Collegio Carlo Alberto

Industrial Employment in Italy, 1911:

The Burden of the Census Data

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Carlo Alberto Notebooks

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ABSTRACT

In Italy two censuses were taken in 1911: the usual demographic census, that contains labor-force data, and the first industrial census, that contains employment data. The two yield aggregate figures that are very far apart. The literature directly concerned with estimating industrial employment considers the industrial-census figures essentially exhaustive. In point of fact, the industrial census was self-admittedly, grossly incomplete, and its coverage of small-scale manufacturing, and construction, is particularly poor; the extant estimates badly underestimate total industrial employment, and badly distort its allocation by sector. Far better estimates of employment are obtained from the labor-force data, allowing for sector-specific unemployment and other distortions.

INDUSTRIAL EMPLOYMENT IN ITALY, 1911:
THE BURDEN OF THE CENSUS DATA

> "Et s'il n'en reste qu'un, je serai celui là."
> Victor Hugo, *Les Châtiments*

Those of us who work on the economic history of post-Unification Italy know, or should know, that we are still working on the foundations: even the basic facts of our past are largely unknown, even our shared fundamental certainties can be swept away by the fruits of new research.[1]

This paper is concerned with the level of industrial employment in 1911, which is still to be established to the satisfaction of all concerned,. The issue is significant in its own right, as the extant estimates vary widely, almost *du simple au double* for industry as a whole, and by far more than that for individual industries; and it has significant implications, as much production was not directly documented, and the corresponding value added is perforce derived primarily from estimated employment.

The focus on 1911, and the attendant variety of employment estimates, stems of course from the two censuses that were taken in June of that year: the fifth demographic census, and the very first industrial census.[2] The *Censimento demografico* assigned the population aged 10 or more to a detailed set of agricultural, industrial, and service activities, or to the non-working population; for each economic activity, it provides data on the corresponding labor force.[3] The *Censimento industriale* reports employment (and power in use) in industry, broadly defined to include *arti* (crafts) and *mestieri* (trades), as indicated in the enabling legislation (*regio decreto 6 novembre 1910, n. 776*, art. 23). In all, the former counted 4.3 million members of the industrial labor force, the latter 2.3 million employed industrial workers; the extant estimates of actual employment diverge because minor adjustments apart some reproduce the higher figure (the reported labor force) and some the lower one (reported industrial employment), with yet others opting for a middle ground.

Our estimates are essentially Bayesian, they reflect not only the data, the contents of the sources, but our priors, the beliefs that we bring to bear and that shape our interpretation of the source's content. The "minimalists" consider the industrial census exhaustive or nearly so, and

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[1] See S. Fenoaltea, "The Fruits of Disaggregation: the General Engineering Industry in Italy, 1861-1913," *Carlo Alberto Notebooks* No. 358, June 1914.

[2] Ministero di agricoltura, industria e commercio, Ufficio del censimento, *Censimento della popolazione del Regno d'Italia al 10 giugno 1911*, 7 vols., Rome, 1914-16, henceforth *Censimento demografico*; Id., Id., *Censimento degli opifici e delle imprese industriali al 10 giugno 1911*, 5 vols., Rome, 1913-16, henceforth *Censimento industriale*.

[3] The population of working age (10+) of small administrative units (from the municipality to the province) is distributed by sex, activity, and status in vol. 4, that of the regions and the Kingdom by sex, age, activity, and status in vol. 5. On the data-gathering process and the classification of economic activities see vol. 4, pp. 3-6 and 7-31, respectively.

readily accept that little more than half the reported industrial labor force was actually employed in industry; the "maximalists" readily accept that the industrial census is grossly incomplete, and consider the industrial labor-force figures much the better first-order indicators of actual industrial employment.

This paper presents the case for the "maximalist" position, at present very much a minority view.[4] It deserves better than that: it sits comfortably with reasonable priors, and above all it is consistent, as the alternatives are not, with the text, and the numbers, of the sources themselves. The millions of industrial workers purportedly lacking industrial employment in 1911 deserve to go the way of the "agrarian crisis" and the supposedly unemployed masses of the 1880s.[5] To them too, Godspeed.

I. THE SOURCES

1. The employment data in the *Censimento industriale*

The two censuses were taken simultaneously, and coordinated. The significant positive result is that the classification of industrial activities in the demographic census and the industrial census is with relatively minor exceptions one and the same: the labor force numbers in the one and the employment numbers in the other are from this point of view (almost always) directly comparable.[6] The significant *negative* result is that the *Censimento industriale* is in fact grossly incomplete, for inexperience told, and the coordination of the two censuses did not work out as planned.

The partial nature of the figures in the *Censimento industriale* is evident from the published description of its objectives, procedures, and results.[7] One questionnaire was sent to every separate ("small") industrial workshop, with one to ten subordinate workers in addition to the owner/manager, another to every ("large") separate industrial workshop with more than ten subordinate workers; the remaining industrial activity ("not separate" from the owner/manager's residence, or even if thus separate, by the owner/manager who worked alone) was to be documented by a third questionnaire, on the back of the demographic form for each head of household. *The replies to this last questionnaire proved too unsystematic to be usefully processed, and the published figures report only the replies to the first and second, singly (respectively vol. 2 and vol. 3) and combined (vol. 4).* Those who worked alone, or in a place not separate from where they ate and slept, were omitted: that much is declared outright.[8]

A subtler issue concerns the relevant physical separation. The census refers to a separate *locale*: the word conjures up a separate room, and thus suggests that (unaided artisans apart) the

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[4] A minority perhaps of one: "maximalists" is in the plural because I want to believe that somebody, somewhere, agrees with me.

[5] See S. Fenoaltea, *The Reinterpretation of Italian Economic History; from Unification to the Great War*, New York, 2011, ch. 3.

[6] The main difference is that the industrial census includes additional categories, marked by an ω in the appropriate position, for integrated shops: for example, shops spanning two or more of categories 4.41 to 4.45 are grouped in 4.4ω, those spanning 4.1 to 4.5 in 4.ω, those spanning 4 and 5 in ω.71.

[7] *Censimento industriale*, vol. 5, pp. 22-26.

[8] It bears notice that the title of vol. 2, on the "small" shops, refers to "firms that employed no more than ten workers, in addition to the owner or manager." A more accurate title would have read "from one to ten workers in addition to..."; the failure to count those who worked alone is very explicitly noted in the text, but it would appear that the Census Bureau was reluctant to advertise it on the volume's very cover.

industrial census missed only "domestic workers" in the strictest sense of the term.[9] The enabling legislation tells us more, not least that *locale* had (then, or at least there) an altogether broader meaning, as it could be, among other things, a construction site (*cantiere*). In fact, the census-takers started by compiling lists of street addresses, with the apparent intention that each should receive the appropriate questionnaire (depending on whether it was a residence, a "small" separate workshop, or a "large" one) or no questionnaire at all (if it was neither residential nor industrial, or, if industrial, if the occupant worked alone). The appropriate questionnaire, in the singular, to avoid duplication; and separation apparently became in practice a matter not of a separate room, but of a separate street address.

This is of course conjecture, but the internal evidence is overwhelming. One element is as noted the procedure itself, with street addresses at its core. Another is that many of the omitted workers were engaged in activities that they were unlikely to perform alone, or could not possibly perform within the confines of their residential quarters (blacksmithing, or shoeing horses, to cite two obvious examples). A further, now well known bit of evidence is specific to the rubber industry. In Milan the *Censimento demografico* counts thousands of workers, a figure that sits well with the records of the world-renown Pirelli works; the *Censimento industriale* counts only some hundreds. It apparently missed the factory altogether: and this would happen, on the above logic, whenever the factory and the owner's residence were joined in a single compound, and shared a single, "residential," street address.

But to my mind, given my own priors, the strongest evidence that the industrial census is incomplete is in the figures themselves: it counted but 2.3 million employed workers against a labor force of 4.3 million, and, even more tellingly, just 1.7 million employed males out of 3.0 million in the labor force.

My priors are based on my sense of the Italian economy in 1911. In general, it was, I believe, a poor economy, in which abundant leisure was the privilege of the affluent. It was an economy without social security, unemployment insurance, or the dole, an economy in which the poor worked or went hungry. It was an economy with flexible prices and flexible wages: "the" return to labor, net of any skill premium, was set in the market for agricultural day-laborers, and there it varied day by day. It was also an economy characterized by an astounding level of international, and presumably domestic, labor mobility.

It was also, I believe, an economy in transition, with some industrial sectors already dominated by modern factories, others still staffed, as they had been for centuries, by artisans, by "manufacturers" in the full etymological sense of the word. In the clothing industry (category 6.92), for example, the *Censimento industriale* counted 513 "large" shops and 17,013 "small" shops, but only 29 of the former and 11 of the latter used any power-driven machinery at all; in general, working conditions appear to have been much the same whether one worked at home or away from home, alone or in company. In that industry the industrial census counted 79,000 workers, the demographic census over 465,000, including 125,000 males; to my mind these figures point not to massive un(der)employment, but simply to an industry that had yet to be transformed, an industry in which there is no substantive difference between the workers the *Censimento industriale* counted and those it missed.

In 1911, in particular, the economy was riding the crest of the long pre-War boom. Industrial production had grown by leaps and bounds, nominal wages had risen substantially faster than prices.[10] None of that is reconcilable, to my mind, with massive unemployment, or underemployment, at that particular time. The argument works also in reverse: had the peak of the

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[9] This impression is reinforced by the wording in Istat (Istituto centrale di statistica), *Le rilevazioni statistiche in Italia dal 1861 al 1956. Generalità sulle rilevazioni. Ordinamento dei servizi statistici. Lavori meccanografici. Censimenti. Annali di statistica*, Serie VIII, vol. 5, Rome, 1957, p. 615.

[10] Fenoaltea, *The Reinterpretation*, chs. 1 and 3.

cyclical upswing in 1911 been marked by severe un(der)employment, the cyclical trough a decade earlier would have been marked by a lack of work so catastrophic as to cause mass starvation; and of that, at least, there is no evidence.

These general presumptions are reinforced by the detailed census data. In 1911 the *Censimento industriale* missed over 100,000 engineering-industry workers (categories 4.3 to 4.5), but none or next to none in heavy engineering alone (category 4.4); I find it hard to believe that there could have been long queues of unemployed workers in some specific industries even as there were none at all in others that belonged to the same group and used similar skills.

In the blacksmithing industry alone (category 4.31) the *Censimento industriale* missed over 40% of the 150,000 in the labor force. In 1901, when production was far lower, the counted blacksmiths (and farriers, included with the blacksmiths in 1911) were already 150,000; a 40% unemployment rate in 1911 is incredible in its own right, and implies an unemployment rate in 1901 that is simply impossible. In 1911 near 30,000 blacksmiths were aged 21 to 30, and most of those must have chosen that trade in the depths of the preceding depression; I find it hard to believe that large numbers of young men would have sought to enter a vastly oversubscribed profession, with very little work for its established members and negligible prospects for themselves.

The construction industry is an even more dramatic case in point, as the industrial census missed over 80% of the labor force. The "minimalist" interpretation implies an unemployment rate at the peak of the construction boom that seems utterly absurd, and doubly so if back-cast to 1901, when the construction industry appears to have produced under half as much as it would in 1911. But here we have data to complement our priors, for construction is well documented from the expenditure side. The evidence on expenditure and the wage share of cost, category by category, produces estimated wage bills that sum to 499 million lire; that on hourly earnings, average hours per day over the year, and seasonal unemployment yield an estimated wage bill of 502 million lire, assuming summertime full employment for the entire reported labor force.[11] The industrial-census "employment" figure cannot be anywhere near right, it is contradicted by overwhelming evidence.

The employment figures in the industrial census are self-avowedly, grossly incomplete; if taken at face value they have implications that are not easy to accept. Any reasonable estimate of actual employment in industry must therefore recognize the partial nature of the industrial census, and bring the demographic-census labor-force data to bear.

2. The labor force data in the *Censimento demografico*

Next to the "employment" data in the industrial census, the "labor force" data in the demographic census appear gloriously complete, and entirely straightforward; but even these are less simple than they seem.

One element of complexity concerns the classification of activities. As noted, the classification of *industrial* activities is in general the same as in the industrial census, and accordingly a classification of individuals not by profession but by product: not "carpenters," for example, but [production of] "wood furniture," "wood vehicles," and so on. Commercial activities are similarly handled: the census lists not "merchants" or "shopkeepers," again for example, but "sale of animals," "sale of bread and pasta," and so on. Artisans of course combine industrial production and retail selling, but the census attributes them entirely to industry. This is spelled out

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[11] S. Fenoaltea, "Construction in Italy, 1861-1913," *Rivista di storia economica, International Issue,* 4, 1987, p. 48. Given my priors, I required that reconciliation of the aggregate estimates. A first-round sum of the disaggregated estimates, near that in the then extant national income figures, struck me as much too low; part of the gap was closed by the discovery that many public works appeared not in the public-works budget, but elsewhere (e.g., school construction, in the education budget); and the residual disappeared when I added "private public works" (e.g., hydroelectric dams). If as it seems the industrial census sought to record activity at specific street addresses, it naturally missed the larger part of the construction industry, carried out on green-field sites, on the streets themselves, and so on.

in the enabling legislation, and implied by the failed data-gathering procedure, recalled above. It is also evident from the legends of the *Censimento demografico*: on the one hand, the relevant industrial categories explicitly include artisans (as they do not in the *Censimento industriale*), either combined with other owner-managers, or separately; on the other, the relevant commercial categories explicitly exclude them, and the selling of bread and pasta, for example, is restricted to the (re)selling of wares produced elsewhere.

Within industry, there is an exception: construction is disaggregated by product in the industrial census ("construction of buildings," "construction of roads," and so on), and by profession in the demographic census ("bricklayers," "glaziers," and so on). But the exception in industry is the rule for agriculture and non-commercial services, where the categories are in fact professional (for example, "share-croppers" in agriculture and "mid-wives" in the services); and it is arguably the general rule, to the extent that the subtitles of the relevant volumes of the *Censimento demografico* both refer to the distribution of the population "by profession."

So within industry (save construction) the labor-force data match up with the industrial-census "employment" data, and include the workers the latter omitted because they worked alone, or at (somebody's) "home." That is the good news; but the bad news is coming right up.

We tend to think of the labor force as the sum of the employed and the unemployed, and therefore an upper bound to actual employment; but whether this definitional relationship applies to the historical data depends very much on how they were obtained, on how the labor force was actually measured, on how workers were attributed to specific census categories. Ideally, for our purposes, the census form would have asked each individual for all of his or her professional activities, and for the hours devoted to each over a twelvemonth; in fact, it asked for no more than the indication of the principal and any subsidiary occupation, and the information on the latter appears not to have been tallied up at all.[12]

Clearly, therefore, the "labor force" figures tend to undercount the effective, full-time-equivalent labor force in activities that are inherently "subsidiary occupations" because they cannot provide continuous employment: most obviously the processing of perishables, that occurs in a brief span of time following the harvest. Logically, an undercounted labor force can fall short of actual employment; and this inference finds immediate confirmation, for example in the data for the sugar industry (category 7.15). The latter combines year-round refining with high-summertime extraction of sugar frothe beet: the demographic census counts some 6,500 individuals in the labor force, the industrial census counts, in specialized works, some 8,700 actually employed.

Further cases where the labor force falls short of actual employment are suggested by independent evidence, notably the often highly detailed data on the extractive industries, and the downstream processing industries, provided by the Corpo delle miniere.[13] These reveal a vertically integrated industry extracting clay in the winter and firing it into bricks and tiles in the summer; and they suggest that the labor force the census attributed to quarrying was well below (and that attributed to the kiln-products industry well above) the number actually employed, on average, over the year. But one should not jump to the conclusion that the census labor force reflected what the workers were actually doing in June, for the problem appears to have stemmed not from seasonality but more generally from vertical integration, from the apparent tendency of individual workers to indicate not the immediate product of their own work but the final product of their employer.

The evidence here comes from the non-seasonal chemical industry. The production of superphosphates was largely integrated with that of the necessary sulfuric acid, with the result that in the industrial census the corresponding employment is lumped in with that of other integrated

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[12] The introduction to the *Censimento demografico*, vol. 4, seems never to mention subsidiary occupations at all, as if the attempt to count them had never been made.

[13] Corpo delle miniere, *Rivista del servizio minerario*, annual.

chemical works.[14]   The demographic census reports, for sulfuric, nitric, and hydrochloric acid together, a labor force of under 800 individuals; the plant-specific employment and production data provided by the Corpo delle miniere point to an aggregate employment nearer 3,000.   In general, it appears, the census labor-force data tend to overcount the workers producing final products, and to undercount those producing intermediates.   Nor does the distortion always come out in the wash, in the aggregate for the entire industry, for vertical integration is not necessarily within-industry. Coking, for example, is part of the chemical industry; but where the coking works were integrated with blast furnaces the entire labor force could be attributed to metalmaking, and even the aggregate labor force of the chemical industry would then be understated.

Yet other evidence can now be brought to bear, with surprising results.   Carlo Ciccarelli and I have recently reconstructed the regional production (1911-price value added) time series for, among others, the construction industry, using direct evidence on the new production and maintenance of railway lines, of other social overhead capital, and of buildings; the estimates for 1911 are entirely independent of the labor-force data in the *Censimento demografico*, and of course of the very partial "employment" figures in the *Censimento industriale*.[15]   Dividing the regional construction-industry value added aggregate by the corresponding regional labor force, as reported, one obtains per-construction-worker figures that range from .8 to 1.2 times the national average, with five outliers: for Venetia, Umbria, and Latium the figure is 1.4, for Liguria 1.6, for Basilicata over 1.8.[16]   Given the above-noted evidence that points essentially to full employment nation-wide, such extreme differences are unlikely to reflect high unemployment rates in the regions with a near-average product per worker; and since construction technology was at the time entirely traditional right across Italy, such extreme differences are also unlikely to reflect interregional differences in the productivity of employed workers.   Given the robustness of the numerator the most likely explanation of these outliers is that in those cases the denominator is understated, that here too employment exceeded the recorded labor force.

There is in fact a strong correlation between regional value added per member of the recorded construction-industry labor force and recent growth in regional construction, with the latter much the highest in Basilicata, followed by Liguria: the obvious suggestion is that where construction exploded beyond its traditional levels it sucked in workers from other regions (cross-border workers, home when the census was taken, on a week-end), who of course cancel out at the national level, and workers from other sectors (say an agricultural day-laborer reporting himself as such, even if he is temporarily working as a navvy), who do not.

The point to be noted is a general one.   Unskilled workers in particular moved readily from one sector to another, and an industry experiencing rapid growth could employ significant numbers of such workers who identified themselves on their census form by their customary occupation;

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[14] Category 7.1ω; one notes that sugar (7.15) was then considered a chemical rather than a foodstuff.

[15] C. Ciccarelli and S. Fenoaltea, *La produzione industriale delle regioni d'Italia, 1861-1913:   una ricostruzione quantitativa.   1. le industrie non manifatturiere*, Rome, 2009, pp. 119-395.   A companion volume, subtitled *2. le industrie estrattivo-manifatturiere*, has also appeared (Rome, 2014); these present the "second-generation" regional estimates, so called to distinguish them from the earlier literature recalled below.

[16] These ratios shed an interesting light on Vera's criticism of "[the] disaggregation of national totals based on [demographic] census occupation figures [as in Fenoaltea's initial estimates]...   I have never been prepared to accept that in the construction industry, or [other industries], productivity could be equal across regions...   Obviously, this approach unduly favors backward areas" (B. A'Hearn *et al.*, "The Economy of Liberal Italy: a Round-table Discussion with Brian A'Hearn, Nick Carter, Giovanni Federico and Vera Zamagni on Stefano Fenoaltea's *The Reinterpretation of Italian Economic History*:   *from Unification to the Great War*.   Cambridge: Cambridge University Press, 2011," *Modern Italy*, 18, 2013, p. 84).

these would appear in the labor force tally not in the industry in which they worked on census day, but in the industry (or non-industrial sector) in which they "ordinarily" earned their living.

The reported labor force data are not, at the industry level, an upper bound to the number actually employed, for they are not the sum of the latter and the unemployed. The measured labor force can fall short of the conventionally defined labor force, and accordingly fall short even of actual employment (on the census date, or on an annual full-time equivalent basis); and it will tend to do so, to a greater or lesser extent, in the case of seasonal industries, in the case of industries vertically integrated with the succeeding stage of production, in the case of industries experiencing an unusually high level of demand.

3. Estimating employment from the census data: on method

Any reasonable estimate of employment in industry -- not just employment in ("separate") workshops and factories, but all employment not in agriculture and not in the services -- must obviously allow for the partial nature of the industrial census, for the workers it missed. To gauge their actual numbers, *a fortiori* to gauge their relative productivity, one must assess who and what they plausibly were, how and how much they plausibly worked; and, again obviously, this must be done on a case-by-case basis, as circumstances clearly differed from industry to industry.[17]

Some industries were by nature temporary, seasonal; neither census tells us how many they may have employed, on average, over the year (unless they were active in June, and the time profile of the 1911 processing season can be established from other sources). The corresponding estimates must be obtained in other ways, by working back from output-based value added estimates to the likely wage bill and the likely (full-time-equivalent) employment, or, in the absence even of output data, by working back from later censuses.

For year-round industries the *Censimento demografico* provides at least an indication of the labor force. In most cases the latter measure needs to be reduced to allow for unemployment, which surely existed. As surely, the likely incidence of unemployment depends on industry-specific growth paths, and can be inferred from time-series evidence (including where relevant that related to technological shocks, as in the tragically famous case of Britain's hand-loom weavers). In the presence of rapid growth, as noted, measured unemployment may be negative; and in the presence of vertical integration the labor force figures themselves need to be adjusted, as also noted, either down or up.

Those members of the labor force who worked alone or within the confines of their homes, too, must be carefully evaluated. Some, surely, worked, and produced, little if at all. In the South many female "textile workers" appear notoriously to have been essentially housewives (to the extent that one wonders whether in Calabria, in particular, married women were considered weavers as in England unmarried women were considered spinsters), and if they worked at all their productivity can hardly have matched that of factory workers.[18] But other industries remained

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[17] S. Fenoaltea, *Italian Industrial Production, 1861-1913: A Statistical Reconstruction*, in progress, *passim*.

[18] These Calabrian "textile workers" appear in every pre-War census, but in 1881 the problem was exacerbated, and large numbers of female "textile workers" were recorded all over the South. Again, one can only wonder; but could it be that in the wake of the hiking of textile tariffs word went out to the census-takers that the textile industry should not appear to be concentrated in the North? See S. Fenoaltea, "La crescita industriale delle regioni d'Italia dall'Unità alla Grande Guerra: una prima stima per gli anni censuari," Banca d'Italia, Quaderni dell'Ufficio Ricerche Storiche No. 1, Rome, 2001, pp. 33-34; also V. Zamagni, "A Century of Change: Trends in the Composition of the Italian Labor Force, 1881-1981," *Historical Social Research*, 44, 1987, pp. 36-97, and, most recently, C. Ciccarelli and A. Missiaia, "The Industrial Labor Force of Italy's Provinces: Estimates from the Population Censuses, 1871-1911," *Rivista di storia economica*, 29, 2013, pp. 141-191.

overwhelmingly traditional, artisanal, without modern factories, like the clothing industry considered above. In those cases, the employed workers the industrial census missed were no less productive, and no more exposed to demand shocks, than those it counted; in those cases, the industrial-census "employment" figures are at best useless, at worst misleading. The reported labor force no doubt includes a fringe of "frictionally" unemployed workers (because of illness and the like); but one can allow for that, and there is in any case no better guide to actual employment.

In most industries, to be sure, employment is best estimated from the two censuses together: not to define the aggregate (which is typically established by the labor-force figure, allowing for the industry's cyclical path), but to break it down into components, to separate workers with different working conditions and presumably different productivities. In most industries, not surprisingly, horsepower (and therefore, presumably, capital) per worker ratios were higher in large shops than in small shops; but as seen above the *Censimento industriale* did not miss only the lower tail of the distribution by shop size. The likely productivity (and productivity-weighted employment) of the omitted workers is then usefully gauged from the combined census evidence, industry by industry, using the ratio of omitted owner-managers to omitted hirelings (corrected for unemployment) as an indicator of the average size of the omitted shops. As the latter include one-man (and truly domestic) operations one would expect them to be very small indeed; but that was not always so, and in some branches of the engineering industry (categories 4.3 - 4.5), for example, the average omitted shop appears to have actually been larger, and therefore more heavily mechanized, than the average "small" shop counted by the industrial census.[19]

II. THE LITERATURE

1. *Lux*: "the maximalists"

Light, like beauty, is in the eye of the beholder, modesty I sorely lack: this section of the paper recalls the relevant parts of my own work. My efforts over the past decades have been directed primarily at reconstructing the time path of industry's physical product in the half-century from Unification to the Great War, and obtaining an initial set of value added estimates for 1911 (a year selected long ago precisely because the two censuses of that year provide a uniquely rich data-base). A full set of 1911 value added estimates was presented in 1992, at the behest of the Bank of Italy. Some of these drew on earlier work, others were preliminary figures constructed ad hoc; some were derived from production and prices, others from employment and wages. The evidence of employment was taken from the censuses, the essential features of which were duly recalled: it was specifically noted there, as has been repeated above, that the industrial census is terribly partial, as it omitted those who worked alone or at home (but were "industrial" workers all the same), and also, apparently, all those who worked at somebody's home address (even in large factories like the Pirelli works).[20]

The estimates for the non-manufacturing industries (the extractive, construction, and utilities industries) were completed relatively early on; they were built up from evidence on production, and the census data were used, if at all, only to verify the reasonableness of the estimates of aggregate value added in 1911. This was done in fact for construction, as recounted above, using the demographic-census labor-force data in preference to the (absurdly low) industrial-census

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[19] S. Fenoaltea, "The Measurement of Production: Lessons from the Engineering Industry in Italy, 1911," ms.

[20] S. Fenoaltea, "Il valore aggiunto dell'industria italiana nel 1911," in G. M. Rey, ed., *I conti economici dell'Italia. 2. Una stima del valore aggiunto per il 1911*, Collana storica della Banca d'Italia, serie "statistiche storiche," vol. I.II, Bari 1992, pp. 105-190; see in particular pp. 109-110.

"employment" data; and also for the utilities, where the two sets of census figures practically, and unsurprisingly, coincide.

Within manufacturing, too, most of my previous work had been on sectors where the production side, and at times even employment, is well documented by independent sources. The richest of these are the above-cited reports of the Corpo delle miniere; these yield the (bulk of) the production data and, derivatively, the 1911 value added estimates for the metalmaking, non-metallic mineral products, and chemical industries. Production figures, reported or estimated, were also used to generate the corresponding estimates of value added in 1911 for the food, tobacco, textile, and paper and publishing industries, for the hat-related component of the clothing industries, and for the shipbuilding and railway-vehicles components of the engineering industry; for all of these, as for the non-manufacturing industries, the census data played at most a subsidiary role.

The remaining industries (leather, wood, residual clothing, residual engineering) were very largely artisanal, with the twin result that the reported labor force is far in excess of the employment counted by the industrial census, and that production was poorly documented. Value added in 1911 was accordingly calculated from the census data. The (non-hat) clothing industry was heavily female, and uniquely devoid, as noted, of machine-powered production; the value added estimates essentially assume near-full employment for the men, and half-time employment, on average, for the women. The estimates for the (male-dominated, not entirely artisanal) residual instead distinguish the workers in the large (and if useful the small) shops covered by the industrial census from the rest of the labor force, and typically mildly discount (the unit value added attributed to) the latter, to allow for a measure of unemployment: no more than mildly, in view of the above-cited evidence pointed to a relatively tight labor market at the peak of the pre-War boom.

Thus the "maximalists": few no doubt in number, but highly trained and heavily armed.

2. *Nox*: the "minimalists" and the mugwumps

The "minimalist" school is in comparison the *levée en masse*. It traces its roots to Vera Zamagni's *oeuvre de jeunesse*, her Oxford dissertation which became her first book (1978).[21] Her concern there was with regional inequalities on the eve of the World War; her main source was the *Censimento industriale*, and she took it to be an essentially complete tally of industrial employment. She was well aware of what the industrial census omitted, well aware that measured "industrial employment" fell woefully short of the measured labor force; what is significant is that she attributed that discrepancy to "*grave sottoccupazione*" and "*lavorazione a domicilio*."[22]

"*Grave sottoccupazione*" means, unequivocally, "severe underemployment." Its subjective plausibility depends first and foremost on one's sense of the economy at the time, on one's priors; but one's priors too can be evaluated in light of the evidence. In the case at hand, as noted above, there are excellent empirical reasons *not* to attribute the massive discrepancy between the two census figures to underemployment: the fact that that discrepancy varies so markedly even between closely related activities, and typically vanishes in the absence of small-scale production, more generally but no less powerfully the fact that 1911 marked the peak of a long boom, a boom over which wages had sharply increased.

"*Lavorazione a domicilio*" -- "domestic processing" -- raises issues of a different order, not least because it retains a margin of ambiguity. Broadly, it includes here irrelevant "family production," not for the market.[23] Strictly, as in the relevant jurisprudence (*legge 18 dicembre 1973, n. 877*), it refers to processing by subordinate employees who work in their own home, as

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[21] V. Zamagni, *Industrializzazione e squilibri regionali in Italia. Bilancio dell'età giolittiana*, Bologna, 1978.

[22] Ibid., p. 223; the quoted words are italicized in the original.

[23] Whether it *should* be irrelevant is a serious, separate issue, which cannot be pursued here.

distinct on the one hand from subordinate employees who work on the firm's own premises, and on the other from the self-employed who also (happen to) work at home. Vera's implicit definition seems to be an intermediate one, that excludes production not for the market but otherwise includes all "domestic" production, even if by independent artisans: to her mind, those actually employed in industry were counted by the *Censimento industriale*, the others counted by the *Censimento demografico* were working alone (and not worth recalling), at home, or not at all.

Vera's words may mean whatever she chooses them to mean, but in ordinary discourse, and in the national accounts, market-oriented domestic production is very much part of industry. Indeed, prior to the introduction of the satanic mills the bulk of Europe's textile industry was organized on the putting-out system, and the normal locus of production was the worker's home (then typically a rural home, whence "cottage industry"). In our own day that same system has been revived by the highly successful Benetton firm, and domestic production appears to be alive and well in Italy's equally successful industrial districts.[24] A measure of aggregate industrial employment must perforce include all those who produce for the market, regardless of where they actually work.

In fact, Vera may not have been interested in (national-income-accounting) *aggregate* industrial employment at all. What she may have had in mind all along is suggested by a later piece, in English, where she distinguishes between industry that is "truly 'industrial'" and industry that is not.[25] If industrialization interests her as evidence of modernization, a focus on modern, *factory* industry is perfectly legitimate, a lack of interest in traditional handicraft manufacturing equally so.

But as seen above in the egregious case of the clothing industry, the "industrial workers" the *Censimento industriale* counted could be indistinguishable, in their applied technology, from the "domestic workers" it omitted. Even as the census "employment" figures badly understate employment in all industry, they badly overstate employment in "truly 'industrial'" industry, and are intrinsically irrelevant to the latter as they are to the former. The industrial-census employment figures are not fish, not fowl, just foul, because the data-gathering process failed. They measure "employment in ('true') industry" only if "('true') industry" is tautologically identified with whatever happened to be covered by the census itself; on any more useful definition of ("true") industry the census aggregate measures nothing at all.

Whatever her reasons, Vera presented the industrial-census figure as the appropriate measure of total industrial (or "industrial") employment, and dismissed the omitted half, or nearly so, of the reported labor force. Vera is a leader, a bellwether: the subsequent literature is derivative, and equally minimalist.

Near a decade on, under Vera's supervision, Roberto Chiaventi worked on Italy's industrial censuses from 1911 to 1951, with an eye to allocating the census figures to diachronically homogeneous categories. He paid close attention to what the *Censimento industriale* did and failed

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[24] L. F. Signorini, "Introduzione," in Id., ed., *Lo sviluppo locale. Un'indagine della Banca d'Italia sui distretti industriali*, Rome, 2000, p. XXVII..

[25] Zamagni, "A Century of Change," p. 38. She there corrects the textile-industry labor force reported by the demographic census to eliminate the bogus (Southern, female) "textile workers" it apparently includes, estimating it directly as 110% of the employment reported by the industrial census. Two comments seem warranted. First, that small margin may in fact be a decent approximation for the mechanized textile industries, like cotton and wool, but seems woefully inadequate for those others, like hemp and linen, that were still dominated by hand processing; second, and only in part by the same token, it is at odds with her own belief in industry-wide "severe underemployment." My own correction was to cap the number of females, region by region, at four per male (S. Fenoaltea, "Peeking Backward: Regional Aspects of Industrial Growth in Post-Unification Italy," *Journal of Economic History*, 63, 2003, pp. 1083, 1086); it eliminated some 70,000 workers, Vera's correction over twice as many.

to do; but for all that he low-balled the estimate of the workers it missed. On the one hand, he estimated those who worked alone at a mere 200,000; the figure is based on proportions calculated from the 1927 census, even though, he tells us, the latter also seems seriously to have undercounted them, given that the succeeding census picked up twice as many. On the other, tellingly, he too altogether ignored those who worked "at home," as if they were not "industrial." His estimate of total "industrial employment" is just 2.5 million, only marginally above the 2.3 counted by the *Censimento industriale* itself.[26]

Another fifteen years on a flurry of works appeared in rapid succession. The first of these, by Giulio Cainelli and Marco Stampini, appeared in 2002; it repeated Chiaventi's effort, narrowing the focus from all industry to manufacturing alone, but broadening it to include both the later censuses to 1991, and a disaggregation to the subnational level. The discussion of the *Censimento industriale* again reflects the influence of the Bologna school: Vera's early work is cited to note the census's geographic limitations (as some municipalities of presumably trivial importance never returned the census forms), and again to compare the authors' regional estimates to hers; Chiaventi's, to replicate his adjustment for those who worked alone. Those who worked "at home" are again altogether ignored, and estimated manufacturing employment is under 2.3 million, or again just 200,000 above the corresponding figure in the industrial census.[27] Ten years had passed since my own warning that the *Censimento industriale* was grossly incomplete, that it apparently omitted all shops at residential addresses (and, not least, the Pirelli works), that "cottage industry" was also industry, in short that industrial employment could not be estimated without (judiciously) using the *Censimento demografico* labor force data as well; but there is no evidence that Cainelli and Stampini ever came across it.

The second appeared the following year; it was by Giovanni Federico, our expert on matters agricultural, in a cameo appearance in the literature on industry. As in the preceding efforts the industrial-census data were reallocated to diachronically homogeneous categories, this time those of 1991 rather than 1951; the sub-national aspect was abandoned, and the focus shifted to the changing sectoral composition of employment. The paper explicitly notes the apparent omission of the Pirelli works and the gross undercounting of employment in construction, but curiously treats these as one-off errors, and not as manifestations of a possible pattern; it explicitly recalls my sense that the industrial census missed far more than domestic production strictly defined, but lamely counters that the later industrial censuses were probably also incomplete. In the end, the author enrolls in the Bologna school: he accepts Chiaventi's small correction to allow for those who worked alone, and, like him, simply dismisses the artisans who worked ("part-time") at home. Once again the *Censimento industriale* is accepted as essentially complete, once again "industrial" employment in 1911 is set at a paltry 2.5 million.[28] But the incidence of the artisanal, "domestic" industry the industrial census largely missed is highly sector-specific: the author's "minimalist" estimates badly

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[26] R. Chiaventi, "I censimenti industriali italiani 1911-1951: procedimenti di standardizzazione," *Rivista di storia economica*, 4, 1987, pp. 119-151; see Table 2 and pp. 121-122 (where he qualifies his estimate of those who worked alone with the words "at least"). Surely, as industrialization progressed those who worked alone declined as a proportion of the total; a more reasonable procedure would have been to take the *highest* proportion subsequently documented, and to *inflate* it going back in time. Table 3 presents his estimate of employed artisans (a total of 700,000 including those who worked alone); the text (pp. 124-125) suggests that these were counted by the industrial census, save of course those who worked alone.

[27] G. Cainelli and M. Stampini, "I censimenti industriali in Italia (1911-1991). Problemi di raccordo ed alcune evidenze empiriche a livello territoriale," *Rivista di storia economica*, 18, 2002, pp. 217-242; see in particular pp. 220-221, 223, 228-229, and Table A.1.

[28] G. Federico, "La struttura industriale (1911-1996)," in R. Giannetti and M. Vasta, eds., *L'impresa italiana nel Novecento*, Bologna, 2003, pp. 41-88; see in particular pp. 47, 59, 61, 63-64, and Table 2.1.

distort the sectoral allocation of employment in 1911, and his account of how that allocation then evolved is correspondingly of little value.

In that same year I published an initial ("first-generation") set of diachronic regional estimates of industrial production for the census years 1871, 1881, 1901, and 1911. These simply allocated the national product of 15 broad industrial sectors on the basis of each region's share of each sector's labor force; the 1911 shares were of course derived from the *Censimento demografico*.[29] These estimates were obviously quick-and-dirty, and did not pretend to be any better than they were; but they yielded useful insights, and they were not presented without due reflection. One lengthy appendix, largely repeated above, explained why the *Censimento demografico* was the better guide to relative employment, a second why the resulting estimates were not visibly biased against the North.[30]

Emanuele Felice was then completing his doctoral dissertation, under Vera's supervision; and he soon entered the fray, presenting his own regional production estimates for 1911. Facing on the one hand her old estimates of regional production derived from the employment figures in the *Censimento industriale*, and on the other my new ones derived from the labor-force figures in the *Censimento demografico*, he simply split the difference: he used both censuses, and discounted the workers missed by the industrial census by a uniform 50%.[31]

He has recently returned to that exercise, with a perceptible change in perspective. The averaging of the census figures is no longer presented as a way to generate improved estimates of regional industrial *production*, for he too readily accepts the altogether more solidly based "second generation" (Ciccarelli-Fenoaltea) regional value added estimates recalled above. Rather, it is presented directly as the correct, "common sense compromise" way to estimate actual industrial *employment*.[32]

One begs to differ. If as argued above the straight "minimalist" position is contradicted by the evidence in the sources, and implies unemployment rates that are simply absurd (in their levels, as in the clothing or construction industries, or in their distribution, as in the engineering industry), the purported "common-sense compromise" merely halves the contradiction and the absurdity. But that is much like halving infinity: to take a single example, his compromise 40% unemployment rate in the construction industry at the peak of the boom is no less absurd, and no less at odds with the evidence, than the "minimalist" 80% rate. The only sensible approach, surely, is properly to familiarize oneself with the sources, and then to proceed case by case.

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[29] Fenoaltea, "Peeking Backward." It may be noted that the algorithm uses labor force *shares* to estimate value added *shares*, and remains agnostic as to actual employment. These are the estimates that earned Vera's strictures recalled in note 16 above.

[30] Ibid., pp. 1083-1100; see also pp. 1063-1064, 1068-1069. The latter appendix noted *inter alia* that the three regions of the "industrial triangle" were not in general concentrated in capital-intensive sectors, and that they were uniquely concentrated in sectors that were then growing at sub-average rates (engineering in Liguria) or actually in decline (textiles in Piedmont and Lombardy). The former appendix described the actual content of the *Censimento industriale*, repeating the material presented eleven years earlier (above, note 20). It is repeated yet again above: third time lucky?

[31] E. Felice, "Il valore aggiunto regionale. Una stima per il 1891 e per il 1911 e alcune elaborazioni di lungo periodo (1891-1971)," *Rivista di storia economica*, 21, 2005, pp. 273-314; see in particular p. 290, where he details his own algorithm (and p. 277, where he discusses his predecessors' estimates, oddly ignoring both the article by Cainelli and Stampini, and.the appendices to mine).

[32] See above, note 15, and E. Felice, *Perché il Sud è rimasto indietro*, Bologna, 2013, pp. 30, 35, 80-81. His implicit argument is *in medio stat virtus*, but if Vera and I each offered him a plate of mushrooms, and each of us warned him that the other's were poisonous, would his "common sense compromise" be to eat exactly half of each plateful?

III. CONCLUSION

The "maximalist" estimates of industrial employment in 1911 are derived from, and generally close to, the labor force reported by the demographic census. They are consistent with the boom conditions of the time, with the rapid rise in wages over the preceding years. They are also consistent with the extant estimates of industrial production in 1911: in some cases, as in that of the construction industry, because the available direct evidence of production points to full employment of the reported labor force; in others, conversely, because in the absence of such evidence production is itself estimated on the assumption that the reported labor force was (near) fully employed.

The literature aimed most directly at measuring industrial employment in 1911 is dominated by the far lower "minimalist" estimates derived from, and close to, the employment reported by the industrial census. The "minimalist" estimates are supported by a number of authors; the "maximalist" estimates, by the numbers in the sources.

Three points warrant emphasis. First, these two strands of the literature are simply incompatible: if they are forcibly mated, the offspring is sterile. To take the construction industry once again as an example, its estimated product is consistent (by construction, so to speak) with full employment of the corresponding labor force; dividing that product by a mere fraction of that number of workers does not measure productivity, it measures nothing at all.

Second, and derivatively, the "maximalist" employment estimates are part of a coherent picture of the Italian economy of the day. The *pars costruens* of that picture, decades in the making, has been recalled above. The present paper details a complementary *pars destruens* (also long in the literature, but to no apparent effect): it debunks the "minimalist" estimates as such, not least by documenting the very partial nature of the industrial census.

If the "minimalist" estimates of employment are to be part of a similarly coherent picture they must be accompanied by production estimates that are logically consistent with those very employment figures, and with the other relevant evidence. The *pars construens* is easy: where I estimated the product of the clothing industry, say, from the labor force, a substitute based on the fraction reported "employed" is readily obtained. The *pars destruens* is daunting. What can the "minimalists" argue? In the large, that there was no pre-War boom? that wages didn't rise? In the small, and to return to the construction industry, that the public-works expenditure figures in the public budgets are enormously inflated? that the technical manuals of the day vastly overstated the share of labor in construction costs? that the railway lines reported built at that time never existed? What critical weakness, or misreading, of the underlying evidence can they hope to discover? The "minimalist" position dominates one particular strand of the literature, but in a broader context it is an aberration, isolated and indefensible.

Which brings us to the third point. The "minimalist" estimates of industrial employment in 1911 stem at bottom, it would seem, from an overly quick reading of the sources: from a failure to work on the censuses long enough, and deeply enough, to break through their surface crust. I say this with malice toward none, to underscore, rather, the treacherous nature of the sources themselves: I myself used the industrial census for well over a decade, if memory serves, before the discovery of the above-noted *curiosum* concerning employment in the rubber industry in Milan prompted a careful reappraisal of what the census takers may actually have done, of what the published figures may actually contain.

Luigi Einaudi warned us long ago -- in the very first essay of the very first issue of the *Rivista di storia economica* -- that we come to understand the historical sources only slowly, *poco a poco*.[33] He knew whereof he spoke.

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[33] L. Einaudi, "Teoria della moneta immaginaria nel tempo da Carlomagno alla rivoluzione francese", *Rivista di storia economica*, 1, 1936, p. 7.