

Business Attitudes Toward Statistical Investigation in Late Nineteenth Century Italy: A Wool Industrialist from Reticence to Influence

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Business and Statistics

Statistical representations are usually the result of negotiations and conventions with regard to what should be counted, and how it should be counted. A wide literature has shown that this has been the case for almost any kind of statistical data collected in the last few centuries, from censuses to demographic, social, and economic surveys and time series.

This literature has paid a great deal of attention to classification building as a crucial factor in the social construction of statistical objects, feeding a lively debate. One result was a clearer awareness that the preliminary definition of a set of commensurable objects is a necessary condition for counting them and comparing the results in time and space, which is the task of statistics. These “conventions of equivalence” are the actual foundations of the use of quantification to rationalize the political governance of complex societies. The arrangements involved in this process include a wide range of

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solutions adopted to cope with the contradiction between the purported neutrality of statistical measures and their relevance for political decisions, going from the technocratic resort to expert authority to control exerted by the way of public accountability.¹

The construction of these conventions implies not only the fixing of agreed measurement procedures but also a general confidence in the reliability of the sources from which the data are collected. This point implies some peculiar problems. Many historical case studies have shown the effects on statistical results of the inquired subjects' resistance, suspicion, or ignorance, and statistical theory has in its turn developed specific data-editing techniques to deal with these effects as if they were observational errors.² Still, there is a distinction to be made between the "atomistic" alteration of collected data, and a conscious effort by data suppliers to modify the results of statistical surveys and their interpretation. Obviously, the latter is possible when informants enjoy some sort of monopolistic or oligopolistic control of the information supply. As I will show, this was in some measure the case in the first surveys on manufacturing realized in nineteenth-century Italy that are the main object of this study and are summarized in the Appendix.

Those surveys represented one step in the long history of the measurement of industrial development. Given the above-outlined

1. On the "social construction" of statistical classifications see Alonso and Starr, *The Politics of Numbers*; Besson, *La cité des chiffres*. It is discussed in Hacking, *The Social Construction of What?* The interpretive framework based on the idea of "conventions of equivalence" is proposed in Desrosières, *La politique des grands nombres*. On technocracy versus accountability in the use of quantification see Porter, *Trust in Numbers*. For a summary of the debate on this matter in the history of statistics, see Desrosières, "Histoire de la statistique," in *L'ère du chiffre*, eds. Beaud and Prévost, 37–57. A recent discussion of these issues in the context of a long-period historical case study is in Stapleford, *The Cost of Living in America*.

2. Some examples of historical case studies inquiring (also) into the effects of the supply of incorrect information include: on Soviet Russia, Blum and Goussef, *Demographic and Social Statistics*; on British vital statistics in the early twentieth century, Szreter, *Fertility, Class and Gender*; on German statistics of unemployment, Zimmermann, *La constitution du chômage*; on anthropometric data of Italian conscripts at the time of Unification, Farolfi, "Dall'antropometria militare"; on Italian peasants' consumption and conditions in the 1930s, Toalini, *Contadini toscani negli anni Trenta*. On the statistical methods of data editing developed to cope with these effects, see Gigerenzer, Swijtink, Porter, Daston, Beatty, and Kruger, *The Empire of Chance*, 37–69; for a nonprobabilistic interpretation of this approach, see Benzécri, *Histoire et préhistoire de l'analyse des données*. Studies on age heaping in the census were developed in Italy during the 1870s, but see also the research on shifted date of birth at the end of the year by Gini and D'Addario, *Intorno alla portata delle date di nascita differite*.

perspective, the subsequent evolution of economic statistics in the nineteenth and twentieth centuries could be seen as the outcome of the construction of specific “conventions of equivalence” concerning the industrial economy. The production of increasingly reliable quantitative representations involved, at the same time, the development of new theoretical tools, a different organization of surveys, and a changing relationship between the statisticians and their sources. From this point of view, we encounter a history of the progressive reduction of information asymmetry. Starting from a situation where the statisticians were, in effect, hostages of their informants, they were able to use each piece of information as a step forward in building a reference framework that became more and more independent of additional data and, in time, more and more useful with regard to checking on the reliability of collected information.³

An example of this process, offered here, shows that the publication of statistical “monographs” on single areas or industries, relying on available informants, was finally the occasion for the head of Italian official statistics to theorize the use of coefficients to estimate total output and other economic variables for single industries at a national level. Even so, this proposal took for granted the approach to the problem of representativeness that was distinctive of statistics before the twentieth century sampling revolution. As a convergence toward average characteristics emerged from general surveys, it was deemed possible to reach greater depth in studying typical cases. I argue that, in this context, the weak theoretical framework imposed on the selection of these cases allowed some “typical” entrepreneurs to play the role of privileged informants, exerting extensive influence on data elaboration and interpretation. These businessmen could even have the last word on the limits of their own typicality, discussing the

3. Markovitch, “Statistiques industrielles et systèmes politiques,” in *Pour une histoire de la statistique*, eds. Mairesse and Thave, 317–26. A general interpretation of the evolution of statistical systems is given in Desrosières, *La politique des grands nombres*; see also Puig, *Spécial Alain Desrosières*. In-depth studies on industrial and economic statistics in France are Gille, *Les sources statistiques de l'histoire de France*; Volle, *Histoire de la statistique industrielle*; on the role of the Chambers of Commerce in the production of data see Scott, “Statistical Representations of Work”; Lemerrier, “Statistique et ‘avis divers’.” On Germany, see Lindenfeld, *The Practical Imagination*; Garner, “État et information économique en Allemagne”; Tooze, *Statistics and the German State*. On statistics in the United Kingdom, see Higgs, *The Information State in England*; on industrial statistics in the late eighteenth and early nineteenth centuries see Minard, “La statistique industrielle en Angleterre”; on the Board of Trade and its connection with the Royal Statistical Society, see Cullen, *The Statistical Movement*.

inclusion and exclusion of colleagues and competitors into the relevant “equivalence class.”

From the point of view of business economics, this could imply sort of a “regulatory capture,” insofar as industrial and economic statistics in general were used to devise or justify policy decisions.⁴ Obviously, industrialists also had other means to exert their influence on government choices, from direct lobbying of political representatives to journalistic propaganda. What this case underscores is that these interested subjects were making reference in parliamentary discussions and in magazines and newspapers to the same data they contributed to producing. Their strategy could be interpreted as a “deep capture” of public opinion and of the legislative bodies, exploiting the presumed neutrality of official statistics that they were influencing.⁵

The study of archived correspondence and the comparison of texts illuminates the actual mechanisms by which a businessman could exert an influence on official statistical publications and use them to support his positions in political debates. This gives the historian the opportunity to go beyond the vague use of the concept of “influence” generally made in the historical literature on this subject, answering a series of questions arising from the considerations proposed above.

First, to what extent were industrialists deliberately providing data fitted to their political arguments? And what exactly were these arguments? Second, how were they able to convince official statisticians of the reliability of their statements? Were the latter complicit in incorporating biased data in official publications, or how did they cope with these attempts? Third, to what extent were official statistics instrumental or useful in the making of political decisions?

It is usually quite difficult for historians to identify sources that might provide some clues to help answer such queries. An exceptional occasion is offered by the correspondence between Alessandro Rossi (the main Italian wool industrialist of his time who, from 1870, became the actual leader of the protectionist movement in Italy) and

4. The concept of “regulatory capture,” firstly used in 1913 by the American President Wilson in Wilson, *The New Freedom*, was discussed at theoretical level by Bernstein, *Regulating Business*, and developed by Laffont and Tirole, “The Politics of Government Decision Making.”

5. On the concept of “deep capture” see Hanson and Yosifon, “The Situation.”

Luigi Bodio (the director of Italian official statistics from 1871 to 1898).⁶ This correspondence, mainly drawn from Rossi's personal archive at the Schio Civic Library, includes both Bodio's original letters and Rossi's letter books and clearly shows a gradual change in the relationship between the statistician and the industrialist. Starting from his initial role as a privileged source for industrial statistics, Rossi became, in the 1890s, a sort of unofficial expert and consultant, especially in editing the first statistical survey on the Italian wool industry, finally published in 1895.⁷

This situation allowed Rossi to correct Bodio's texts, to express judgements on the reliability of other sources, and sometimes to have the final word on the decision as to whether or not to publish collected data. A cross comparison between the 1895 official publication and Rossi's comments on its proofs allows a philological assessment of the industrialist's influence on the statistician. This is a wonderful opportunity to evaluate the hypothesis made above about the opportunity offered to those industrialists selected as "typical" privileged informants to "capture" the inquirer and through him to deeply embed their opinions in the official data that became the main references in political debates.

Beyond the protectionist positions Rossi supported explicitly, his advice proved relevant in defining the "class of equivalence" for industrial statistics, or to decide what counted as "industry." As Rossi suggested Bodio to exclude some specific competitors and in general the very small businesses relying on domestic systems and traditional production, his observations were integrated into the representation official statistics gave of late nineteenth-century Italian industrial development. Indeed, their influence on Italian industrial surveys endured because of the significant role Bodio continued to play in official statistics until his death in 1920.

One could then argue that statistics in Italy added its influence to that exerted by classical economics in promoting a theory of

6. Bodio's letters to Rossi and carbon copies of the letters Rossi wrote to Bodio are available at the Bcs, *Asar*, 3, Luigi Bodio. Quotations from these letters are translated by the author of this article. Some letters sent from Rossi to Bodio are also available at Bnb, *Carteggio Bodio*, 1820, Alessandro Rossi, but they rarely deal with issues concerning Bodio's official role as the chief of the statistical bureau. The whole available correspondence between Rossi and Bodio was published in Favero, *Lo statistico e l'industriale*. On Alessandro Rossi (1819–1898) see Avagliano, *Alessandro Rossi*; Fontana, *Schio e Alessandro Rossi*. On Luigi Bodio (1840–1920) see Soresina, *Conoscere per amministrare*.

7. Dirstat, *Industria della lana*.

development focused on specialization and mechanization as the main forces leading to mass-production industrialization.⁸ Statistical data providing a portrait of Italian industry long undervalued the importance of small producers and justified contemporary political interventions favoring the interests of big factory-based businesses against traditional manufacturers. This suggests that historians should be careful when using available statistical series to reconstruct Italy's path to industrialization.

The following sections focus on the case study, starting from the 1870s strategy Bodio, director of Dirstat (Direzione generale della statistica, Italy's statistical bureau), devised to collect statistical data on industrial development (Official Statistics and Industry in Liberal Italy). Rossi's entrepreneurial activities and his political role as leader of the protectionist lobby (The Point of View of a Wool Industrialist) and the evolving relation between the statistician and the industrialist in the 1880s and 1890s (Coping with Official Statistical Investigations) are the objects of further considerations. Special attention is then paid to the influence Rossi was able to exert on the 1895 Italian wool industry survey (The Statistical Monograph on the Wool Industry: A Philological Check), and to Bodio's roles both in constructing a statistical representation of the Italian economy and in international scientific debates (The Point of View of the Statistician). The Conclusion will summarize this study's results and discuss them in connection with the peculiar relationship between business and government emerging in nineteenth-century Italy.

Official Statistics and Industry in Liberal Italy

From the outset, Dirstat, established in 1861 under the authority of the Maic (Ministero dell'Agricoltura, Industria e Commercio) and headed by Pietro Maestri,⁹ found difficulty in measuring industrial phenomena. Its 1862 attempt to provide statistics of the manufacturing industry resulted in a complete failure, given industrialists' distrust in the inquiry's asserted statistical purposes.¹⁰ Results could be published only for two provinces (Bergamo and Parma) out of fifty-nine: the criteria for counting industrial activities were interpreted in

8. For a widely discussed critical analysis of this view, see Sabel and Zeitlin, "Historical Alternatives"; see also Sabel and Zeitlin, *World of Possibilities*.

9. On Pietro Maestri (1816–1871) see Della Peruta, "Maestri Pietro." In *Dizionario biografico degli italiani*, 195–7.

10. Polsi, "La 'statistica dell'industria manifattrice'".

many different ways at local levels, and fears of fiscal consequences caused industrialists to refuse access to data. To be sure, industrial politics in the 1860s were subordinate to other problems deemed more urgent for state and nation building. The Italian ruling elite that emerged from the Risorgimento included mainly rich and often noble landowners, sometimes involved in finance but rarely in industry. The “historical Right,” the government majority who led the country from 1861 to 1876, shared a constitutional liberalism and classical laissez-faire views in economics. The main political issues of the time concerned the defense and extension of territorial unification, pursued not only by military means through the 1866 war against the Austrian Empire and the occupation of the Papal States in 1870, but also by fighting secessionist brigandage in the South. Another main problem was the fiscal difficulties deriving from this effort and from major investments made in the national railway network, built mainly by foreign businesses. Hence, Italy endured the slow emergence of a national market, constrained also by its monetary isolation, consequent on suspending currency convertibility in 1867. In this context, new industrial enterprises were established in the Northern regions, where manufacturing activities had a stronger tradition. Industrialists started gathering in associations and congresses and asking for greater consideration of *their* interests in taking decisions concerning government economic policy.¹¹

These appeals yielded the 1869 establishment of an advisory Council for industry and commerce, followed by announcement of an “industrial inquiry.” From 1870 to 1874, industrialists were interviewed on “the effects of trade agreements, which were signed with most of other countries, in order to derive a rule of conduct in the revision of commercial law.”¹² The results of the inquiry have been the object of detailed studies, showing industrialists’ various attitudes toward commercial and economic policy.¹³ Still, the collected answers gave little information on industrial conditions, given their qualitative nature. Meanwhile, policy makers became interested in other statistical issues, such as workers’ conditions,

11. A good synthesis of the history of Liberal Italy is Romanelli, *L'Italia liberale*. In English, see the classical Mack Smith, *Italy*; on economic history, see Toniolo, *An Economic History*.

12. The sentence by Vittorio Ellena, one of the inquiry secretaries, is quoted in Are, “Una fonte per lo studio,” 242–3.

13. Are, “Una fonte per lo studio”; Romano, *Borghesia industriale in ascesa*; Baglioni, *L'ideologia della borghesia industriale*.

given the political discussions started around the implementation of the first regulations on labor.¹⁴

In the 1870s, this political argument was part of a wider debate on state intervention into economic issues, started in 1874 by a diverse group of Italian economists who questioned the orthodox free-trade approach dominating Italian economics at the time.¹⁵ Its main leader was Luigi Luzzatti, then Deputy Minister of Maic, with authority overseeing the Dirstat. In his view, the Ministry had a “task of encouragement and initiative; it was a Ministry for vocational schools, for information and statistics; a Ministry of *Fomento*, as they say in Spanish”: in this perspective, statistics was a perfect instrument for gauging state social intervention, allowing it to encourage and shape the autonomous development of economic forces without direct interference.¹⁶

Luzzatti belonged to the moderate political elite that emerged in the Venetian provinces after their unification in 1866. A pupil of Angelo Messedaglia, as were other members of this regional group, he shared with them a vision of the relationship between politics and statistics that his mentor had elaborated under Austrian rule. Messedaglia had indeed theorized the possibility of a rationalization (or “scientification,” as he wrote) of policy by means of statistics, which could allow public opinion to influence administrative actions even in an autocratic context¹⁷. He was convinced that the approach to statistics proposed by Adolphe Quetelet, with its focus on

14. Despite the heated debate of the late 1870s on the issue, a law fixing a minimum age of nine for children being allowed to work was passed only in 1886, and limitations on women’s work were introduced only in 1902, excluding the textile industry: see Marucco, *Lavoro e previdenza*.

15. On the Italian *Kathedersozialismus*, or on the “Lombard-Venetian School” of economics, as it was denominated by its opponents, see Parisi Acquaviva, “Congresso di economisti”; Romani, “L’anglofilia degli economisti.”

16. The quotation is from a letter of Bodio to Luzzatti, October 8, 1871, Ivsla, *Archivio Luzzatti*, 6, Luigi Bodio (published in Lungonelli, “Sul servizio statistico,” 298–9): in the letter, Bodio discussed his appointment as the head of the Dirstat. On Luigi Luzzatti (1841–1927) see Ballini and Pecorari, *Luigi Luzzatti e il suo tempo*. In the letter, Luzzatti made reference to the actual name (*Ministerio de Fomento*) of the Spanish ministry in charge of transport infrastructures, communications, and scientific services. The point was that it was a ministry working for the indirect promotion of economic development. The reference to Spain was perhaps inspired by the recent election of Amedeo of Savoy (the second son of the King of Italy, Vittorio Emanuele II) to the throne of Spain by its Parliament on November 16, 1870.

17. Messedaglia, *Della necessità di un insegnamento*. On Messedaglia and his theorization of a “science of administration” see Mozzarelli and Nespor, *Giuristi e scienze sociali*, 30–4; Favero, “Angelo Messedaglia.”

convergence toward the mean in normal distributions and on the regularity of social facts, could yield identification of scientific laws of human development, which could be used rationally to initiate political interventions.¹⁸

Another Italian supporter of Queteletian statistics was Luigi Bodio, a young professor of statistics at the School of Commerce in Venice, who met the Belgian at the 1867 International Statistical Congress in Florence and started an assiduous correspondence with him. Direct connections with Quetelet and with other French and German statisticians, such as Adolphe Bertillon, Émile Levasseur and Ernst Engel, together with his knowledge of mathematics, allowed Bodio to become one of Italy's most renowned Italian statistical experts.¹⁹ For this reason, after Pietro Maestri's death (1871), Luzzatti appointed Bodio in his place, having been acquainted with him since the early 1860s. In 1872, with the reorganization of the Giunta centrale di statistica (Gcs), an advisory body on official statistics that already existed but was idle, Bodio became its secretary and the Dirstat's acting director, a position he took on permanently in 1873.²⁰ Bodio remained at the head of Italian official statistics until 1898, surviving many political changes. To overcome the problems he experienced in the 1871 population census, he pursued a gradual centralization of counting, checking, and elaboration not only for the ensuing 1881 census, but also to track population movements and other basic statistics, introducing innovative technical instruments for mechanical data processing. The Dirstat employed in 1891 a staff of 177 clerks, and many high officials, politicians, and academics spent their apprenticeships there. Bodio made the Italian central statistical office into an internationally recognized center for statistical studies. In 1885 it became also the virtual seat of the International Statistical

18. On the Belgian statistician Adolphe Quetelet, the historical literature is abundant. Particularly useful are the considerations in Porter, *The Rise of Statistical Thinking*; Hacking, *Taming the Chance*; Brian, "L'oeil de la science". Apart the classical Quetelet, *Sur l'homme*, also Quetelet, *Du système social*, was important for Messedaglia.

19. Bodio's letters to Quetelet and copies of his replies are kept at the Académie Royale de Belgique, *Correspondance d'Adolphe Quetelet*, liasse 421. They are partially published in Julin, "Luigi Bodio et Adolphe Quetelet". Bodio's reputation as a statistician was fostered by the publication of his inaugural lecture in Venice, Bodio, *Della statistica nei suoi rapporti*.

20. See the royal decrees n. 708 (second series) of February 25, 1872, and n. 1696 (second series) of November 16, 1873.

Institute (Isi), which Bodio served as general secretary until 1905, and president from 1909 until his death in 1920.²¹

During the last three decades of the nineteenth Century, Bodio was thus the main promoter of official statistics as a public service, as a state function, and not as “an illegitimate daughter of policy.”²² In his opinion, expressed on the eve of the 1871 census, this was the only condition that could allow statistics to overcome the widespread wariness against the possible fiscal and administrative uses the government could make of inquiry results. Bodio knew that the popular mistrust of the census “was not wrong. It is not a superstition, it is a reality we know by reasoned cognition and the plebs by intuition: the taxes, the conscription, and so on, find their allocation method in the figures of the inhabitants. And the poor multitudes perceive the burdens more than the honours of being citizens of the State.” The census represented a “plebiscite that was scientific and political at the same time,” a “battle against ignorance, against the stratagems and expedients taxpayers find to hide themselves.”²³

As director of Italian statistics, Bodio constantly confronted this kind of resistance, in particular on economic subjects. In the 1870s, following Gcs members’ criticism about data inadequacies, the Dirstat chose to publish no official statistics on industry and labor.²⁴ However, the Maic charged some Dirstat employees and its director, as private scholars, to collect the data it needed on matters that were becoming increasingly ticklish. In 1873, Bodio himself published for Maic a

21. On the expansion of the Dirstat in Bodio’s years, see Marucco, *L’amministrazione della statistica*, 39–72; Favero, *Le misure del Regno*, 156–76. On the mechanization of data processing, see Hémin, “Buon compleanno, Mr. Hollerith.” Among the officials passing by the Dirstat in their early career there are Bonaldo Stringher, then director of the National Bank of Italy, Carlo Francesco Ferraris and Carlo Schanzer, both Ministers in the 1900s, and the statistician Rodolfo Benini. On Bodio’s international role, see Soresina, *Conoscere per amministrare*, 101–17.

22. Marucco, *L’amministrazione della statistica*, 24.

23. Bodio to Luzzatti, October 8, 1871, Ivsla, *Archivio Luzzatti*, 6, Luigi Bodio (quoted above).

24. For instance, Pietro Rota, a professor at the University of Genoa, collected on Bodio’s advice some data on workers’ wages in some Lombard industries in 1847, 1859, 1866, and 1874. They were presented on March 25, 1877 to the Gcs by Bodio himself (Gcs, “Statistica dei prezzi e dei salari”) and discussed again on November 27, 1882, in the context of a wider communication on wage statistics (Bodio, “Sulla statistica dei salari”: see below). Nevertheless, they were finally published only in 1885 in Dirstat, *Contribuzione per una statistica delle mercedi*, 1–36; this publication included also the data supplied by some owners and directors of industrial plants (37–61), by the Royal mining engineers on the workers of Sardinian, Sicilian, and Romagnese mines from 1862 to 1881 (64–73) and by the Direction of the Royal dockyards on their civilian workers from 1874 to 1881 (76–82).

tentative monographic study on the Italian economy, showing the limitations of available quantitative knowledge, given its mainly verbal descriptions.²⁵ Vittorio Ellena, an employee at the Dirstat until 1877, later published the information he had collected on workforces and motive power employed in some industries (1878).²⁶ In 1882, the Maic Minister, Domenico Berti, appointed Ellena as the general director of Customs, and entrusted him with the task of devising a general survey on industrial production. This would assess the eventual need for a revision of customs duties, deriving from restoration of the lira's convertibility that would come into force in 1883. This survey would then be transformed into a parliamentary inquiry for revaluing customs duties. This inquiry's results were eventually used to frame the new protectionist tariff promulgated in 1887.²⁷

The project of a statistical survey on industrial production was discussed for the first time in the session of the reorganized Consiglio superiore di statistica (Css), held in November 1882. Ellena made reference to his own experience with the early 1870s industrial inquiry to argue the need to have recourse to all possible sources of information, from local to fiscal authorities up to private experts, to cross-check industrialists' statements. Even when the discussion shifted to the parallel study proposed by Bodio on the conditions of workers as a tentative assessment of their real wages, Ellena dwelt on the opportunity to rely as little as possible on industrialists as sources. He argued that they could have two opposite tendencies. Some could obviously "depict with rosy colours the conditions of their workers." However, others (and Alessandro Rossi was here implicitly referred to) could also have an interest in painting "the picture more darkly, in order to show that the present system is increasing the poverty of workers," since "recently they have focused their observations and their studies on obtaining an exaggerated [level of] protection for industry."²⁸

25. Bodio, *L'Italia economica*. This publication was actually the forerunner of the Italian statistical yearbook, the *Annuario statistico italiano*, thirteen volumes of which were published irregularly from 1878 to 1908.

26. Ellena, *Notizie statistiche*. It contained information on workers and power employed in the food, textile, leather, wood, and paper industries. Ellena complained the lack of data on mining, metal works, glass and ceramics, and chemicals; he also was unable to estimate the number of domestic workers in textiles (27–8).

27. Ellena, *Atti della Commissione*, II, *Parte industriale*. For the first volume on agriculture the rapporteur was Fedele Lampertico.

28. Bodio, "Sulla statistica dei salari," 66.

Bodio reacted by defending his idea of comparing the remuneration of industrial workers with the prices of foodstuffs as provided by their employers, who knew better than anybody else their purchasing habits. In his view, it was a matter of using prices that could be actually commensurable with wages, pertaining directly to the environment where workers lived and not to the general conditions referred to by market reports. To cope with tendentious answers, he deemed it enough to invert the logical order of questions, first asking industrialists about their workers' expenses, and then about the wages they paid, which could be more easily cross-checked.

Bodio had already proposed a comparison between workers' expenses and wages in a research paper presented at the Academy of the Lincei some months before.²⁹ The method he devised was inspired by the studies of European workers that Frédéric Le Play and his pupil Émile Cheysson published in the previous decades. These monographs included many household budgets of workers, secured by direct interviews with "typical" workers, selected on the advice of authoritative consultants, including local notables and employers.³⁰ In his paper, Bodio concluded that, for studying workers' conditions, Le Play's method was "the most fruitful, the truest, and perhaps the only one to reach the aim." In his opinion, "those who go other way easily get lost or flatter themselves that they know, accepting words where there are no ideas. The other method, the statistical method par excellence, which proceeds by means of direct and universal surveys, is not suitable for the endless variety of circumstances that is useful to keep in view." Bodio still thought that the two methods should be reconciled, applying to the average data drawn from extensive surveys the results of monographic studies: in practice, the average wages should be compared for each category and industry with the budgets collected for typical workers.³¹

Notwithstanding the latter specification, in the 1882 paper Bodio distanced himself from Quetelet and his theory of means and accidental causes, which he explicitly had accepted ten years earlier.

29. Bodio, "Prime linee di una statistica," 317–23.

30. On Le Play, see Kalaora and Savoye, *Les inventeurs oubliés*; Desrosières, *La politique des grands nombres*, 261–6; Hacking, *The Taming of Chance*, 133–41. On his influence in Italy, see Protasi, "Tra scienza e riforma sociale."

31. Bodio, "Prime linee di una statistica," 322–3. The same concept was repeated in Bodio, "Sulla statistica dei salari," 53.

This evolution was influenced by the methodological criticism of Wilhelm Lexis concerning the presumed universality of normal distributions, which in Italy Messedaglia immediately took up. As the latter wrote, “not only the *value* of the type in itself is unknown; it is in the first place an unknown phenomenon.”³² Le Play’s monographic approach allowed Bodio to avoid the abstractness of the general considerations on real wages that Gcs and then Ccs members criticized in some occasions.³³ What is more, the selection of typical cases by way of a method that was at the same time “scientific, paternalistic and charismatic” answered their concerns about publishing data that would “put under the workers’ nose some examples that could make a strong impression” at any moment when “the social question appears.”³⁴ The convention of equivalence implicit in Bodio’s monographic approach to the study of industrial workers’ conditions was thus making reference not only to the direct comparability of workers’ income and expenses, but also to the reassuring filter provided by the use of employers as informants. It was then up to the statistician to build a trusting relationship with industrialists and to assure the collected data’s reliability.

At this point, the relationship between Luigi Bodio and Alessandro Rossi, the owner of the biggest Italian textile company and the most prominent political supporter of protectionism, became strategic for both men. Winning the industrialist’s confidence could allow Bodio to enjoy a regular flow of data on wages and prices he could use to implement his projected survey. In 1885, he obtained the first set of statistics on clothing and housing prices for workers, collected by Rossi personally.³⁵ Sending Rossi a copy of the publication in which these data were included, Bodio pointed out that he had used Rossi’s numbers to demonstrate a decline in the

32. Messedaglia, “Il calcolo dei valori medi,” 369. The quote is from the extended text published after Messedaglia’s death by Rodolfo Benini, but the author published a first version of the text in 1881 on the journal *Archivio di statistica*. The journal published in the same year an essay on the matter by Lexis, “Sulle medie normali.” On Lexis’ criticism to Quetelet, see Stigler, *The History of Statistics*, 161–220.

33. See for instance Gcs, “Statistica dei prezzi e dei salari,” 187.

34. Bodio, “Sulla statistica dei salari,” 67–8. The definition of Le Play’s method is from the review to Desrosières, *La politique des grands nombres*, by Seys, “La politique,” 57.

35. Bodio to Rossi, December 21 [1885], Bcs, *Asar*, 3, Luigi Bodio, letter 58 (Favero, *Lo statistico e l’industriale*, 68). Data provided by Rossi were published in Dirstat, *Movimento dei prezzi*, XXX.

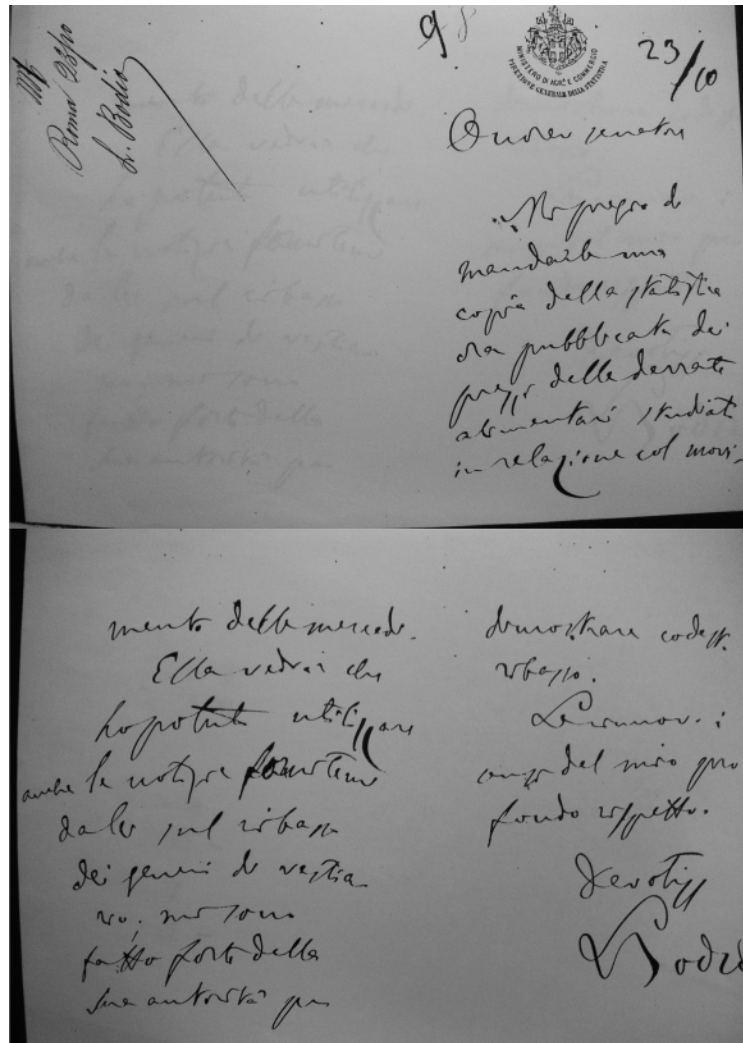


Figure 1 Letter sent by Luigi Bodio to Alessandro Rossi on October 23, 1886: Bcs, Asar, 3, Luigi Bodio, 8. Bodio thanks Rossi for the information on the prices of clothing and housing for his workers.

price of clothing products: indeed, he “used the strength of his [Rossi’s] authority to prove this decrease” (figure 1).³⁶ Immediately afterward, Bodio asked for data on wages for the Italian Statistical Yearbook. Rossi replied after some delay, but without demonstrating any explicit resistance.³⁷

36. Bodio to Rossi, October 23, 1886, Bcs, Asar, 3, Luigi Bodio, letter 8 (Favero, *Lo statistico e l’industriale*, 68).

37. Bodio to Rossi, December 14, 1886, Bcs, Asar, 3, Luigi Bodio, letter 9 and Rossi to Bodio, December 19, 1886, Bcs, Asar, 103, Letter book 17, October 31, 1885–April 29, 1887, 376 (Favero, *Lo statistico e l’industriale*, 69–70).

Again, Bodio was eager to emphasize the value of the benchmark “type,” which he ascribed to Rossi’s data. He also projected producing a “business monograph” on Rossi’s wool mills.³⁸ From Bodio’s perspective, this implied in return Rossi’s tacit promise to provide regular information on prices and wages; Rossi probably saw it as a one-time favor to Bodio. This ambiguity would become clearer in 1892, when the economic crisis deepened his company’s difficulties and exacerbated pay disputes. Still, before discussing in depth what happened then, a more detailed look at Rossi’s viewpoints and at his position in the Italian political context is worthwhile.

The Point of View of a Wool Industrialist

In Italy an evident shift from the generalized individualistic and laissez-faire views of the 1860s to prevailing protectionist positions in the 1880s had materialized. Industrialists started lobbying in the 1870s to modify state economic policies, and to invite, and cope with, its intervention in matters such as tariffs and labor regulations. This was finally achieved in the name of national industrial development, as many classic studies have shown.³⁹ The protectionist alliance that emerged in the 1880s was very heterogeneous and diversified. It linked varied private interests and paid little attention to constructing a concept of “public interest” that could be opposed to “free trade.” However, as Silvio Lanaro has argued, there were some exceptions, and Alessandro Rossi was perhaps the most visible one. Rossi’s ability to build up a coherent political vision supporting his claims for an “integral protectionism”

38. See Bodio to Rossi, May 19, 1889, Bcs, *Asar*, 3, Luigi Bodio, letter 16 (Favero, *Lo statistico e l'industriale*, 87). The idea was probably inspired by the considerations on the need to supplement the household monograph with inquiries more suitable to the shift from the domestic to the factory system, proposed by Cheysson, “La monographie d’atelier.” Bodio would send also to Rossi on April 18 [1891] (Bcs, *Asar*, 3, Luigi Bodio, letter 66; Favero, *Lo statistico e l'industriale*, 100) the volume by Cheysson and Toqué, *Les budgets comparés*, he published as the secretary of the Isi.

39. Cafagna, *Il Nord nella storia d'Italia*; Are, *Il problema dello sviluppo industriale*; Baglioni, *L'ideologia della borghesia industriale*; Lanaro, *Nazione e lavoro*; Castronovo, *L'industria italiana*.

was the main reason behind the leadership position he rapidly assumed for the entire protectionist movement.⁴⁰

In 1882 Rossi started promoting a political project he had conceived in order to prevent the dangerous effects of extending the electoral franchise. In a series of conferences, Rossi called for an alliance among industrialists, workers, and radical intellectuals to support strengthening customs protection, introducing a progressive tax, and establishing a stricter monetary policy to defend the purchasing power of wages.⁴¹ The failure of this project in the short term did not prevent Rossi from developing his arguments into a more organic vision, showing his ability to blend disparate protectionist interests into supporting the 1887 tariff revision. Rossi's proposal was indeed generic enough to keep together advocates who would clash on other issues, such as clericalism, industrial modernization, assertive nationalism, or pro-labor measures. His point was that, in the long term, an improvement of workers' conditions could be attained only by means of the industrial development protection fostered, notwithstanding a temporary rise in food prices due to agricultural protectionism. These arguments also engaged the antiliberal implications of the Catholic Church's "social doctrine," expressed in the 1891 Papal encyclical *Rerum Novarum*, which Rossi applauded.⁴²

What about modernization, then? This was a matter of technical training, applied technology, and empirical approaches to economics. Rossi himself established in Vicenza a technical school (1878).⁴³ He promoted Italy's first hydroelectric plants because they delivered a cheaper source of energy than imported coal.⁴⁴ He was also a sincere

40. Lanaro, *Nazione e lavoro*, 163–5. Following Lanaro, another exception was Pasquale Turiello, who focused his attention on the connections between protectionism and colonial expansion: see Turiello, *Il secolo XIX*. On Rossi's protectionism see also the debate between Prodi, "Il protezionismo nella politica"; Lanaro, "Nazionalismo e ideologia"; Sabbatini, "Formazione e ideologia della società industriale"; Franzina, "Alle origini dell'Italia industriale."

41. Rossi kept his conferences in Milan, Venice, and Bologna in October 1882, during the campaign for the election of October 29 and November 5, 1882. See Avagliano, *Alessandro Rossi*, 84–7. The electoral law, issued with the consolidated act number 999 of September 24, 1882, extended the franchise from real estate owners and richer taxpayers to all the male citizens over twenty-one who were literate or paid taxes or even a minimum rent. The electoral body was extended from 2 percent to 7 percent of the population.

42. Lanaro, *Nazione e lavoro*, 173–80. A summary of the vision Rossi elaborated could be found in Rossi "Socialismo e fraternato."

43. Rossi, *Proposta per l'istituzione*: see the regulations in appendix. In the Vicenza school, teaching Catholic religion was compulsory, unlike in public high schools.

44. He built in 1870 an hydroelectric plant on the Astico river to supply power to the Piovene spinning mill for combed wool.

admirer of the American model, which he saw as the first example of a coherent protectionist reaction to British economic dominance.⁴⁵ Technical training and production rationalization went together in his view with the substitution of imported raw materials by domestic resources generated by technological innovation. Customs protection would help amortize the investments that national industry had to make so as to lower costs.

The revision of classical economics that Rossi supported was based on the need to oppose the empirical study of local and national conditions to imagined general laws that condemned Italy to agricultural production in the age of coal. His alternative entailed drafting specific economic measures suitable for the needs of each country, thereby sustaining industries deemed strategic for development. As Lanaro points out, protectionism was perceived as a form of special legislation at the sectoral level. In time, protectionism's supporters elaborated a different notion of the public interest. The shift was from an "arithmetical" to an "algebraical" concept, as now "the result of the action of any social group—even a narrow one—that was able to produce positive cumulative effects on the whole society" contributed positively to the public interest.⁴⁶ The peculiar character of the alliance between privileged big businesses and the state in Italy's "political" capitalism, as described by business historians, finds its origins here.⁴⁷

In this view, special inquiries, such as the industrial one of the early 1870s, were the best approach to collecting the kind of knowledge this policy needed, as they gave direct expression to the exigences of particular groups. As Carlo Francesco Ferraris, another Messedaglia pupil and a member of Ciss, theorized, they were always indispensable for devising rational political measures, where general

45. In 1884, Rossi financed the publication of a report on a research visit to the United States made by Egisto Rossi, his secretary and later the Director of the Bureau of Information and Protection for Italian Emigration at Ellis Island (New York): Egisto Rossi, *Gli Stati Uniti*. Writing on Egisto Rossi's travel to Bodio on December 30, 1881, Alessandro Rossi confessed: "I will finish soon, but for my siblings sometimes I regret (I say this in a quiet voice) not to be born British or American"; Bnb, *Carteggio Bodio*, 1820, Alessandro Rossi, letter 4 (Favero, *Lo statistico e l'industriale*, 52). Rossi promoted the circulation of the book, which was not so successful. He even suspected Luigi Luzzatti of blocking favorable reviews and of stopping the official distribution of the book to local authorities by the Maic: see a private manuscript quoted in Avagliano, *Alessandro Rossi*, 150–2.

46. Lanaro, *Nazione e lavoro*, 189.

47. On the Italian "political capitalism" in general see Amatori, "Italy," in *Big Business*, eds. Chandler, Amatori and Hikino, 246–76. On the long-lasting effects of the protectionist turn on Italian economics and politics see Cardini, *Le corporazioni continuano*.

statistics, as an arithmetic assemblage of information, could be eventually useful in their subsequent implementation.⁴⁸ Ferraris explicitly agreed with Rossi's call for class solidarity with industrialist interests in the name of national development and against the dangers of socialism.⁴⁹ The concept of a "science of administration" he elaborated in the 1880s was indeed inspired by Messedaglia, even if Ferraris reversed the terms of the problem as Messedaglia had put it in 1851: empirical knowledge of national conditions could indeed be used to manage policy, not against the autocratic power of monarchy, but against the danger of a degeneration of democracy into socialism.⁵⁰

Who were the supposed readers of these inquiries? A mixed audience comprising experts, scholars, political representatives, and public officials. The last two groups were policy actors who should be convinced of the need to support particular interests in view of their importance for the nation. Still, once the needed measures were adopted, statistics in itself became extremely useful, as the enforcement of special legislation required a detailed knowledge of the targets' specific conditions. In this perspective, a protectionist policy applying selective tariffs to different products could be devised only on the grounds of an assessment of their production conditions, data of which should be regularly updated. Hence, statistical representations of national industries' circumstances were to become the main evidence used in the legislative body and in technical commissions to support customs revisions. For Rossi this meant defending the wool industry's interests and those of his business in particular. It took some time for Rossi to realize this point, given the broad vision of protectionism he had elaborated.

After the Venetian provinces joined Italy in 1866, Rossi emerged as the Italian wool industry's most prominent representative, his business being the sector's largest and, after 1873, also Italy's first industrial joint stock company. Close to Schio were the wool mills of Gaetano Marzotto; other important wool centers in the country were Prato (Tuscany) and Biella (Piedmont), with additional firms also in Liguria and Campania. From 1869 to 1872, French and German competitors were blocked by the war, but after 1873 the renewal of foreign manufacturing implied an invasion of imported cheap wools. Italian producers replied by intensifying the production of blended and regenerated wools, but nevertheless they lost ground in the domestic market. Wool entrepreneurs consequently articulated

48. Ferraris, "Le inchieste pubbliche," 126.

49. Ferraris, "Le associazioni dei padroni," 83.

50. On Ferraris, see again Lanaro, *Nazione e lavoro*, 184–8; see also Mozzarelli and Nespor, *Giuristi e scienze sociali*, 54; Favero, *Le misure del Regno*, 138–51.

the most coherent protectionist positions in the early 1870s industrial inquiry.

To support their business interests, the Association of the Italian Wool Industrialists (Aili, 1877)—chiefly the biggest wool entrepreneurs—was established in Milan, the first of its kind in Italy.⁵¹ Rossi was its first president. Having been elected in 1867 to the Parliament, after 1869 he became protectionism's leading advocate. He proved able to build an alliance among the representatives of agricultural and industrial districts, including the wool industrialist and minister of Revenues Quintino Sella, and the Prime Minister, Agostino Depretis, thus preventing the resistance from laissez-faire supporters, more interested in free banking than in free trade. The first result of his efforts was the introduction of a protectionist tariff on woolen textile imports during the 1878 customs revision, which assisted increasing internal demand for Italian woolens.⁵²

Still, for high-quality fabrics of combed wool, Italian companies depended on importing combed yarn ("tops") since the production of existing combing plants, such as the one Rossi established in 1869 in Piovene Rocchette (close to Schio), was inadequate to meet national needs. Encouraged by the 1878 tariff, in the next year, the Antongini family started in Borgosesia (Piedmont) a combing mill aiming to sell "tops" to other spinners, and a spinning mill for combed wool, which became the favorite yarn supplier for Italian weaving factories. Other entrepreneurs would follow, among them Marzotto, who, in the late 1880s, established in Valdagno a combing factory producing "tops" for the domestic market.

Rossi did not follow his competitors along this path: he preferred instead to rely on suppliers of "tops" from Verviers in Belgium to feed his mills for spinning and weaving combed wool. During the textile crisis of the 1870s, he completely reorganized the Lanificio Rossi, at the time the biggest business in the country, transforming it into a corporation. Managers in each section (including one or more plants in Schio and in the surrounding neighborhood) secured organizational autonomy in 1879, though prohibition of internal competition among

51. On the first industrial associations in Italy, see Moneta, "Forme e tendenze"; Fontana, "Les associations agraires et industrielles," in *Les associations économiques*, ed. Subacchi, 221–36. The same Subacchi, *Les associations économiques*, provides a comparative view on the emergence of industrial associations in Europe. On the rise of "secondary organizations" in the USA and in other countries see Chandler and Galambos, "The development of large-scale economic organizations," 201–17.

52. On the 1878 customs revision, see Toniolo, *An Economic History*, 82–3.

units and financial control from the general administration and the Milan Board of Directors did remain.⁵³

In the 1880s, the restoration of currency convertibility in the context of a strong decline of international prices fostered the claims of big landowners for increasing agricultural protectionism. The representatives of metallurgical interests joined, arguing that their strategic industry could never be developed in Italy without protection. Taking his turn, Rossi voiced the Aili's requests for higher tariffs on fabrics and more equilibrated tariffs on yarns. The presence of a "more united and far-sighted leadership" allowed the wool industry to avoid the incoherences that arose in other industries, from the introduction of diverse amendments, which damaged cotton weaving and engineering, for example.⁵⁴ The success of his protectionist propaganda pushed Rossi to devote himself to supporting general industrial interests in the following years. He started collecting data to sustain his positions not only in Parliament and in the newspapers, but also among the highest ranks of public administration, whose opinion proved decisive in 1878 and 1887. Thanks to the privileged relationship established with Luigi Bodio, he was even able to affect the representation of the conditions of industry and labor given in the official statistical publications of the Dirstat. Rossi grounded his political arguments with references to official data (*sometimes even before they were published*), in his Senate discourses and in the articles and books he published or promoted.⁵⁵

When his company was concerned, matters were quite different. From considerations expressed in some letters about a visit to Schio of an American scholar, Elgin Gould, Rossi's recognition of his own business's shortcomings are clear, if compared with the "labour division, technical rules, working capacity and other things that are characteristics of more perfected countries." This organizational

53. On Rossi's productive choices see Bertoli, "Meccanizzazione e prodotti." In *Schio e Alessandro Rossi*, ed. Fontana, 359–403; on the connection with Verviers (also for technological transfers) see Fontana, "L'Europe de la laine," in *Wool*, eds. Fontana and Gayot, 687–746; on the organization of the joint stock company see Fontana, *Mercanti, pionieri e capitani d'industria*, 71–5.

54. On the 1887 tariff, see again Toniolo, *An Economic History*, 83–4. Of the same author, a specific study on the effects of the tariff on metal works is Toniolo, "Effective protection."

55. Rossi quoted the results of the industrial inquiry to support his opposition against the projected law on children's labor (Rossi, *Perché una legge?*). He even used the data that he provided to Bodio and would be published in Dirstat, *Movimento dei prezzi*, in 1886, to show the decline in food prices in his 1885 discourses in the Senate in favor of agricultural protectionism: Rossi, *Discorsi*. Frequent quotes from official statistical publications appear in the "economic news" (Notiziario economico) he regularly published in the journal *Rassegna nazionale* from 1894 to 1898.

inferiority developed not just because the Lanificio Rossi was “an industry in a new country,” but also because of the Schio wool industry’s monopolistic features: “in Schio, where we are the tradition, the model, the past, the present and the future, we are, so to speak, a separate centre, whilst Biella, for instance, because of wall-to-wall competition, is forced to adopt more uniform systems”. Rossi decided it was better not to fill in Gould’s questionnaire, which would inform American producers about Schio’s deficiencies. Gould’s visit should instead be diverted from the plants toward “schools, nurseries, housing, and so on.” (figure 2)⁵⁶

Monte Biella, ad odi, per la stessa
 concorrenza fa meno a meno e'
 obbligato ad abbracciare sistemi
 più uniformi (2)
 Non e' dunque un teorista
 ma un indagatore, un expert,
 un censore che viene ad uso e
 consumo dei confronti che interpassa
 gli Stati Uniti — chi la? nelle
 future loro visite di esposizione
 Opie di Unione doganale americana.

Ho' non vuol dire che ti abbia ad
 altre nuove gentili. Carlo Gould —
 la brava gente appunto ad
 degli gentili pure non accettando
 il suo indirizzo.

Devi aver visto Piovone l'est
 di Mackall, dove io lavoravo.
 Quindi l'industria, l'industria etc.
 fine Aprile 1889

Decade 11 da Biella subito a Biella
 Allegato al n. 13 (1)
 Pieno il copia lettera e aspetto sapere
 de' Polasato alcune notizie precise
 sui pezzi di capitazione a Biella.

Vieni dunque a Schio da Piovone,
 Munito di una lettera di Bodio a me
 di Elgin Gould
 il quale ha un questionario Contiglo
 di quello di Biella.
 Questionario pel quale e' permesso di
 non pubblicar nomi, ma a che a non
 non prova affetto di ricompensa, con
 pensa anche Gastone.

Si tratta di un indirizzo di comparazione
 al quale non si può ottenere una indicazione
 di un paese nuovo, una industria dei per
 quanto a base larga, non può, anzi per quelle
 due ragioni, applicano la divisione del lavoro
 e quelle nome tecniche, di periodi, di capa-
 cita' operari ed altre due sono attribuiti
 di paesi consumati. Allora per dove hanno
 noi l'industria tipo, passato, presente e futuro
 formiamo per con dire un conto a parte,

Figure 2 Note sent by Alessandro Rossi to Luigi Lago [on May 20, 1889], enclosed to the letter of Bodio of April 23, 1889: Bcs, Asar, 3, Luigi Bodio, 13. Rossi instructs Lago how to behave with Elgin Gould during his visit to Schio mills.

56. Rossi's note to Luigi Lago, enclosed in Bodio to Rossi, April 23, 1889, Bcs, Asar, 3, Luigi Bodio, letter 13 (Favero, *Lo statistico e l'industriale*, 89–90). Lago was the director of the Schio section of Rossi's company. Bodio recommended Gould as a delegate of the US government visiting Italian industrial plants; Rossi welcomed Gould, but the letters show his suspicion about this “inquirer.” Elgin R.L. Gould (1860–1915), later an academic statistician at the University of Chicago and at Columbia University, and President of the New York City and Suburban Homes Company, at the time was charged with an inquiry into production costs in some industries on behalf of the US Department of Labour. See Luigi Luzzatti to Rossi, May 21 [1889], Bcs, Asar, 15, Luigi Luzzatti, letter 55; Isi, “Elgin Gould” (obituary notice).

These private remarks shed some light on the existing link between the management of the business and its workforce, the protection Rossi was calling for, and the paternalistic model he adopted in Schio.⁵⁷ Welfare institutions performed both the function of controlling the labor force and of promoting an industrial model, at the same time leaving the actual productive organization in the shadows. The success of this strategy can be observed in the accounts that both contemporary publications and early historical studies provide of Rossi's industrial and social activities, which discouraged a fuller consideration of his entrepreneurial initiatives.⁵⁸ Indeed, working to assure manicured descriptions of his business and its industrial problems in scholarly publications had distinguished Rossi for decades. So, when the Istituto veneto di scienze lettere e arti (Ivsla) asked Rossi to review the "History and statistics of Venetian industries" by Alberto Errera, which it planned to publish, Rossi forced Errera to stay in Schio for some days to discuss in detail the section on his wool mills and welfare initiatives. As well, Rossi pressed the author to eliminate from the text descriptions of many small enterprises that he judged doomed to disappear.⁵⁹ In official statistics, it was evidently not so easy to control what was finally

57. On Rossi's patronage action, in Schio, Rossi exerted also a patronage action on other entrepreneurs: see in particular Fontana, "Imprenditori, imprese e territorio." In *L'industria vicentina*, ed. Fontana, 387–94; Baglioni, *L'ideologia della borghesia industriale*, 232–308.

58. Among the publications of the time providing an enthusiastic portrait of Rossi's entrepreneurial and welfare initiatives, see Errera, *Storia e statistica*, 199–205; Cipani, "Le istituzioni operaje Rossi." The same is true for the first biographical study on Rossi by Cappi Bentivegna, *Alessandro Rossi*; and partially also for Avagliano, *Alessandro Rossi*. It is possible to remark a separation between the studies on Rossi's welfare activity and those on his industrial and political strategies even in Fontana, *Schio e Alessandro Rossi*. For a more recent and complete consideration of the relationship between different aspects of Rossi's entrepreneurial activities in the context of a wider analysis of local industrial development in the nineteenth Century, see again Fontana, "Imprenditori, imprese e territorio." In *L'industria vicentina*, ed. Fontana, 387–94.

59. On the revision of Errera, *Storia e statistica*, see Fedele Lampertico asking Rossi (on behalf of the Ivsla) to review it with the letters of March 12 and March 16, 1870 (Bcs, *Asar*, 14, Fedele Lampertico, ad datam). See also Alberto Errera telling Lampertico the trouble he had "living three days in that hole called Schio," having three "interviews with Rossi" and "welcoming with submissive attitude all his remarks" (Bbvi, *Carte Lampertico*, Alberto Errera, letter of January 1, 1870); and later explaining him that Rossi told it was better "to omit the description of small spinning mills, summarize data on minor industries and recapitulate others" (Bbvi, *Carte Lampertico*, Alberto Errera, letter without date of March 23, [1870]). A trace of Rossi's opinions could be detected where Errera wrote that "small factories do not face a favourable future," as in consequence of mechanization "domestic, or even discontinuous or decentralised businesses cannot keep the pace with general competition": Errera, *Storia e statistica*, 111.

published. Consequently, Rossi was in principle extremely suspicious of any inquiry that could display to the fiscal authorities or to domestic and international competitors information on the output, investments, or value added in his business. That said, he recognized the importance of building good relations with statistical officials to have a say in their work.

Coping with Official Statistical Investigations

During the 1880s, Bodio apparently regarded Rossi as a crucial source of data on industrial and labor issues. Still, the accustomed cooperation between the statistician and the industrialist fractured in the early 1890s, when the financial and economic crisis endangered the political and social equilibrium that had been built in the 1880s. Political changes also affected Bodio, Dirstat's head, as from 1887 he started sending Prime Minister Francesco Crispi periodic confidential reports on the country's economic situation. His friend Alberto Pisani Dossi, at the time Crispi's cabinet minister, had informally requested Bodio to provide documentation suitable to show "with the evidence of reasoning and above all of figures" that the present economic difficulties did not derive from government actions, but "had distant causes or were the result of general conditions not exclusive to Italy."⁶⁰ Bodio was then playing the role of statistical consultant to the government, going well beyond the political neutrality he asserted in his correspondence with Rossi, when trying to escape lobbying pressures. On the other hand, Rossi knew from his contacts with Crispi about Bodio's role as informal advisor to the government, but he preferred not to mention this explicitly to the director of official statistics.

Things changed for the worse in the Rossi–Bodio relationship from 1891 to late 1893, when Crispi was no longer in power. Bodio's private studies and official statistics were then used by Luzzatti, as Minister of the Treasury, for an explicit assault in the Senate on protectionism and on Rossi himself. Luzzatti argued the need to stipulate new trade agreements to augment Italian exports, which were suffering from the commercial war with France, a policy realized

60. See the letter of Alberto Pisani Dossi to Bodio of January 29, 1889, in Bnb, *Carteggio Bodio*, ad nomen, as quoted in Soresina, *Conoscere per amministrare*, 92. The reports Bodio sent to Crispi are now at the Archivio Centrale dello Stato, *Carte Crispi Roma*, 362 "rosso," *Relazioni e dati statistici (Bodio) sul movimento economico in Italia e su altri aspetti della vita nazionale (1887–1892)*.

in 1892 with decreases in duties provided by commercial treaties with the Austrian Empire, Germany, and Switzerland.⁶¹ Taking these events into consideration, it becomes easier to explain Rossi's insistence on certain political issues, his parallel threat to refuse to reply to further questions "on private matters," and even his sudden change of attitude in 1892.

In April 1891 Rossi sent Bodio some data on housing, clothing, and food prices in Schio. In December, he revised a draft for the second edition of the monograph on Vicenza's industrial conditions, commenting that "it was better not to let some blunders be published."⁶² On this occasion, Bodio replied that "industrialists should be convinced that it is in their own interest, to disclose the whole truth, if well interpreted, in order to discuss and defend the interests of the industrial class."⁶³ However, in 1892 Rossi replied only in general terms and after considerable delay to Bodio's request for "the usual yearly data on wages in the three plants of Schio, Piovene and Pieve," thereby endangering the comparability of the data series published in the Statistical Yearbook. When Bodio insisted, Rossi replied with an unexpected refusal, explicitly critiquing his role as a privileged source: "the Lanificio Rossi could not be used, alone, as a statistical model, when an enormous number of other businesses cannot or prefer not to provide the requested data."⁶⁴ Rossi's letter also complained about government fiscal, customs, and commercial measures, and about the threatened introduction of labor laws, which would prevent industrialists from providing data that could be used against them by the public administration, commercial customers or by socialists (figure 3).

Bodio responded with a short but articulate letter, pointing out the limitations of the information required ("I am not asking how many workers are working this year in comparison with the last, neither the amount of production"), and standing up for the idea of statistics as a "public function", implying that "it is not for the sake of polemics

61. Luzzatti's intervention in the Senate was made on the installation in office of the government headed by Antonio Rudini in February 1891: see Plebano, *Storia della finanza*, III, 186. On the commercial treaties of the 1890s and the resulting reduction of customs protection, see Corbino, *Annali dell'economia italiana*, IV, 169–87.

62. Rossi to Lago, enclosed in Bodio to Rossi, December 31, 1891, Bcs, *Asar*, 3, Luigi Bodio, letter 18 (Favero, *Lo statistico e l'industriale*, 104). The publication here discussed was the second edition of Dirstat, *Monografia delle condizioni industriali della provincia di Vicenza*. In the first edition Rossi's wool mills were cited only in a footnote.

63. See the above-quoted letter from Bodio to Rossi, December 31, 1891 (Favero, *Lo statistico e l'industriale*, 102–3).

64. The first quote comes from Bodio to Rossi, February 3, 1892, Bcs, *Asar*, 3, Luigi Bodio, letter 21; the second from the enclosed draft of Rossi's reply (Favero, *Lo statistico e l'industriale*, 106, 108–9).

1 30 19 Febbraio 1892

Aggiungi signor Direttore

Le domande fattomi dalla prez. nota 12. Cio mi furono
 pena in quanto non si possono condire ^{dai signori} come avviene in altri
 paesi meglio formati alla cosa pubblica.

1° Il Ministero Popoli non può, da solo o quasi, venire indicato
 a modello di statistiche quando una infinità di altri uffici,
 o non sono in caso o non vogliono offrire i dati richiesti.

2° La gravità degli oneri che colpiscono la produzione, e di
 minuire la fiscalità finanziaria che ne spira e ne esagera
 tutti i palpiti, per neutralizzarli delle sottrazioni operate dalle
 mafasche che la legge non sa colpire.

3° Il clinto Commerciali da una parte, e i socialisti dall'
 altra che si uniscono al fisco per esplorare sotto i loro aspetti
 quanto viene consegnato alla pubblica ^{che non hanno per me l'unico di} ^{giurati} ^{Et non è necessario}
 se un Senatore libero-cambista in pieno Senato, per rispondere
 a un difensore del lavoro nazionale, o so' portare nella discussione
 i listini di borsa del Ministero Popoli.

4° Il governo che s'ingegna di regolare le condizioni della
 produzione manifatturiera con le così dette "leggi sociali",
 che finiscono per essere una risposta, senza nessun legame
 morale, anzi distruggendo quanto onnicora limite di regime
 paterno nelle industrie.

5° Un caso avvenuto allo scrivente che interrogato da un
 membro della Commissione sui salari doganali, dopo di
 essersi stato anche cortese introduttore nelle fabbriche, questo
 si ne valse per confutare il detto parere in una relazione
 ufficiale, contrapponendogli quello di un carneade qual-
 chini di Prato, smentito dai fatti.

6° ^{Lo scacco} ~~Il~~ ^{interessi} che prende il Governo allo sviluppo

Figure 3 Draft of the reply Alessandro Rossi wrote on February 19, 1892, enclosed to the letter sent him by Bodio on February 3, 1892: Bcs, Asar, 3, Luigi Bodio, 21. Rossi lists the reasons of his refusal to transmit to Bodio the usual yearly data on wages for the *Annuario statistico italiano* 1/7 (1892).

that statistics are published and data provided." He concluded with a covert menace: "I would be sorry to have to print the new Annual with a note saying it was impossible to fill the gap for one of the most important production sites in our country."⁶⁵ This was the strongest

65. Bodio to Rossi, February 29, 1892, Bcs, Asar, 3, Luigi Bodio, letter 22 (Favero, *Lo statistico e l'industriale*, 110–11).

argument, as it implied a break of the good relations established in previous years, which evidently had been advantageous to Rossi. At last, the industrialist asked his subordinates to fill in Bodio's form, reporting nothing more than what Bodio was asking, and in particular not detailing the number of workers assigned to each task: in official publications, indeed, wage data for the Lanificio Rossi were always provided as averages, not weighted by occupation (figure 4).

Bodio's victory was indeed more apparent than real. Rossi's strategy had changed, and far from refusing cooperation, he started

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Mercedi degli operai

FILATURA E TESSITURA DELLA LANA
Lanificio Rossi, in provincia di Vicenza.

Tav. II

Mercedi medie giornaliere, in lire (ventali) nel 1889

Mercedi medie giornaliere, in lire (ventali) nel 1889

Mercedi medie giornaliere, in lire (ventali) nel 1889

Mercedi medie giornaliere, in lire (ventali) nel 1889

STABILIMENTO CENTRALE, IN SCHIO con succursale a Tona

Operai addetti alla tessitura.		Tonditori	1.86	Oedrici	1.54
Uomini	4.91	Tintori	2.20	Soderici	1.43
abili	3.96	Uomini addetti alle lane	2.64	Rioricrici	1.41
mediocri	3.42	al lavato	2.64	Callatori	1.58
apprendisti	1.75	agli stenditori	2.97	Imballatori	2.97
Donne	1.75	Ataccacfil (ragazzi)	1.41	Fucchini alle cald. e al g.	2.86
Scardassatori	1.50	Donne addette alle lane	1.41	Falegnami	2.71
Filatori	1.50	Rammendatrici	1.61	Fabbr meccanici	1.98
Pressatori	2.97			Manovali-muratori	1.98

STABILIMENTO DI PIEVE.

Tonditori	1.59	Fabbr	2.86	Addetti alla manip. delle lane	2.20
Garzoni ataccacfil	1.15	Falegnami	2.64	Scardassatori	2.64
Scardassatori	1.76	Muratori	1.86	Filatori	4.91
Oedrici	1.41	Manovali	1.87	Fallatori	3.64
Rammendatrici	1.41	abili	4.73	Garzatori	2.20
Rioricrici	1.41	Tessitori	3.41	Tonditori	2.20
Fucchini alle cald. e al g.	2.71	mediocri	1.41	Pressatori	2.71
zomero	2.71	apprendisti	1.41		

STABILIMENTO DI PIOVENE (Filatura e tessitura di lana pettinata).

Filatori di lana f. abili	1.39	Garzoni ataccacfil	1.98	Tessitrici (1)	1.10
pettinata (mediocri)	2.86	mediocri	1.10	1.12
Scardassatori	1.76	apprendisti	0.66	Fucchini	2.71
Lavoratori	1.98	Donne addette alle lane, pettinatrici, preparatrici, rioricrici	1.00	Operai addetti ai trasporti	1.65
Tonditori	1.87	Asparici	1.10	Falegnami abili	2.20
Callatori ordinari	2.43	Rammendatrici	1.10	Fabbr abili	3.74
Apparecchiatori	1.87			Muratori abili	2.20
Imballatori	2.71				

osservazioni di 10

al lavoro

Osservazioni. — Per tutti e tre gli stabilimenti il numero medio delle ore di lavoro nella giornata nell'89.

Oltre ai tre nominati il Lanificio Rossi comprende un quarto stabilimento, situato in Torrebaldino. I quattro stabilimenti occupano in complesso 1110 operai (maschi) nel 1889.

I giorni di effettivo lavoro nell'anno si possono calcolare a circa 296. I giorni di assenza per malattia sono 2 per 100, in media.

Un fenomeno costante del Lanificio diede luogo a un movimento di immigrazione dai comuni vicini in cui sono situati gli stabilimenti e principalmente a Schio, i cui abitanti sono raddoppiati da quando il Lanificio Rossi per l'industria paterna. — Di qui la necessità di costruire nuove abitazioni. Nel nuovo quartiere operaio di Schio, gli imperati, mediante una legge di ammortamento in aggiunta al fisco, divennero a poco a poco proprietari. Anche a Piovene fu positivamente costruito un quartiere operaio, che ha già 200 abitazioni. Le donne occupate in quello stabilimento dinotano parte in comune, con alloggi trattati e coltivate economicamente, parte nel quartiere operaio.

Il Lanificio ha impiegato gradualmente in stabilimenti per le istituzioni operaie (scuole, nidi, ecc.), un capitale di circa mezzo milione di lire, e sostiene annualmente una spesa di circa 85,000 lire per mantenere il Lanificio.

Nell'ufficio centrale non sono ammessi fanciulli di età inferiore a 12 anni; quelli da 12 a 15 anni non lavorano di notte; l'orario del loro lavoro diurno è dalle 7 del mattino alle 12, e quindi, dopo un'ora di riposo, legge sul lavoro dei fanciulli. In seguito a questa legge, nello stabilimento di Piovene furono rimandati i fanciulli di età inferiore a 12 anni, perché non possono essere occupati nel lavoro notturno per un periodo superiore di ore.

(1) Le tessitrici con due telai hanno un salario maggiore di quello segnato nello specchio.

Figure 4 *Annuario statistico italiano* I/6 (1889-1890): 556, with draft corrections by Luigi Lago, to be inserted in the 1892 edition. Enclosure n. 1 to Bodio's letter to Rossi of January 9, 1892: Bcs, Asar, 3, Luigi Bodio, 19. Data on wages for 1891 were filled in a separate form (enclosure n. 2 to the same letter).

using his influence as a privileged source more consciously to shape the results of official statistical inquiries, which, after all, influenced policy choices toward industry in general and the wool businesses in particular. This shift also signaled a change in Bodio and Rossi's relationship. Bodio imposed regularity and comparability on the information that Rossi provided, but was forced to limit his requests, defining once and for all the form that had to be filled in. The structure of the tables relating to wages that appeared in official statistical publications was then the result of a compromise between the curiosity of the statistician and the suspicion of the industrialist. Moreover, Rossi now dared to question the aims and methods of official statistical inquiries, and Bodio felt the obligation to ask his authorization to publish any information, not only about the Lanificio Rossi, but also about the wool industry in general.⁶⁶ From this point of view, Rossi's role as Bodio's core informant served legitimate the industrialist's assertions, whatever they were.

The Statistical Monograph on the Wool Industry: A Philological Check

In the early 1890s, the Dirstat published some statistical studies on single industries, in which the data collected for the provincial monographs in previous years were gathered together. The detailed list of existing industrial plants and on the quality of their production provided for each province by the Chambers of Commerce, together with the forms then filled in by the industrialists, could indeed be a starting point for an in-depth study of industry at national level.⁶⁷ The choice to proceed branch by branch of industry was derived from

66. See Bodio to Rossi, March 31, 1892, Bcs, *Asar*, 3, Luigi Bodio, letter 24 (Favero, *Lo statistico e l'industriale*, 123): Bodio asked Rossi to approve the modifications suggested by the agrarian committee of the Vicenza province concerning the Lanificio Rossi in the drafts of Dirstat, *Monografia delle condizioni industriali della provincia di Vicenza*.

67. The complicated survey method used in provincial monographs is described in detail in Dirstat, *Industria della lana*, 5-6. After collecting a list of the industrial plants existing in the province from mayors and Chambers of Commerce, a file was created for each industrialist, and a form was prepared "taking care to avoid any question directly concerning the quantity and value of products," in order to reassure industrialists against the fear of fiscal aims in the inquiry. The forms were sent to the industrialists by means of the mayors and Chambers of Commerce, asking them to fill them in directly in case of delay or rejection. With the data collected from the forms and other published material, a first draft was drawn up, to be sent for revision to local political representatives, government offices, trade associations, private experts in the form of teachers in vocational schools, and to the main industrialists themselves.

the need to assess the specific conditions of production in each sector to devise a focused customs policy.

Meaningfully, the first monograph, published in 1889, centered on the cereal grinding industry, using data collected by fiscal bureaus when the tax on grinding was in force.⁶⁸ Apart from Bodio's doubts about the reliability of fiscal records, this solution was not workable in other industries, where the final income and not the quantity of production was taxed.⁶⁹ Hence reliance on information provided by the industrialists was unavoidable, and they were usually reluctant to cooperate, sometimes refusing to do so. However, by using the network of relations with local authorities erected for the provincial studies, it was possible to publish in 1891 a second report on the silk industry, which after the difficulties due to the pebrine epizootic,⁷⁰ was the object of governmental intervention, providing the required sericultural infrastructures and establishing an export duty on raw silk. The technicians and experts supervising sericulture offered the information needed to compare production, imports, and exports of raw silk, estimating thereby the value of semifinished and finished products.⁷¹

A similar operation began for the wool industry in 1893, as agents contacted the Chambers of Commerce, the mayors of the municipalities where woolen mills were situated, and the Aili for information. Other informants were the forest inspector, Gian Carlo Siemoni (probably on sheep breeding), and the industrial inspector, Luigi Belloc (for data on labor issues), the directors of the professional schools of weaving and dyeing of Arpino (Latium) and Prato (Tuscany), and two professors from the museum of industry in Turin (*Museo industriale di Torino*), Cesare Thovez, and Gian Giacomo Arnaudon (Italy's founder of merceology [the study of commodities and their classifications]). Three industrialists were cited as informants: Alessandro Rossi, Basilio Bona (owner of the woolen mill in Caselle), and Giuseppe Magni (chief executive of the Manifattura Lane of Borgosesia).⁷²

68. Dirstat, *Macinazione dei cereali*. The tax on grinding was in force from 1869 to 1880: see Marongiu, "La tassa sul macinato," 2130–98.

69. A tax on the income of businesses was imposed with the consolidated act (testo unico) n. 4021 of August 24, 1877.

70. Huxley, "Address," 405–406. Pebrine, a disastrous bacterial plague, destroyed 100% of silkworm populations in sections of France and Italy at this time, triggering many investigations in microbiology.

71. Dirstat, *Industria della seta*, 42. The estimates used to draw the table were mainly provided by the Sericultural Institute of Padua, established in 1871 in order to foster the recovery of silk production from pebrine epizooty: on this institution, see Vianello, "La stazione bacologica."

72. A list of acknowledged informants was published in Dirstat, *Industria della lana*, 7.

The contributions other informants made to the statistical portrayal of the wool industry can only be assessed indirectly, as Bodio's archive at the Brera National Library in Milan contains only scattered correspondence with them. Still, a closer examination of their concerns allows us to identify a connection between the statistical measurement of industrial activity, product standardization, and more generally the "scientific" interests of these industrialists: Rossi authored many economic essays on the industry's development; Bona, a technician, was the main advocate for standardizing textile measurements;⁷³ and Magni exemplified a new generation of entrepreneurs and managers skilled in mathematics and able to apply scientific approaches to achieve regularity and safety in production processes.

The correspondence between Bodio and Rossi shows, in this case, a strong imbalance in favor of Rossi's authority, as he became the main reference for the statistician. Bodio did not ask only for first draft corrections. He sought authoritative confirmation for using coefficients, such as the average output for each loom, to estimate production quantities, for it was impossible to ascertain them directly. In this effort, he asked Rossi to mark approximately, for each different technology (power looms, hand looms, jacquard looms), the average daily production of a loom in meters of fabric, the average number of workdays annually, and the average selling price of a meter of fabric.⁷⁴ This estimate would then be used to fill in the entry on production in a final table on the value of production, consumption, and import and export of wool, as in the silk monograph.

Bodio had been speculating on the possibility of using this inductive system since the end of the 1860s, inspired by the idea of reviving a method political arithmeticians created for population estimates in the eighteenth century, before it was superseded by the notion of a general census.⁷⁵ He developed this approach in the late 1880s and early 1890s, in connection with his attempts to devise a method suitable to link the information deriving from particularized studies to the results of general statistical surveys. The main *theoretical* problem in applying this system to the assessment of industrial production was that of defining the class of equivalence, in this case the typology of looms, to which it was possible to apply the

73. Bona, *Riduzioni e pesi dei tessuti*.

74. Bodio to Rossi, May 30, 1893, Bcs, *Asar*, 3, Luigi Bodio, letter 28 (Favero, *Lo statistico e l'industriale*, 126).

75. See Bodio, *Della statistica nei suoi rapporti*, 44–53. On the use of coefficients by political arithmeticians, see Brian, *La mesure de l'État*.

same multiplier. The main *practical* difficulty, however, came from industrialists' suspicions that the data could be used for taxation.⁷⁶

Rossi tried to deter Bodio from continuing with this attempt, suggesting an alternative estimation of domestic production by comparing Italy's wool trade balance with an approximate calculation of total domestic consumption drawn from the demand for wool textiles per capita, as implemented in a recent French customs commission statistical report.⁷⁷ In the draft introduction to his chapter on the "Production of Wool Fabrics and their Value," Bodio inserted Rossi's methodological reservations about deriving an estimate of production from the average value of a loom's yearly output. Nevertheless, he insisted on submitting to Rossi the "approximate account" that he drew up following his method. Only at this point did Rossi send Bodio drafts of his own recent wool industry study, in which he calculated the approximate value of the Italian production of wool fabrics using a coefficient of 10,000 liras per loom. Bodio later used the same coefficient, citing Rossi's essay, not only in the above-cited chapter, but also in his final published table on production, consumption, and imports and exports for wool.⁷⁸

The discussion shifted then to the actual number of active looms. In his study, Rossi calculated the number of looms inside industrial plants at 9,988, but Bodio's calculations suggested 10,244. In addition, Bodio also located some 18,484 domestic looms in operation. Rossi objected, expressing "the strongest doubts" with regard to this figure. He suggested that in the wool industry's current technical conditions, it was impossible to compare the domestic system to industrial production, as the need to postpone calendaring and

76. See Bodio, "Di alcuni indici misuratori"; Bodio, *Di alcuni indici misuratori*. A direct reference to the "fear of tax inspectors" as the reason of industrialists' reluctance to disclose the information on production is in Rossi to Bodio, November 26, 1894, Bcs, *Asar*, 103, Letter book 20, November 28, 1893 to February 4, 1895, 402–8 (published in Avagliano, *Alessandro Rossi*, 477–8; Cazzola, *Lo sviluppo del capitalismo italiano*, 67–68; Favero, *Lo statistico e l'industriale*, 131–3).

77. See Rossi's methodological criticism in Rossi to Bodio, Bcs, *Asar*, 103, Letter book 21, February 5, 1895 to August 10, 1896, 101–5; the reference he cited was to Ministère du commerce, *Les industries textiles en 1889*.

78. Bodio's "approximate account" in Bodio to Rossi, August 3, 1895, Bcs, *Asar*, 3, Luigi Bodio, letter 37 (Favero, *Lo statistico e l'industriale*, 147–50, 155). Rossi, "L'industria laniera," was cited as the main reference on the use of coefficients for an estimate of production in the same introduction to the chapter on the "production of wool fabrics and their value": Dirstat, *Industria della lana*, 35–6. The table comparing wool production, consumption, import, and export was at page 51.

dyeing would double costs, and lead to the production of poor final products (by industrial standards). In view of these statements, Bodio abandoned his calculations on domestic looms, accepting Rossi's view.⁷⁹

Clearly, Rossi's methodological considerations were not neutral. Excluding domestic looms from calculations assumed the rapid transition to factory system in wool textile production, which, in Italy, was far from being complete.⁸⁰ Rossi himself said that some domestic looms could be used by housewives in winter, but added that this was a declining habit. His authority on the matter pressed Bodio to finally accept his comments as they were: the coefficient the statistician adopted and the class of equivalence to which it was applied were directly defined by the consulting industrialist. Rossi's influence on the wool study was not limited to this point about handlooms. All the corrections he made on the drafts passed directly into the report's final text. A cross-comparison between the correspondence and the published text is striking. The chapter on spinning was a paraphrased cut-and-paste from Rossi's "Notes concerning wool yarns," sent to Bodio.⁸¹ Bodio also directly inserted the manufacturer's methodological observations and other line-by-line remarks.⁸² Was this simply a matter of technical expertise?⁸³ Hardly, for in the correspondence, the political meaning of Rossi's technical arguments is evident. When transposed into an official publication, they still expressed Rossi's point of view on Italy's woollens industry. Technical information and political comments were so intertwined that one cannot distinguish data from interpretation. Still one can identify three different purposes in the detailed comments Rossi sent Bodio in a long enclosure accompanying his letter of November 26, 1894. He

79. See Bodio to Rossi, September 30, 1895, Bcs, *Asar*, 3, Luigi Bodio, letter 40; and Rossi to Bodio, October 4, 1895, Bcs, *Asar*, 103, Letter book 21, February 5, 1895 to August 10, 1896, 223–5 (Favero, *Lo statistico e l'industriale*, 158–61).

80. See Fenoaltea, "The Growth of Italy's Wool Industry".

81. Compare Dirstat, *Industria della lana*, 25–7, with Rossi to Bodio, April 10, 1895, Bcs, *Asar*, 103, Letter book 21, February 5, 1895 to August 10, 1896, 90–3 (Favero, *Lo statistico e l'industriale*, 141–4).

82. Rossi sent Bodio detailed comments on the drafts on November 26, 1894 (Bcs, *Asar*, 103, Letter book 20, November 28, 1893 to February 4, 1895, 402–8), and again on October 4, 1895 (Bcs, *Asar*, 103, Letter book 21, February 5, 1895 to August 10, 1896, 223–5); Favero, *Lo statistico e l'industriale*, 131–8, 159–61.

83. In statistical and historical literature, these monographs are usually appreciated as a "telling picture of the situation of single industries," and what is blamed is the incompleteness of the survey: Gnesutta, "Prospettive di sviluppo nazionale," 334; see also De Angelis, "Industrie agricole-manifatturiere." In *Le rilevazioni statistiche*, 320–38.

obviously tried to argue indirectly the need for customs protection of the wool industry in general, but also sought to undermine the reputation of other informants and competitors, and to foster that of his business.

As for the last point, it is enough to say that when Rossi noted incidentally the importance of his production of military cloths, even for export, Bodio carefully included it in his text.⁸⁴ More interesting perhaps is that Rossi's comments were particularly aggressive when other informants contradicted his opinions. He dismissed for instance the data Bodio collected on the Lanificio Italiano, recently established in Terni, which he defined as "bankrupt." He wrote that "all those considerations formulated [on the Lanificio Italiano] by persons who have no part in the industry. . . are dangerous. . . or at least useless for drawing general conclusions." The result was not only the exclusion from the survey of an important competitor, but also a dismissal of the opinions of other informants: "You should try to avoid tables like the one at page 20, where of four witnesses three, or two and three quarters, are bankrupt for mismanagement," Rossi explicitly wrote to Bodio.⁸⁵ Concerning the need for protection, Rossi convinced Bodio to drop from the final text all considerations on the Italian wool industry's comparative advantages, from "cheap labor" (that in his opinion existed only in the South, where wool businesses were not up to date), to the benefits of hydraulic power (that could eventually become available only by way of electrical transmission), on to "the sun that dries wool and clothes" ("a true legend" for Rossi, as steam drying was in use everywhere except in the South, a claim Bodio repeated in the text).⁸⁶

Still other comments indirectly affected customs policy. Rossi pointed out for instance that even after 1885 the wool industry's growth continued (i.e., protectionism did not cause a fall in investments),

84. In Italian, the sentence in the comments sent to Bodio sounded: "una certa rinomanza hanno le nostre fabbriche di panni militari, tra le quali il Lanificio Rossi concorre anche all'estero". In Dirstat, *L'industria della lana*, 31, it is possible to read: "per i panni militari tiene il primo posto il *Lanificio Rossi*, i cui prodotti vanno anche all'estero."

85. Quotes are again from the above-quoted enclosure to the letter of November 26, 1894. The Lanificio Italiano, despite of its 335 workers and twelve thousand spindles, was finally cited only once in Dirstat, *L'industria della lana*, 25. Another target of Rossi was an Adamo Ricci, mentioned in the drafts at page 19, who disappeared in the final text.

86. See Dirstat, *Industria della lana*, 45, both for the prevailing use of steam power and of steam drying.

despite the decline of raw wool imports (by weight) after this date. This decline, in Rossi's opinion, derived from the growing use of domestic/recycled wool, from the success in the domestic market of blended cloths partially made with cotton, and from a shift of imports to combing residuals, or "peignons." These short fibers, known as "noils" in English usage, did not lose weight during the production process, as instead virgin wool did. Bodio directly inserted all these technical arguments in the final text.⁸⁷ A year later, the monograph still being in process, Rossi stated his opinion about Bodio's comments on the decrease of Italian sheep flocks: "a tariff on the raw material would not be of use to sheep farming, it would be unable to fix a measure and a ratio for different materials, and would result in an uncalled-for injury to the wool industry." Bodio remarked in his text that foreign production offered "better and cheaper wool" than Italy provided.⁸⁸ The opportunity of a tariff on raw wool was indeed discussed in the Parliament in 1896, as soon as the wool monograph was published, and an explicit reference to this point was used to contradict arguments that it would not damage the domestic wool industry.⁸⁹

This is only one example showing to what extent the 1895 Dirstat study on the wool industry published influenced the tariff debates. In 1892, Rossi had already exposed in the Commission for customs tariffs his arguments, asserting that the Italian wool industry did not enjoy excessive protection, for the 1887 tariff had failed to generate the development everyone had expected.⁹⁰ Through his connection with Bodio, his opinions finally appeared in an official statistical publication concerning the whole industry. This happened at a moment of crisis, when the government commenced changing the principles of its customs policy, using the data produced by the Dirstat. The permanence of high customs protection for the wool industry, even as relaxing protectionist policies was under discussion, was the main result of the industrialist's connection with the

87. Dirstat, *Industria della lana*, 13: Bodio quoted directly from Rossi's comments.

88. The first quote is from the letter Rossi sent to Bodio on October 4, 1895 (Bcs, *Asar*, 103, Letter book 21, February 5, 1895 to August 10, 1896, 223–5; Favero, *Lo statistico e l'industriale*, 159–61). The second one is from Dirstat, *Industria della lana*, 7.

89. See *Relazione sugli studi fatti in riguardo alle proposte di un dazio sulle lane greggie*, AP, Camera dei deputati, session 1895–1897, document XXII, as quoted in Corbino, *Annali dell'economia italiana*, IV, 129.

90. The Royal Commission for customs tariffs was established with the Royal decree n. 167 of April 12, 1891. On Rossi's testimony in front of it, see Corbino, *Annali dell'economia italiana*, IV, 128.

statistician. There is more. As no other inquiries on the wool industry followed until the early 1900s, the same words Rossi used in his correspondence with Bodio were echoed, taken from official sources, in the subsequent issues of the Italian Statistical Yearbook, as well as in private studies, and even in an historical chapter on the wool industry published in the interwar period.⁹¹

The influence Rossi exerted on Bodio's approach to industrial surveys had also other lasting effects on Italian economic statistics. In fact, a trace of the 1895 discussion with Rossi on domestic looms could still be detected in a decision Bodio provided (as president of the Csis) regarding the industrial census of 1911—to count only those plants having “at least five workers or an engine.”⁹² The exclusion of traditional and domestic manufacturing from the assessment of industrial production persisted in the following decades, favoring indirectly the expansion of political intervention for the benefit of big business. Together with the absence of exhaustive industrial surveys before 1911, the omission of small businesses and craft production in available industrial statistics opened the way to many attempts at a more complete quantitative reconstruction of manufacturing activity, contributing to a long-term historical debate.⁹³

91. The same points Rossi made in the enclosure to the letter of November 26, 1894, on the shift of Italian demand toward union cloths, on the lack of a rational organization of labor in the plants of many of his “bankrupt” competitors, and on the still scarce protection on fine fabrics, are repeated in *Annuario statistico italiano*, I/11 (1900): 444; and even in Corbino, *Annali dell'economia italiana*, IV, 128.

92. See the letter Bodio wrote to Luzzatti (Minister of Maic at the time) on the preliminary report Rodolfo Benini presented for the 1911 census: March 12 [1910], Ivsla, *Archivio Luzzatti*, 6, Luigi Bodio, undated letter 43.

93. On the historical debate on Italian industrial development and the role of big and small businesses, see Gerschenkron, “The Industrial Development of Italy,” in *Continuity in History*, ed. Geschenkron, 98–127; Cafagna, “The Industrial Revolution in Italy.” In *The Fontana Economic History*, ed. Cipolla, 279–328; Federico and Toniolo, “Italy.” In *Patterns of European Industrialization*, eds. Sylla and Toniolo, 197–217; Federico, *The Economic Development of Italy*. An estimated historical series of industrial production was firstly proposed by Tagliacarne, “Lo sviluppo dell'industria.” In *Rapporto della commissione economica*, 2, 33–92; in reference to this a new index was then proposed by Gerschenkron, *Economic Backwardness*, 347–406, followed by the Istat, *Indagine statistica*; Vitali, “La stima del valore aggiunto.” In *Lo sviluppo economico*, ed. Fuà, 463–77; Carreras, “La producción industrial.” In *El desarrollo económico*, eds. Prados and Zamagni, 173–210; Fenoaltea, “Notes on the Rate”. For a detailed bibliography, see Fenoaltea, *L'economia italiana*, 12–76 (now in press also as Fenoaltea, *The Reinterpretation of Italian Economic History*).

The Point of View of the Statistician

Was Bodio complicit with Rossi in building a picture of conditions of the wool sector and of the Italian manufacturing in general which supported the latter's political claims, especially in showing the need for protection of the industry? On this point, we may assess his position using the correspondence not only with Rossi, but also with other protagonists in Italian political and economic life at that time. In replying to Rossi's remarks on the wool monograph's drafts, Bodio regretted that he "could agree only partially" with Rossi on industrial legislation, as he could "not admit protectionism as a *permanent* system."⁹⁴ Why then did Bodio pay so much attention not only to Rossi's technical notes, but also to his general considerations? He explained this in reference to Rossi's Senate discourses on behalf of agricultural protection:

I do not say that, if I were a senator, I would vote in favour of your proposal, as I think that those who have vigour could secure their interests and the interest of the country without protectionist duties, adapting themselves to the circumstances they find; still, I consider it extremely useful and never superfluous that a voice so influential as yours rises from time to time to warn us that it is better not to fool ourselves; it is better not to sink into a lazy optimism.⁹⁵

This position derived from the peculiar vision of statistics as instrumental to politics that Bodio elaborated gradually across twenty-six years of service as Dirstat's head. The quest for exactitude and truth was the larger part of a statistical official's work, but his interpretive tasks remained limited, being subsidiary to the nation building project that found its origin in the Risorgimento.⁹⁶ Statistical data could be useful when available, but in many cases the politicians should have the nerve to argue their positions "following political principles, rather than statistical arguments," as he wrote to Fedele Lampertico, who insisted on asking for an estimate of the 1882 voting reformation's effects on the electorate. In Bodio's view, the alleged

94. Bodio to Rossi, November 28, 1894, Bcs, *Asar*, 3, Luigi Bodio, letter 33 (Favero, *Lo statistico e l'industriale*, 139).

95. Bodio to Rossi, May 23, 1885, Bcs, *Asar*, 3, Luigi Bodio, letter 55 (Favero, *Lo statistico e l'industriale*, 63).

96. On Bodio's concept of the relationship between statistics and policy, see Soresina, *Conoscere per amministrare*, 100.

rationalization of politics frequently was nothing but a pretext for a politicization of official statistics, which were “in this way discredited and ruined.”⁹⁷

Was this position consistent with the informal role of statistical consultant to Crispi's government Bodio assumed in the late 1880s and first 1890s? The answer is yes, as the task of the statistician as the provider of data both suitable for political use and based on actual facts, remained in Bodio's view separate from those of the politician. Still, such data were not going to be officially published. The production of confidential reports useful for government policy emerged from the trust-anchored relationship Bodio established with Crispi, who actively supported his late 1880s efforts for a complete centralization of statistical services. Bodio by turn supported Crispi's project for an authoritarian refashioning of the Italian State through extending government powers, which would fulfill the Risorgimento's promise by constructing a new strong nation.⁹⁸

That was indeed a lost cause from the Dirstat's viewpoint, as Bodio's informal political reports and ad hoc studies were enough to satisfy Crispi's needs for quantitative information. The 1891 census, far from sparking a reorganization of the Dirstat, was suspended instead, interrupting the decennial series of Italian population counts. Tight budgets led to a drastic reduction of Dirstat's funding, as other special investigative bodies were created as Italian public administration was transformed. Even Bodio's hopes for a resumption of the census in 1896 were disappointed, leading him to resign from his position in 1898.⁹⁹

This said, it is possible to argue that Bodio complied quite willingly with Crispi's specific data requests in the late 1880s, when the Prime Minister asked for materials useful to argue the extensive nature of the economic crisis. Bodio really believed the slump was a matter of “anaemia,” as he wrote to Lampertico in 1889, so much so that he used the same data to draft a scientific study which he updated

97. See the letter Bodio wrote to Fedele Lampertico on November 1881 [without day], Bbvi, *Carte Lampertico*, ultima serie 21, 49.

98. On the relationship between Bodio and Crispi see again Soresina, *Conoscere per amministrare*, 39–42.

99. On the crisis of the Dirstat in the 1890s, see Favero, *Le misure del Regno*, 170–6. On the creation of new special bodies, such as the Commissariato generale all'emigrazione, at the head of which Bodio himself was appointed in 1901, and on Bodio's career after 1898, see Soresina, *Conoscere per amministrare*, 182–90. On the diaspora of statistical services that started in the 1890s and continued until the 1920s, see Marucco, *L'amministrazione della statistica*, 119–50. On Bodio's hopes for a resumption of the census in 1896, see his letter to Rossi of May 16, [1896], Bcs, *Asar*, 3, Luigi Bodio, letter 59 (Favero, *Lo statistico e l'industriale*, 180).

in many subsequent editions during the 1890s.¹⁰⁰ In this study, the historical series Bodio had collected and summarized in his confidential reports were re-presented from a different perspective, with a scientific purpose. His first intention was to devise some indicators that could be used for historical and international comparisons. To achieve this, he gathered additional data, revised the figures published in the previous Statistical Yearbooks, and asked colleagues, state administrators, and even Rossi for more recent information.

Rossi responded with some data on food, clothing, and rent prices for his workers and on their wages, for an estimate of the 1889-1891 real wage variations in the second edition of Bodio's study. Yet, in 1896, a new request to update the section concerning wages and the cost of living met with a refusal, which this time was definitive.¹⁰¹ Rossi put forward a new argument: growing internal competition in the wool industry deprived his data on prices and wages "of any practical value."¹⁰² In a situation where wool mixtures (mainly produced in Prato or Biella) were increasingly invading the market, it was no longer possible to use Rossi's company as a "statistical model."¹⁰³ Rossi died less than two years later, and Bodio resigned from his position soon after. The Dirstat's long period of crisis lasted a decade, and the measurement of industry at last resumed with the first industrial census in 1911.

Deep changes both in politics and administration, and in the Italian economy, explain the end of the privileged relation between

100. Bodio, "Di alcuni indici misuratori" was explicitly intended to "provide a measure of the present crisis (if it is a *crisis*, and not *anaemia*)," as he wrote to Fedele Lampertico on October 7 [1889], Bbvi, *Carte Lampertico*, Luigi Bodio, undated letter 170 (italics are underlined in the original). For the following editions of this study see in the Appendix Bodio, *Di alcuni indici misuratori*.

101. See Bodio to Rossi on April 18 and 21 [1891], Bcs, *Asar*, 3, Luigi Bodio, letters 51, 62 and 66 (Favero, *Lo statistico e l'industriale*, 99–101). For the whole discussion, see also Bodio to Rossi, May 17 and May 23, 1896, Bcs, *Asar*, 3, Luigi Bodio, letters 47–48 (with attached note from Rossi to Lago and from Lago to Rossi); Rossi to Bodio, May 21, 1896, Bcs, *Asar*, 103, Letter book 21, February 5, 1895 to August 10, 1896, 455–7, (Favero, *Lo statistico e l'industriale*, 185–91). The section concerned was in the 1896 edition of Bodio, *Di alcuni indici misuratori*, 71–4.

102. The quote is from Rossi to Bodio, May 26, 1896, Bcs, *Asar*, 103, Letter book 21, February 5, 1895 to August 10, 1896, 463–4 (Favero, *Lo statistico e l'industriale*, 192).

103. The quotation is again from Rossi's draft letter to Bodio, February 19, 1892, attached to Bodio's letter of February 3, 1892, Bcs, *Asar*, 3, Luigi Bodio, letter 21 (Favero, *Lo statistico e l'industriale*, 108–9).

the two correspondents some years before personal events ended it naturally. In 1897, a single (and perhaps last) letter professed Rossi's friendship, despite the attack he had made in the Senate against Bodio's revised estimates of Italian wealth and its taxation (fourth edition, 1896), which in Rossi's opinion "damaged us rather than inciting us."¹⁰⁴

What was the matter? Bodio's data showed a worrying slowdown in the average increase of private wealth since 1885, which some commentators credited to protectionism's effects. In the text, Bodio noted that the increase barely kept pace with that of population, observing that, given "the sentiment of malaise and uneasiness circulating in Italy. . . . the increase of affluence is difficult."¹⁰⁵

Bodio's contribution to the calculation of wealth followed a detailed discussion with, among others, Alfred de Foville, Maffeo Pantaleoni, and Vilfredo Pareto. Pareto had publicly praised the 1891 second edition of this study, interpreting the data in the light of his free-trade views.¹⁰⁶ Pantaleoni wrote Bodio enthusiastically about his effort to assess Italy's economic conditions by following different moving indicators, defining it an example of "economic semiology." As in medical semiology, it was a matter of diagnosing the (economic) cause of a situation from the (statistical) appraisal of the specific combination of different (economic) effects that could be ascribed to it.¹⁰⁷ Bodio did not pursue his studies on the matter after 1896, despite Pantaleoni's encouragement. Still, Italian scholars later working on index numbers regularly cited

104. Rossi to Bodio, [July] 15, 1897, Bnb, *Carteggio Bodio*, 1820, Alessandro Rossi, letter 7 (Favero, *Lo statistico e l'industriale*, 193): the date is drawn precisely from the reference to Rossi's intervention in the Senate of July 13, 1897 (AP, Senato, XX Legislatura, Discussioni). Rossi specified his opinion also publicly: Rossi, "Il senatore A. Rossi e le statistiche."

105. Bodio, *Di alcuni indici misuratori*, 132. Some reviewers, such as Ferraris, simply discredited the method Bodio had devised as incorrect: see Ferraris, "In guardia contro le statistiche false." Still, Bodio's calculation received the official appraisal of the Minister of Revenues, Ascanio Branca, whose intervention was suggested by Luzzatti, whom Bodio thanked in a letter on July 14, 1897, Ivsla, *Archivio Luzzatti*, 6, Luigi Bodio, ad datam.

106. See de Foville, *La France économique*; Pantaleoni, "Dell'ammontare probabile." Pareto, "L'Italie économique," was originally written in Italian as a review to the 1892 edition of Bodio, *Di alcuni indici misuratori*, but its publication was refused by the direction of *La Nuova Antologia*: De Rosa, "Un episodio," 10–3. For a detailed discussion of the debate on Bodio's study, see Soresina, *Conoscere per amministrare*, 91–100.

107. Maffeo Pantaleoni to Bodio, July 28, 1891, Bnb, *Carteggio Bodio*, ad nomen, as quoted in Soresina, *Conoscere per amministrare*, 98–9.

this research.¹⁰⁸ His contribution was fully part of a theoretical effort aiming to build indicators that allowed the comparison in time and space of the alterations of a single variable, setting aside local and historical context. Once this “convention of equivalence” was fixed, it would be possible to integrate such indicators into the framework provided by economics. This approach continued in the construction of “business barometers” in the 1910s and 1920s, and in the studies on business cycles that prepared the way for econometrics.¹⁰⁹

What was completely lacking in Bodio’s view of economic statistics was the notion that investigators could rely on statistically representative surveys, a tool that would allow twentieth century researchers to shift from the use of informants to surveying statistically representative units to follow the changes of significant variables.¹¹⁰ Bodio was clearly positioned well behind this turn. A rigid idea of class differences and a preference for a charitable approaches to social issues was implicit in his fascination for Le Play’s method.¹¹¹ This implied a quite paternalistic concept of social inquiry, expressed in his reliance on employers as informants about their workers’ purchasing habits. Another important implication of this view was that the conditions of workers, emigrants, or peasants should be assessed separately since the relevant variables were different in each case. This was indeed the main justification for the need to supplement general surveys with special monographs. A proposal for a “representative census” Anders Kiaër made at the Isi’s 1895 session in Bern contained an explicit criticism about the lack of general comparability of these detailed monographic surveys on workers’ conditions. On that occasion and subsequently, Bodio opposed any such project,

108. For a bibliography of Italian studies on “economic semiology” see Lanaro, *Nazione e lavoro*, 65–67. A theoretical systematization of the problem was provided by Mortara, “Sintomi statistici,” 81–108.

109. On business barometers, see Armatte, “Conjonctions, conjuncture et conjecture”; Deblock, “Le cycle des affaires”; Friedman, “The Harvard Economic Service.” On the history of econometrics, see Morgan, *The History of Econometric Ideas*.

110. A case is made for that in American agricultural statistics of the 1920s by Didier, *En quoi consiste l’Amérique?*; for the introduction of sampling in US official statistics, see Duncan and Shelton, *Revolution in the United States Government Statistics*.

111. Bodio made big efforts to involve religious charitable institutions in the support to emigrants when he was Commissary for emigration from 1901 to 1904: Soresina, *Conoscere per amministrare*, 134–43.

actively contributing to delay the discussion of the matter, which would finally be debated at the Isi only in 1925.¹¹²

Conclusions

The case study here discussed has shown that the approach to the problem of representativeness that distinguished nineteenth century statistics implied a fundamental need to resort to knowledgeable informants on some matters. In particular, Bodio's preference for using the monographic method for industrial and labor issues permitted Rossi to insert in official statistical publications elements that could support his general arguments on customs policy, his specific requests in favor of the wool industrialists, and his peculiar vision of industrial problems. As long as quantitative data were used to devise specific economic measures, Rossi and others could then appropriate official figures to argue for policies that would favor their interests. Indeed, those selected as "typical" and privileged informants were usually entrepreneurs owning big firms and promoting rationalization. The influence they exerted had lasting effects, leading to underestimations of small and traditional industry's significance, with consequences both for policy at that time and for historical investigations.

The emergence of an economic policy based on special measures, designed to foster the development of strategic industries (and businesses), deeply affected Italian entrepreneurs' attitudes. In the long run, they "grew used to monopolies, state favouritism, and a general lack of respect for rules," as Franco Amatori has written.¹¹³ They routinely engaged in politics (directly or indirectly) to support favorable legislation. Classical political lobbying was paralleled in some cases by an effort to build up arguments based on quantitative data that could appear convincing to the technical commissions who took decisions on key matters. To disdain this game implied not only neglect, but also discrimination, as happened to metalworking firms with the steel tariff and to cotton

112. Kiaër, "Observations et expériences"; see also the 1897 Kiaër, "Sur les méthodes représentatives". On this episode, see Desrosières, *La politique des grands nombres*, 276–82; Seng, "Historical Survey," 440–57. On the ambiguities of "representative" sampling methods before the 1930s, see Beaud and Prévost, "The Politics of Measurable Precision."

113. Amatori, "Business History as History," 145.

fabric weavers with the tariff on yarns.¹¹⁴ Rossi's eagerness to delete from the 1895 wool monograph any comment suggesting the utility of a tariff on raw wool signals the continuous attention this situation required.

Protectionism went together with an oligopolistic attitude of big businesses, aiming to dominate the domestic market also by actively marginalizing smaller competitors. As shown here, the latter were made politically invisible by competitors using a rhetoric of progress that appealed to statisticians' positivism and affected their metrics. Still, invisibility (or unimportance) could imply in its turn some advantages where fiscal and labor regulations were concerned, for they usually excluded small firms and craft producers. This opened niches where an "institutional dualism" that paralleled scale dualism in Italy could be exploited with ingenuity.¹¹⁵ An example of that is the growth of Prato's small producers of wool regenerated from rags, a "new industry" that Rossi himself could not easily discard as insignificant, despite his meticulous proofreading of the 1895 monograph.

This essay has offered examples demonstrating how the use of qualitative sources bearing on the construction of statistics could provide precious insights to business and economic history. I hope that the use made here of the statisticians' personal correspondence with informants and other scholars shows the richness of these sources. I am also convinced that this case shows that the interactions between business, statistics, and politics can be accounted for only by joining together the interpretive framework elaborated by the history of statistics with a business and economic history perspective. The mechanisms of deep regulatory capture in modern industrial societies can indeed be understood better by studying the specific "conventions of equivalence" that made it possible to use statistics as a tool for rationalization, and the way they could let judgements with political valences enter into technical calculations.¹¹⁶

114. On the negative effects of tariffs on mechanics and cotton weaving, among other sectors, see now Fenoaltea, *L'economia italiana*, and the detailed references he cites.

115. The concept of "institutional dualism" was developed with reference to postwar Italian business history by Arrighetti and Seravalli, "Istituzioni e dualismo dimensionale."

116. Some general considerations on this point were recently proposed by Stapleford, *The Cost of Living in America*, 382–94.

Appendix

List of the statistical publications mentioned.

Author	Short title	Year of publication
Errera	<i>Storia e statistica delle industrie venete</i>	1870
	Private publication containing an historical summary of the available information on manufacturing activities in the Venetian provinces since 1797, a description of the active businesses by industry, and some considerations on the needed measures for their development. Rossi proofread a first draft and imposed some modifications.	
Bodio	<i>L'Italia economica</i>	1873, 1874 ²
	Official publication of the Maic, privately edited by Bodio. It contains monographic verbal descriptions of the different economic activities, with scattered quantitative data.	
Ellena	<i>Notizie statistiche sopra alcune industrie</i>	1878
	Official publication of the Maic, privately edited by Ellena. It contains information on workers and power employed in the food, textile, leather, wood, and paper industries. .	
Dirstat	<i>Annuario statistico italiano</i>	1878–1905/07
	The first series of the official Italian statistical yearbook, irregularly published. The part of verbal introductions is progressively reduced at the advantage of statistical tables. An index of the wage trends after Italian unification was given using the data that Rossi provided on the wages of his workers from 1867 to 1884 for volume 3. They were updated to 1886 for volume 4, to 1887 and 1888 for volume 5, to 1889 for volume 6, to 1891 (data for 1890 were interpolated) for volume 7, to 1894 for volume 8 and to 1896 for volume 9.	
Dirstat	<i>Movimento dei prezzi di alcuni generi alimentari</i>	1886
	Official publication of the time series from 1861 to 1885 of the prices of consumer goods, mainly but not only foodstuffs, as the title would suggest, in comparison with wage series for different areas and industries. Rossi provided data on clothing and housing prices, and on the wages of his workers.	
Dirstat	<i>Macinazione dei cereali</i>	1889
	Official publication of the results of a statistical study on cereal grinding activity in Italy, based on the data collected by the tax offices from 1869 to 1880, when the tax on grinding was in force.	
Dirstat	<i>Industria della seta</i>	1891
	Official publication of the results of a statistical study on the silk industry, based on data provided by local authorities and industrialists. It included a table comparing the value of the production, consumption, import and export of raw materials, and semifinished and finished items.	
Dirstat	<i>Monografia della provincia di 1885, 1892² Vicenza</i>	
	The first edition of this publication (1885) cited Rossi's wool mills only in a footnote. In the second edition (1892), Rossi provided detailed information on his business, giving even some data on yearly production. He also proofread a draft version, correcting data on other wool mills in the province and suggesting possible informants to contact.	

Author	Short title	Year of publication
Rossi	"L'industria laniera"	1895
Rossi's private scientific study on the wool industry, published on the magazine <i>Rassegna nazionale</i> . The study gave a technical description of the different stages of production in the industry, following a scheme going from the raw material to the finished product. It provided an estimate of the value of the final production.		
Dirstat	<i>Industria della lana</i>	1895
Official publication of the results of a statistical study on the silk industry, based on data provided by local authorities, experts and industrialists. It followed a scheme based on the different stages of production, providing statistical data on each of them, and included an estimate of the total value of production based on the same coefficient used in Rossi, "L'industria laniera". Rossi proofread the whole publication several times, dropping and correcting entire chapters and suggesting the insertion of long considerations.		
Bodio	<i>Indici del progresso economico</i>	1889, 1891 ² , 1894 ³ , 1896 ⁴
A private scientific contribution proposing the tentative elaboration of some statistical indicators of the movements and trends of the Italian economy. Chapters presented historical series starting from 1861 on population, on hygiene, and charity institutions, on criminality and education, on economic, financial, and fiscal trends. It followed a tentative estimation of the Italian wealth increase since 1875, based on the records of the succession tax. Rossi was concerned for the second edition on the prices of rents, clothing, and food for workers in 1890, which Bodio used to estimate the purchasing power of wages. For the fourth edition, he proofread the chapter on prices and wages, proposing some considerations that Bodio inserted, yet he did not update the data.		

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