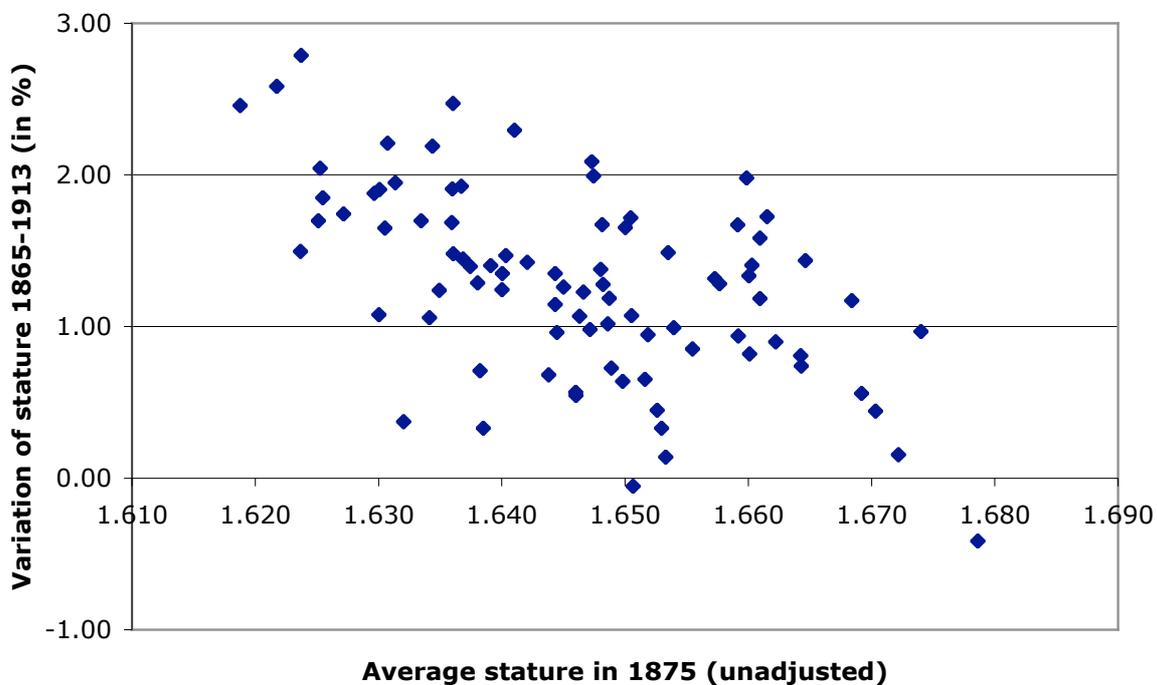
Figure 7. Convergence in department level average stature (unadjusted for missing observations, assuming the individuals who were not measured were distributed among height intervals in the same way as those measured; correlation: -0.56)
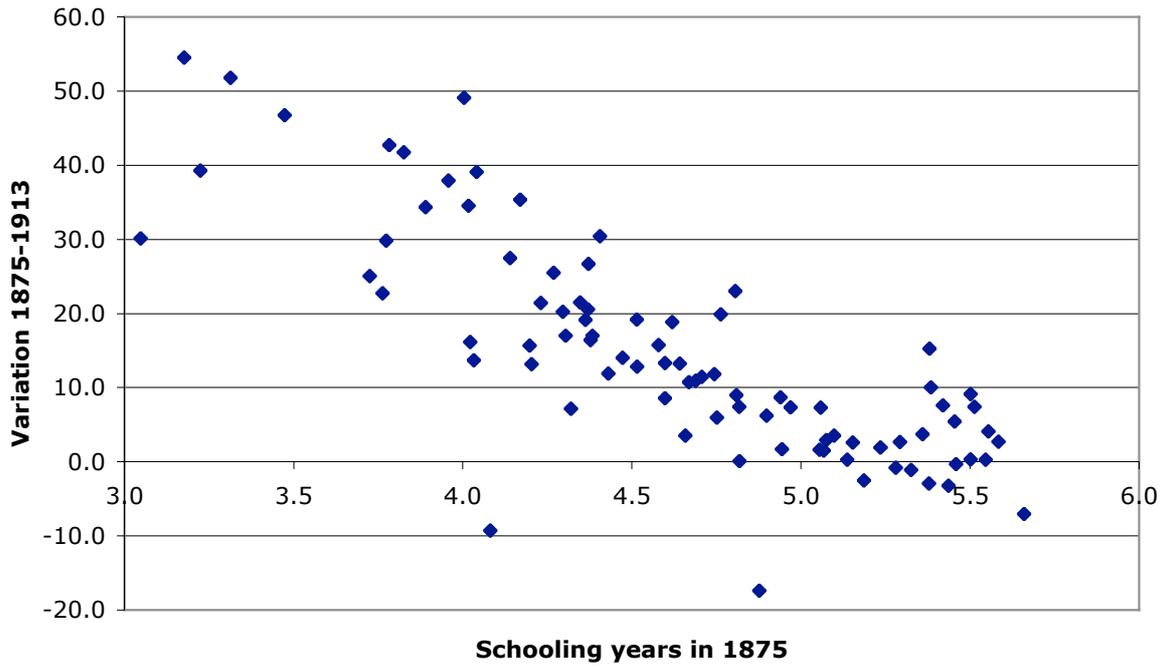
Figure 8. Convergence in schooling years 1875-1913 (correlation: -0.81)
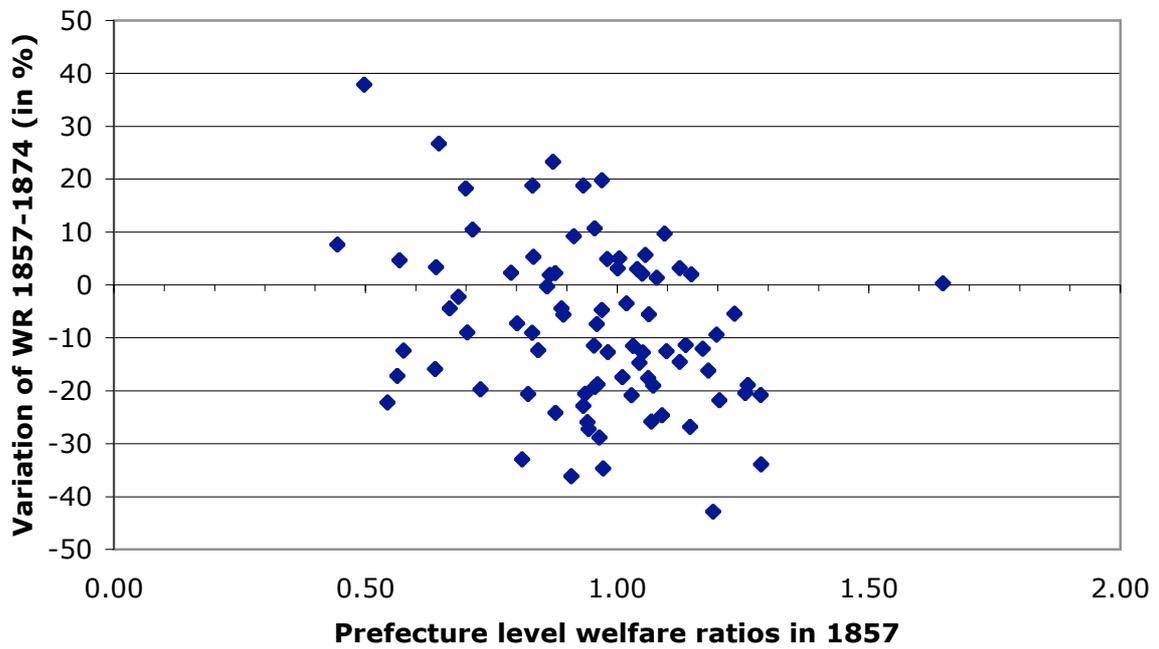
Figure 9. Convergence in real wages 1857-1874 (correlation:-0.45)

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Figure 10. Convergence in real wages 1874-1896 (correlation:-0.65)

Figure 11. Convergence in real wages 1896-1906 (Correlation:-0.36)

V. PPP adjusted wages and education as determinants of stature

In this section, we investigate the role of nominal wages (nw) real wages (wr) and education attainment (h) as determinants of average stature at the department level. Why rely on a data set that is similar to the one used by Weir (1995) for the same purpose? We are considering here the implications of adjusting our stature sample for missing data in each cohort and our wage rates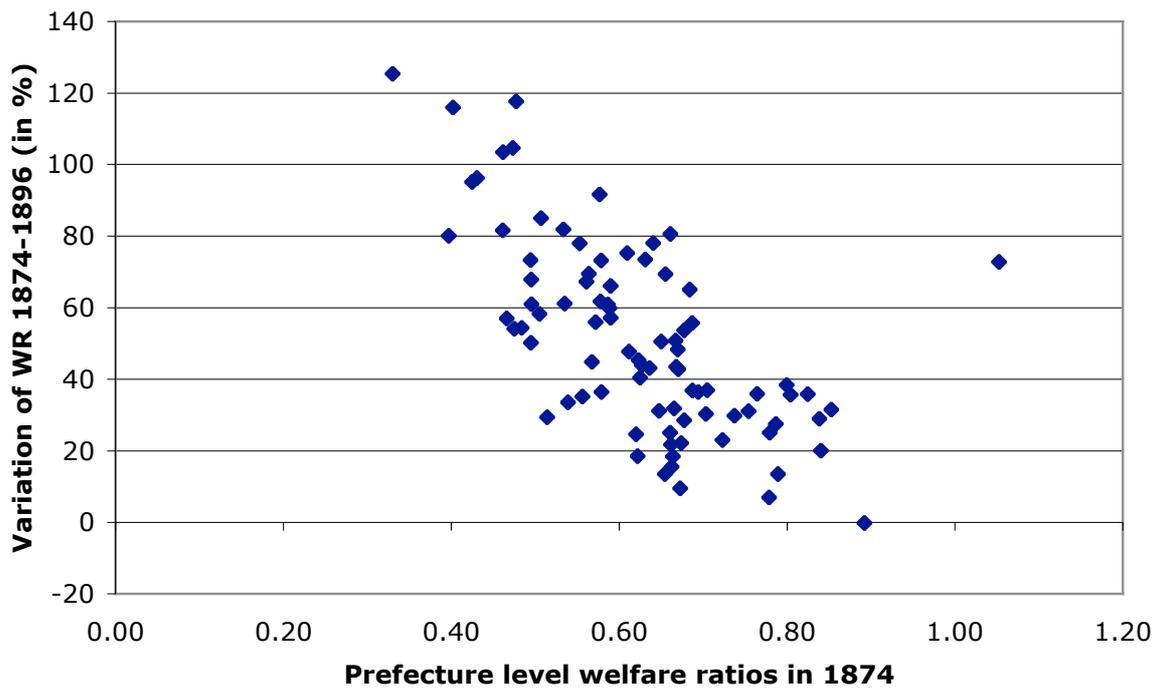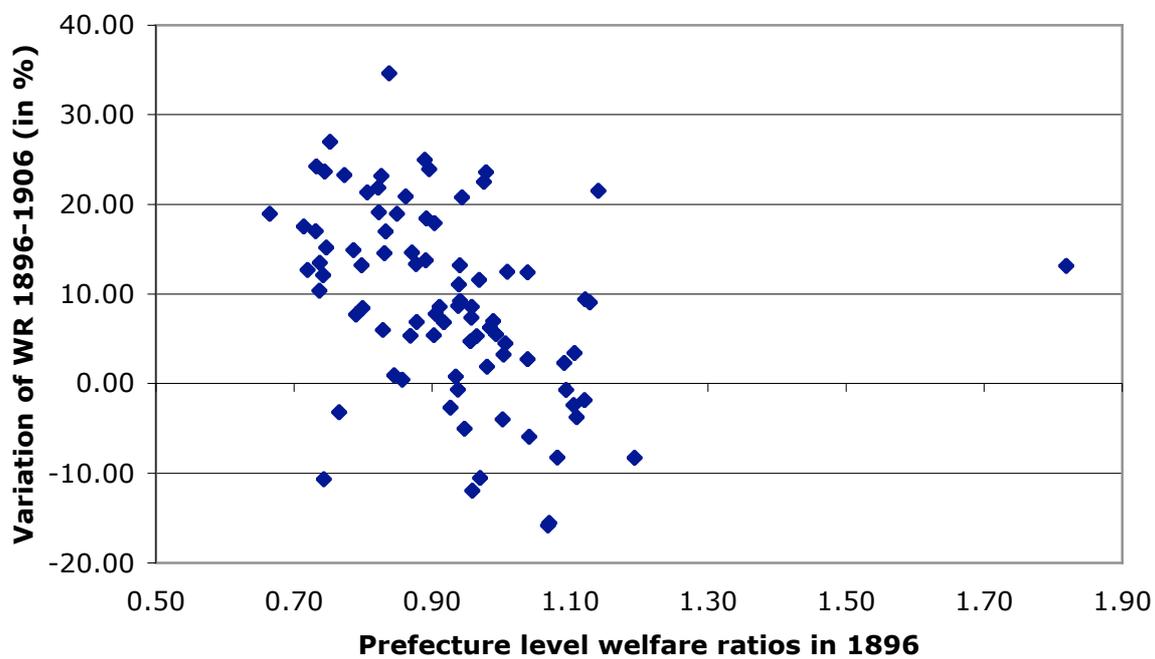 for regional differences in purchasing power (Weir's "real wages" are not actual real wages but merely wage levels adjusted for inflation assuming the same variation in CPI in Paris and in the rest of France). Table 2 presents results that are essentially similar to the one obtained by Weir with unadjusted stature and nominal wages (10 year lag between wages and stature). Instead of the average level of literacy at age 0, we use the average number of school years of the conscripts in the same department (with the same 10-year lag as for wages). Dtime is a dummy (1 in 1901 and 0 otherwise) that is used for capturing effects other than the rise in real wages and level of education, for instance the impact of improvement in health conditions on stature. Interestingly, these results are not robust to the adjustment of wages for regional differences in purchasing power (Table 3). However, the coefficient for educational attainment remains significant and positive.

Table 2: Determinants of department level unadjusted stature (10-year lag; pooled cross section 1884, 1906; explanatory variables are log of nominal wages and human capital)

Source	SS	df	MS	No. of obs.	= 172	
Model	.022186527	3	.007395509	F (3, 168)	= 77.54	
Residual	.016023214	168	.000095376	Prob>F	= 0.0000	
Total	.038209741	171	.000223449	R-squared	= 0.5807	
				Adj. R-sq.	= 0.5732	
				Root MSE	= .00977	
statureunadj	Coef.	std. err.	t	P>|t|	[95% conf. interval]	
lognw	.032993	.0107275	3.08	0.002	.0118149	.0541711
logh	.1242061	.0181789	6.83	0.000	.0883176	.1600947
dtime	.00757	.0019648	3.85	0.000	.0036911	.0114489
const	1.542925	.0113556	135.87	0.000	1.520507	1.565343

Table 3: Determinants of department level unadjusted stature (10-year lag; pooled cross section 1884, 1906; explanatory variables: log of real wages and education)

Source	SS	df	MS	No. of obs.	= 172
Model	.021541842	3	.00718061	F (3, 168)	= 72.38
Residual	.016667899	168	.00009921	Prob>F	= 0.0000
Total	.038209741	171	.00022345	R-squared	= 0.5638

statureunadj	Coef.	std. err.	t	P>|t|	[95% conf. interval]
				Adj. R-sq.	= 0.5560
				Root MSE	= .00996
lognw	.017215	.0106861	1.61	0.109	-.0038813 .0383113
logh	.1363389	.0182789	7.46	0.000	.100253 .1724248
dtime	.0082644	.0022822	3.62	0.000	.0037589 .0127698
const	1.553904	.0136714	113.66	0.000	1.526914 1.580894

The results obtained when using adjusted stature are comparable to those obtained when using nominal wages as the explanatory variable, albeit with a lower R-squared (table 4 and 5). These results suggest that Weir's findings regarding the relation between income and stature in 19th century France may be spurious.

Table 4. Determinants of department level adjusted stature (10-year lag; pooled cross section 1884 and 1906; explanatory variables are log of nominal wages and human capital)

Source	SS	df	MS	No. of obs.	= 172
Model	.01666499	3	.005555	F (3, 168)	= 31.50
Residual	.029627549	168	.00017635	Prob>F	= 0.0000
Total	.046292539	171	.00027072	R-squared	= 0.3600
				Adj. R-sq.	= 0.3486
				Root MSE	= .01328
statureunadj	Coef.	std. err.	t	P>|t|	[95% conf. interval]
lognw	.0417041	.0145872	2.86	0.005	.0129062 .0705019
logh	.1634132	.0247196	6.61	0.000	.1146122 .2122143
dtime	-.006347	.0026717	-2.38	0.019	-.0116215 -.0010725
const	1.506694	.0154412	97.58	0.000	1.47621 1.537178

Table 5. Determinants of department level adjusted stature (10-year lag; pooled cross section 1884 and 1906; explanatory variables are real wages and human capital)

Source	SS	df	MS	No. of obs.	= 172
Model	.015647758	3	.00521592	F (3, 168)	= 28.59
Residual	.030644781	168	.00018241	Prob>F	= 0.0000
Total	.046292539	171	.00027072	R-squared	= 0.3380
				Adj. R-sq.	= 0.3262
				Root MSE	= .01351
statureunadj	Coef.	std. err.	t	P>|t|	[95% conf. interval]
lognw	.0220967	.0144896	1.53	0.005	-.0065085 .0507019
logh	.1785203	.0247849	7.20	0.000	.1295903 .2274504
dtime	-.0055166	.0030945	-1.78	0.076	-.0116257 .0005924
const	1.5208	.0185375	82.04	0.000	1.484203 1.557396

VI. Concluding remarks

Our findings have confirmed the close relationship between real wages, food consumption and stature in the 19th Century, for the (presumably mostly urban) French population, highlighted the improvement of living standards already spotted by author authors during the Seconde Empire and the 'Belle Epoque' and the deterioration contemporary of the 'Great depression.' Unsurprisingly this trend reflected the consequences of the 'globalization backlash' (in form of increased tariff protection) which favoured farmers at the expense of urban consumers. At the time Léon Say estimated the transfer at ca. four billion francs (or 15% of GNP).

However, our task is far from achievement point. In addition to extend our samples up- and down stream (eventually covering the century from 1840 to 1940), we need to investigate further the role of provision of public goods such as education, particularly in relation to public health provision. Weir suggests that Republican policy was biased towards investment in urban areas. The role of income could be investigated further by considering regional differences in relative prices (bread relative to wine; meat relative to bread, and also relative to addictive goods and narcotics such as wine, tobacco, and sugar).

In a second stage, the results of income and biological welfare convergence can be compared with those obtained for late comers of the 19th and early 20th century industrialization, such Italy, Spain, and Japan using the already extent information (Dominguez Martin and Guijarro Garvi 2000; Esposto 1997; Felice 2005; Roses and Sanchez-Alonso 2004; Saito 2005;Bassino 2006).

Data sources

- Department level nominal wages and prices in 1845, 1853, 1857, 1861, 1865, 1873, 1882, 1891, 1896, 1901, 1906-1913 (from SGF surveys).
- Body height and literacy of conscripts for 1865-1922 (ASF and conscriptions reports).
- Estimates of department level food output, converted into calories and protein per resident for benchmark years 1845-1913 (Agricultural surveys and Statistical abstracts).

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Table A.1 The Male-female and Paris-province wage gaps, 1875

Females	Paris	Province	gap (%)
Laundress	3,00	1,64	54,7
Embroideress	3,00	1,63	54,3
Corset-maker	2,00	1,52	76,0
Seamstress	2,00	1,54	77,0
Breeches maker	4,00	1,55	38,8
Lace-maker	3,00	1,78	59,3
Flower-maker	3,00	na	na
Waistcoat-maker	3,00	1,59	53,0
Linen maid	2,00	1,43	71,5
Milliner	na	1,69	na
Machinist	3,00	1,65	55,0
Average	2,80	1,60	57,2
Males			
Jeweller, goldsmith	6,50	3,95	60,8
Butcher	6,00	2,74	45,7
Baker	6,65	3,35	50,4
Brewer	4,25	3,22	75,8
Brick-maker	3,30	2,82	85,5
Quarrier	4,00	2,93	73,3
Coach-builder	5,50	3,40	61,8
Charcoal-burner	4,00	2,54	63,5
Pork-butcher	na	2,74	na
Hat-maker	6,50	3,17	48,8
Carpenter	6,00	3,63	60,5
Cartwright	5,00	3,16	63,2
Boilermaker	5,50	3,19	58,0
Slipper-maker	2,25	2,38	105,8
Rope-maker	4,00	2,56	64,0
Shoe-maker	3,50	2,72	77,7
Cutler	5,50	2,89	52,5
Roofer	6,00	3,52	58,7
Cabinet-maker	5,00	3,32	66,4
Tinsmith	4,00	3,11	77,8
Florist	5,00	1,83	36,6
Blacksmith	6,50	3,50	53,8
Watchmaker	5,00	3,82	76,4
Printer	6,00	3,41	56,8
gardener	3,75	2,69	71,7
Mason	5,00	3,27	65,4
Blacksmith	5,00	2,98	59,6
Joiner	5,00	3,17	63,4
Pastry-cook	na	2,80	na
Painter	6,00	3,36	56,0

Hairdresser	3,00	2,43	81,0
Plumber	6,00	3,30	55,0
Chimney-sweep	5,25	3,40	64,8
Potter	3,85	2,74	71,2
Binder	5,50	2,84	51,6
Pit sawyer	5,00	3,36	67,2
Woodcarver	7,00	4,94	70,6
Saddler	4,50	3,06	68,0
Locksmith	4,50	3,27	72,7
Tailor	5,00	3,10	62,0
Stone-cutter	6,00	3,70	61,7
Tanner	5,00	3,01	60,2
Upholsterer	5,00	3,52	70,4
Dyer	4,50	2,88	64,0
Navvy	3,85	2,66	69,1
Weaver	3,85	2,52	65,5
Cooper	5,00	2,98	59,6
Wood turner	4,85	2,94	60,6
Metal turner	6,00	3,72	62,0
Basket-maker	4,50	2,76	61,3
Cesspool emptier	5,00	3,05	61,0
Glazier	5,25	2,95	56,2
Average	4,98	3,10	62,3

Source: Statistique générale de la France, Statistique annuelle vol. V (1875)

	'small' industries		'large' industries		
	Paris	*Province*		*Paris*	*Province*
Stone-cutter	8,00	3,87	Stone and marble sawing	6,35	3,67
Brick-maker	6,00	3,04	Tile and brick-making	4,60	3,35
Glazier	5,50	3,17	Glass-making	5,70	3,40
Pit sawyer	5,00	3,54	Wood sawing mills	6,10	3,49
Joiner	7,00	3,46	Furniture-making		
Pastry-cook	6,65	2,98	Confectionery	6,20	3,67
Tanner	5,00	3,26	Tanning mills	5,25	3,54
Dyer	4,50	3,05	Dyeing and finishing	4,80	3,49
Hat-maker	6,50	3,50	Felt hat-making	5,90	3,71
Tailor	5,00	3,21	Cloth-making	5,00	3,23
Binder	5,50	2,98	Paper mills	5,10	3,68
Weaver	3,85	2,52	Mechanical weaving	3,75	3,22
Rope-maker	4,00	2,82	Rope manufacture	4,80	3,16
Potter	4,00	3,04	Earthenware	5,60	3,84
Baker	7,00	3,52	Grain-milling	4,70	3,37
range	3,75-8,00	2,52-4,95	range	3,75-8,00	2,91-5,40