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Gender inequality and occupational segregation in white collar-jobs in the early “quiet revolution”: new evidence from the wages of Swedish teachers (c. 1890)

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Abstract: The relationship between gender inequality and occupational segregation is a fascinating puzzle. New microdata on all primary-school teachers in Sweden in c. 1890 show that the gender wage gap in the profession was 10 percent when holding observable features constant, and occupational segregation was strong. Women worked in minor and junior schools receiving low wages – yet higher than those paid in other occupations –, while men mostly taught in regular primary schools that paid competitive wages for men. Gender wage inequality and occupational segregation were the price for the feminization of schooling, i.e., part of the Swedish “quiet revolution.”

JEL codes: J16; J22; N33 ; I24.

Keywords: gender inequality; wages; occupational segregation; white-collar; teachers; Sweden.

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1. Introduction

The increasing involvement of women in employment has fundamentally changed labour markets in the last one and a half century. The first phase of this “quiet revolution” started in the late 19th century, when women increasingly took white-collar jobs (Goldin 2006). The result of this development was particularly striking in the teaching profession. In the US, teaching became a viable option for women during the first half of the 19th century, and the share of female primary-school teachers rose from 57 to 86 percent in the period 1879/80 to 1919/20 (Snyder 1993). High shares of female primary-school teachers are found elsewhere (Albisetti 1993): 60 percent of primary-school teachers in England and Wales were women in 1877. In Italy, the share of women among non-private primary-school teachers (the majority) grew from c. 35 percent in the 1860s to 75 percent in the early 1900s (Cappelli and Quiroga 2021). In Sweden, considering all primary-school teachers, the feminization was striking – the share of women among primary-school teachers grew from 16 percent in 1862 to 70 percent in 1910, according to available official statistics. Despite the growing share of female white-collar employment in the late 19th century, research on historical wages and gender wage gaps has mostly focused on unskilled workers and blue-collar jobs (Stanfors et al. 2014; Humphries and Weisdorf 2015; Burnette and Stanfors 2020; de Pleijt and van Zanden 2021), while evidence on 19th-century gender inequality and the distribution of white-collar wages remains comparatively limited – with some exceptions (Drelichman and González Agudo 2020; Molinder and Pihl 2023; Palma, Reis, and Rodrigues 2023).

In this paper, we aim at filling this gap by studying gender wage inequality among Swedish primary-school teachers during the early phase of the “quiet revolution” (Goldin 2006). We provide answers to the following research questions: what was the extent of gender wage inequality among Swedish primary-school teachers, once all the other potential individual and local determinants are controlled for? Did teacher wages relative to those of other job opportunities contribute to sustaining occupational segregation and, if so, is this linked to the feminization of primary schooling in the late 19th century? When addressing such questions on white collar gender wage inequality, the teacher profession is of particular interest. Apart from being an increasingly feminized profession, teaching became an important share of female white-collar employment in the late 19th and early 20th century. In the US, it had become the main occupation for educated women in the 19th century (Carter 1986), and in Sweden, female teachers were by far the largest group within women’s labour force after trade and commercial clerks, representing c. 20 percent of the total (Söderberg 1972).

We rely on an untapped primary source to retrieve data on more than ten thousand primary-school teachers in Sweden in c. 1890 – the whole population of teachers at the time. We then build a new micro dataset on their wages to explore two main hypotheses: (i) first, that a statistically-significant gender pay gap can be observed among Swedish teachers – even when the relationship between earnings and other individual and local determinants of wages is considered (Burnette and Stanfors 2020); (ii) secondly, that wages for teachers in minor and junior schools provided substantial premia compared to outside options in the labour market (while this was not the case for men), which explains both occupational segregation and the feminization of the teaching profession through growing employment in such school types (Cappelli and Quiroga 2021; Evertsson 2023).

Based on the results, we make two main contributions to the economic history literature. The first concerns gender and occupational segregation. Exploring the key female white-collar profession of primary-school teaching, we show that gender wage inequality among Swedish teachers was relatively small, albeit discernible (and statistically significant), once observable determinants are considered: female-teachers’ wages are c. 10 percent lower than those of their male colleagues

when holding other factors constant – both individual and regional. The small gender pay gap that we estimate is quite in line with Burnette and Stanfors (2020), who find no statistically significant gender gap within the group of Swedish compositors in the typesetting industry in 1900, once the effect of individual and other features is considered. Despite this, we show that women were predominantly hired in junior and minor primary schools, suggesting a strong segregation of female teachers into these schools that were rural and provided a more limited measure of knowledge (Westberg 2022), which ultimately affected their wage and the gap with their male colleagues.

This analysis of occupational segregation contributes to the literature on women's selection into specific occupations – an aspect discussed by Goldin and Katz (2008). Molinder and Pihl (2023) have shown that women in 16th century Sweden, despite relative equality in wages, seldom got access to the higher-skilled and better remunerated jobs in the expanding parts of the economy. Similarly, in their analysis of Swedish micro data from 1870 to 1950, Bengtsson and Molinder (2024) find that job titles with female suffixes (maids, cleaner, housekeepers in the original Swedish sources) dominate the bottom half of the distribution in the early years of their analysis. Stanfors et al. (2014) explore some of the mechanisms behind the large pay gap among Swedish cigar makers in c. 1900. According to Stanfors, this gap was not dependent on physical strength, but on age, experience, and different jobs within firms. Of particular interest to this paper, is that Stanfors et al. argue that outside job opportunities are crucial to understand the feminization of specific sectors, since the conditions within the firms interact with product-market conditions.

In this paper, we shed light on the mechanisms behind the strong segregation of female teachers into mainly minor and junior schools. We argue that it was the lack of better opportunities in the private sector coupled with the growing need for teachers in minor and junior schools that pushed women to work there, allowing local school boards to expand on the number of teachers while keeping cost at a minimum. The gender wage gap among primary-school teachers was not the result of legislation targeting female teachers, but of occupational segregation promoted by central-government efforts to increase school enrolments and the interest of local school boards in keeping school spending limited, which ultimately aligned with women's incentives in the labour market.

In addition to contributing to the research on gender and occupational segregation, the second contribution of this paper concerns white-collar wages and, more generally, living standards and workers' compensations. By exploring a brand-new dataset on individual teacher wages in late-19th-century Sweden, which provides micro data on an entire population of white-collar workers, we produce a rare set of data in a field that has mostly focused on unskilled and blue-collar jobs and wages (for a review of the literature on wages, see de Zwart 2023). As such, this paper also complements existing work on wages in Sweden that has mainly provided new evidence on the nominal and real wages of manufacturers (Prado 2010), construction workers (Ericsson and Molinder 2020), as well as regional wage dispersion (Collin, Lundh, and Prado 2019), the gender gap (Stanfors et al. 2014; Gary 2018), and the urban-rural gap (Lundh and Prado 2015) as well as wage inequality within countries (Rota and Weisdorf 2020) and within single white-collar professions. The latter have been neglected in comparison to the studies of wages pertaining to unskilled and skilled blue-collar workers (Federico et al. 2021), and between blue- and white-collar occupations (Bengtsson and Prado 2020). Furthermore, our work adds to the extensive historical research concerning the gendered opposition that female teachers faced in the 19th and early 20th century (Albisetti 1993), and the comparatively limited economic-history literature on teacher wages in 19th and early 20th century. The latter include studies that provided estimates of inequality among Swiss teachers (Floris et al 2013), explored potential determinants of the gender gap among white Iowa teachers (Sohn 2015), and examined the link between girls' school attendance and female teachers' wages (Carter 1986).

The paper is organised as follows. Section 2 briefly describes the Swedish school system and regulations concerning teacher wages in the late 19th century. Section 3 presents the data and sources. Section 4 discusses the methodology. Section 5 shows the results. Section 6 concludes.

2. Teachers and primary schooling in late-19th century Sweden

The main features of the late 19th century primary school system in Sweden were defined by the national school act of 1842. According to this school act, more than 2,300 parishes of Sweden were responsible to organize school districts and to establish at least one primary school. As a result, the expanding primary school system was largely public, funded by local taxes and central government grants, with only a negligible number of private primary schools.¹

Teachers were a typical white-collar and middle-class profession (Bengtsson and Prado 2020). Within the primary-school teacher profession, there was a range of teaching positions with varying wages that were subject to several regulations. The first concerned the kinds of primary schools that teachers could work in. In order to promote enrolments, the Swedish central government created a range of publicly sanctioned school types. In the 1880s, these included junior schools (*småskolor*, intended for the first years of primary schooling), minor primary schools (*mindre folkskolor*, intended for sparsely populated areas), and regular primary schools. All these school types were provided either as ambulatory schools, moving in-between villages, or permanent (non-ambulatory) schools. Partly as a result of the lower wages of junior school and minor primary school teachers, these school types proved to be increasingly popular (Westberg 2022) and, not by chance, were mainly led by female teachers (Evertsson 2023).

Second, regulations of teacher wages varied across teacher categories formally recognised by the Swedish primary-school system (see Table 1). As in, e.g., France and Prussia, a minimum wage system was implemented (Grew and Harrigan 1991; Cinnirella and Schueler 2018). In 1887, the minimum wage of a so-called regular male and female teacher – who was required to have a degree from a teacher training school – at a regular primary school was 600 SEK, which was raised to 700 SEK after five years of excellent service (an age premium of 100 SEK). It was very common for regular teachers to receive several types of in-kind wages as well.² Regular teachers could also receive additional wages under certain circumstances: if (i) their teaching exceeded eight months within a year (the standard amount of work expected), (ii) they provided teaching for children who had finalized their primary education, or (iii) they taught “sloyd” – i.e. handicraft education (Statistics Sweden 1891).

At regular primary schools, regulations established two additional categories of teachers. Non-regular male and female teachers (*extra ordinarie lärare*) had temporary positions but required the same training as regular teachers. They received 500 SEK per year, including grains yet not including housing, fuel, cow fodder and land. Assistant teachers (*biträdande lärare*) held temporary positions

¹ Here, we refer to “public” as organised and funded by public authorities, i.e. the state, counties (provinces), school districts, and municipalities. In 1890, on average in the whole Sweden, only 6 percent of children aged 7 to 14 received schooling at home (4 percent) or in private schools (2 percent). This figure was basically null everywhere, except for Stockholm City (12 percent attended private education) and Västernorrland, Västerbotten, and Norrbotten, where between 18 and 27 percent of children of school age only received education at home.

² In-kind wages included grains and cow fodder (1,325 and 825 liters respectively), housing and fuel (firewood) and, if possible, a plot of land. Minimum wages were supported by central government subsidies. These were mainly distributed to school districts based on teacher wages (covering two-thirds of the latter), but only if teachers received the minimum wage, and with a cap linked to the minimum wage – i.e., higher wages would not imply higher government subsidies.

but were not required to have a certificate from a teacher-training institution and did not have a formal minimum wage.³

Table 1. The system of minimum teacher wages in July 1887 and central government subsidies (SEK).

Teacher category	Minimum wage	Central-government subsidy per teacher
Regular teachers (regular schools)	600	400
Non-regular teachers (regular schools)	500	333
Assistant teachers (regular schools)	200*	133
Teachers (junior primary schools)	200*	133
Teachers (minor primary schools)	200*	133

Note: * indicates non-binding wage minima. That is, a minimum wage that was required if the school district were to receive a subsidy from the central government. For each teacher category, the wage minima were the same for men and women.

Apart from these wages at regular primary schools, the wages of junior-school and minor-primary-school teachers were also regulated. These categories of teachers were not required to hold a teaching degree and received a significantly lower wage that did not include any stipulation on additional in-kind wages. They did not have a mandatory minimum wage, but the wage was linked to government subsidies: if school districts provided teachers with a minimum wage, they were eligible for a government subsidy of two-thirds of that wage. For regular primary school teachers, these minimum wages included grain or the value of grain in cash and was a definite minimum wage that school districts were not allowed to fall short of. For the other teacher categories, minimum wages were not binding, but a threshold for central government grants: school districts were not eligible for grants if the wage was below the stated minimum.

One crucial aspect of the Swedish teacher wage system is that, on paper, it remained gender neutral during the 19th century, in the sense that it did not differentiate between men and women. Over time, however, the number of female teachers increased, particularly in the less profitable positions provided by the junior schools and minor primary schools. After public sanctioning of so-called junior schools in 1863, the number of female teachers increased rapidly from 1,350 in 1865 to 2,115 in 1868 and 4,479 in 1876 (Westberg 2022; BiSOS P 1868, 1882). This development may be related to the structure of women's labour market at the time and the lower wages provided at junior and minor primary schools, which we will discuss below.⁴ The increasing number of female teachers at junior and minor primary schools (which did not require a teaching certificate) was also conditioned by the limited access to the teacher training institutions where certificates for teaching at regular primary schools were authorized. In the 1880s, there were only 7 teacher training institutions for male primary school teachers, and 5 for female teachers, where the latter only examined 2,107 female teachers (or 28 percent of the total number of examined teachers from teaching seminars) in the years 1866 – 1890 (Arcadius and Gustafsson 1912).

³ However, if an assistant teacher received at least 200 SEK for eight months of teaching per year, regulations from 1885 stated that the central government would fund 50 percent of the total wage. Revised regulations on July 13, 1887, raised these central government grants to two-thirds of the total wage (Statistics Sweden 1891).

⁴ According to Marklund (2023), half of the female junior-school teachers remained childless between 1842 and 1937. The childless women were normally the ones who attained the longest teaching careers, up to 30 or 40 years. The impediment on forming a family and having children on the eve of the 20th century was possibly due to acquiring education and the attempt at participating in the labour market.

One may also note the particular circumstances of Stockholm City – by the far the largest city in sparsely populated Sweden. In this urban context, the indicated minimum wages were higher than elsewhere and did not offer (formally) in-kind benefits. In contrast to the national regulations, a formal distinction was also made between male and female teachers.⁵

3. Data and sources

We exploit the most encompassing and informative investigation into teacher wages of the late-19th century, which – to the best of our knowledge – has not been digitized nor analysed thus far: BiSOS X 1891 (Statistics Sweden 1891). While there had been efforts to publish data on teacher wages before, Statistics Sweden was ordered to provide records for all personnel working within the field of the Ministry of Education and Ecclesiastical affairs in 1879. Because of the immense size of this task, information regarding teachers at primary schools was first gathered in 1886-7 (Statistics Sweden 1891: i–ii).

The result of this data collection was 200 densely printed pages providing unique insights into 19th-century teacher wages in Sweden. Apart from data on parishes and school types, this comprehensive source offers details on teaching positions: adding to the official teaching positions mentioned above, this data includes those of head teacher (*öfverlärare*), sloyd teacher, physical-education teacher, and non-teaching staff including inspectors and janitors. Unlike the school-spending data in public-education statistics, the source offers details on wage items per employed teacher.⁶ Wage items include additional in-kind compensations such as cow fodder, age supplement, housing, firewood, and land plot, as well as data age supplements and other potential compensations (*arfvode*) – e.g. for being sextons (*klockare*) or organ players. These could be important benefits: in 1898, 96% of the 1,097 teachers that held both a section and organ player position, received more than 100 SEK in remuneration for these services.⁷ Furthermore, such data allow us to understand (albeit indirectly) the issue of part-time work. In the cases of paid wages of up to e.g. 50 or 100 SEK, teachers would need to have another job to make a living – so it is safe to assume that they did not work full time (although they represent just below four percent of all recorded teachers).

Thanks to this untapped source, we can explore individual-level data that include the whole population (not just a sample) of primary-school teachers in Sweden on the eve of the 1890s, one of the most important white-collar jobs, particularly for women. We include 10,127 observations for just one benchmark year (c. 1890), down from c. 10,900 since we exclude some non-relevant occupations for our focus, like e.g. janitors and school inspectors. We focus on nominal wages, due to the lack of readily available (published) county-level basket prices for the period concerned – although Ericsson and Molinder (2020) rely on such data for their analysis. It is worth noting that, for the main aims of the paper (studying gender wage inequality), using nominal wages does not alter the picture – since the reference basket prices would be roughly the same for everyone living

⁵ In Stockholm, from 1883 and onwards, the wages of male teachers were categorized in three wage classes (1,400 SEK, 1,800 SEK and 2,000 SEK), while female primary-school teachers had two wage levels (1,100 SEK and 1,400 SEK). For non-regular primary school teachers, there were two categories of male and female teachers: male teachers received either 1,400 SEK or 1,200 SEK, and female teachers 1,100 or 800 SEK. Statistics Sweden noted the tendency in Stockholm City to hire non-regular primary school teachers (Statistics Sweden 1891: 282-83).

⁶ The data collected are mainly the same data that the Ministry of Education and Ecclesiastical Affairs collected from the school districts (although the ministry was not able to compile and publish them). These enquiries are stored at H3aa, *Statistiska avdelningen, Ecklesiastikdepartementet, Riksarkivet* (National Archives).

⁷ See *Svensk Läraretidning* 17, no. 4 (1898), at <http://runeberg.org/svlartid/1898/> (accessed February 7th, 2023).

in the same location. Furthermore, Bengtsson and Jörberg (1975) showed that, at the end of the 19th century, the coefficient of variation of a range of commodity prices across Swedish counties was always smaller than that of daily wages, even for hay and cows – which exhibited the largest variations in prices across counties.⁸

For the analysis of the gender wage gap, we also rely on county-level data, including the primary-schooling Gross Enrolment Rate (GER) and government expenditure for primary schooling per school-age child (Westberg and Cappelli 2019);⁹ per-capita GDP, the share of public employment over total employment, and population density. The latter variables have been collected from the Lund Economic History Dataset (see, e.g. Schön, Henning, and Enflo 2014).

4. Methodology

First, we focus on a short descriptive analysis of the raw data, looking at the individual and county-level factors that might have shaped wage inequality – particularly in terms of gender and occupations – among primary-school teachers.

Secondly, we investigate individual-level inequality by means of OLS regression analysis. Here, we aim to test the first hypothesis that we discussed in the introduction, namely that gender was a significant determinant of wages, even when controlling for other individual-level features. We also augment our model by considering regional (county-level) potential determinants of wage inequality to check the robustness of our results.

The final model can be written as in equation 1, where mw_{ci} is the monetary wage for individual i in county c , sex_{ci} is a dummy capturing gender inequality, age_{ci} is their age, $school'_{ci}$ is a vector of dummy variables capturing what type of school they worked in, job'_{ci} is a vector of dummies capturing their job type, $other'_{ci}$ is a vector of dummy variables indicating whether they received any in-kind payments or other payments (sexton and organ players), $urban'_{ci}$ includes a set of dummies indicating the city size where they lived, whereas X'_c is a vector of county-level variables that include the Gross Enrolment Rate, government expenditure on primary schooling per school-age child, per-capita GDP, the share of public employment over the total, and population density – which are added to an augmented version of the model (model 2). Model 3 replaces county-level variables in X'_c with county dummies.

In the models, the estimated coefficient of the constant term (β_0) can be interpreted as the estimated wage of a male regular teacher in a junior ambulatory primary school in rural Västerbotten who was receiving only a monetary wage as a teacher (i.e. no in-kind payments or earnings from other occupations) with no age-related compensation. The other coefficients represent the premia provided by the presence of the specific additional features discussed.

$$(1) \quad mw_{ci} = \beta_0 + \beta_1 sex_{ci} + \beta_2 age_{ci} + \beta_3 school'_{ci} + \beta_4 job'_{ci} + \beta_5 other'_{ci} + \beta_6 urban'_{ci} + \beta_3 X'_c + \varepsilon_{ci}$$

Thirdly, we explore whether wage inequality by gender and teacher-wage premia compared to alternatives in the labour market can explain the feminization of the teaching profession in 19th-century Sweden. Albeit preliminary, this analysis is important to shed light on the process of human-capital accumulation, enriching the debate on convergence and divergence across the counties of

⁸ Additionally, Gary (2018) provides cost-of-living data for Malmo, Stockholm, and Kalmar. Her data suggest that price differences cannot explain the differences that we observe in nominal-wage data.

⁹ The Gross Enrolment Rate is calculated as total enrolled students (irrespective of their age) and the school-age population concerned, i.e. the cohort 7-14.

Sweden in the long run, as well as placing Sweden within this framework of analysis pertaining to other countries (Cappelli and Quiroga 2021).

In order to perform the analysis, the dataset was elaborated to harmonise all figures and to match the parish names that appeared in the primary sources on teachers' earnings with today's parish names provided by official statistics. We classified all teachers as working in one of the following school types: regular, minor and junior – each of them further separated into permanent as opposed to ambulatory. Since our aim was to examine teacher wages, we excluded other staff (such as janitors and school inspectors) from our final dataset. The final dataset includes 10,127 individuals.¹⁰

The teachers were also divided among regular (i.e. full time) teachers, assistants, physical-education instructors and sloyd (handicraft) teachers. Then, the monetary wages (in current SEK) were coded, dividing them into the main monthly earnings, other earnings and compensation given by seniority (age) – as reported in the source. Additionally, other (mostly in-kind) payments were consistently reported in the source. Since the source virtually never provides information on the monetary value of in-kind benefits, we adopted a pragmatic approach and coded a dummy variable for each of them, indicating whether that type of payment was received (dummy equal to one) or not (dummy equal to zero). In-kind payments include housing, food, firewood, cow fodder, and a plot of land. Monetary values for in-kind payments are known to have varied to some extent across Sweden in the mid-19th century. However, by the last decade of the century, regional variations were rather small. On the one hand, some items – like housing and fuel – had a minimum cash replacement value set at 50 SEK by the Swedish parliament in 1897. Even if cow fodder (hay) varied a lot across Swedish counties in 1880 (ranging from 44 94 SEK), a bill almost approved by the Swedish parliament sought to set this value at 100 SEK everywhere by 1891 (Westberg 2017: 171-172) – which indicates that a strong convergence in prices was taking place at the time in the country, which is consistent with Bengtsson and Jörberg (1975). Needless to say, no exact information can be inferred concerning the plots of land included in the in-kind payments. Overall, given the qualitative information at hand, the measurement bias introduced by using dummy variables instead of the actual value of in-kind payments is assumed to be relatively small.¹¹ Additional payments were also considered and recorded, e.g. payments associated with being a sexton and playing the organ in church.

Considering the wider socioeconomic and geographic context pertaining to the teachers in our dataset, we coded whether each individual lived in a parish characterized by a small (population < 5,000), medium (population from 5,000 inclusive to 10,000) and large city (population larger than 10,000 inclusive), coding all remaining parishes as rural ones (urban population = 0). We then coded and associated all parishes to present-day county names, so that we could explore how regional economic inequality influenced variations in earnings across space once other factors are considered.

¹⁰ This number of observations refers to the polished dataset, which includes teachers and excludes e.g. principals and school inspectors. The raw number of observations was slightly larger (c. 10,900). Most of the observations actually refer to 1887. It is important to note that, sometimes, when more than one teacher had the same position, the wage reported was aggregated. For example, an indicated monetary wage of 800 SEK may be pertaining to two teachers. Since this only happened when teachers were characterised by the exact same features (school type, occupation, gender, etc.) we simply divided the aggregate wage among the concerned teachers: in the example above, each one of the two teachers would earn 400 SEK.

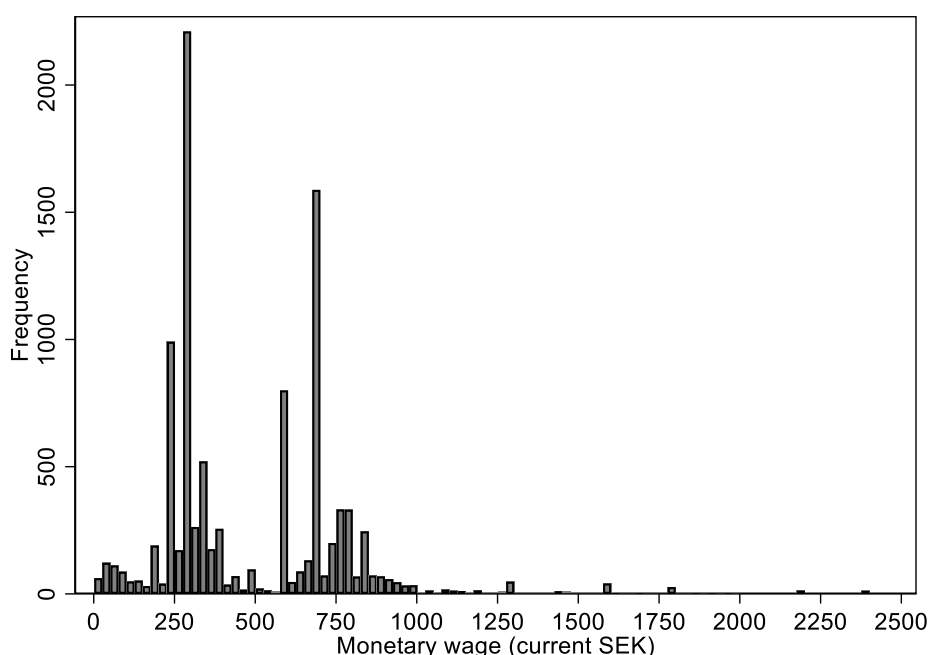
¹¹ Even when values are reported, we do not know to what extent they can be trusted. We discuss them briefly later in the paper.

5. Results

5.1 Factors of wage inequality among primary-school teachers and the gender wage gap

As evident from Figure 1, virtually all of the teacher wages in our dataset was in the range between 200 and 1000 SEK. As we discuss below, this pattern is directly linked to the prevalence of different schools (rural, regular, etc.) and different jobs performed – as well as gender inequality, since some schools employed more female teachers than others. The heaping on certain digits is linked to state regulations pertaining to wage minima and central-government subsidies, which is further discussed in Appendix A (Table A1). Overall wage inequality is astonishingly similar to that of teacher incomes found in Switzerland in the same historical period (Floris, Woitek, and Wüthrich 2013).¹²

Figure 1. The distribution of observations according to the monetary wage.



Sources: see text. Note: the minimum wage for junior-school teachers was set at 200, and primary school teachers at 600.

The gender wage gap among primary-school teachers, at face value, was 54 percent. This is quite similar to other face-value gender wage gaps estimated for Sweden. Based on the Historical Labour Database (HILD) at the University of Gothenburg, the wage gap ranged from 50 to 60 percent in a number of sectors and periods, including agriculture in 1889 (close to 60 percent on average), manufacturing in 1913 (52 percent on average), and white-collar jobs in 1929 (58 percent on average) – the latter two being the earliest available years in HILD data.¹³ A gender pay gap around 50 percent is also not dissimilar to what scholars have found concerning other countries in the same period (Drelichman and González Agudo 2020; Palma, Reis, and Rodrigues 2023).

Table 2 provides descriptive evidence on the potential factors influencing the structure of wages among Swedish primary-school teachers at the end of the 19th century – which might explain part of the gender wage gap illustrated above. The first difference is across school types, a dimension

¹² We computed the Lorenz Curve and Gini Coefficient (Gini = 0.30), which are not shown for the sake of brevity.

¹³ <https://www.gu.se/en/school-business-economics-law/economy-society/the-historical-labour-database-hild>. See Lundh and Prado (2015), and Collin, Lundh, and Prado (2019).

that strongly interacts with gender (Panel A), suggesting strong occupational segregation that affected the gender wage gap, as women disproportionately worked in minor and junior schools compared to men. Indeed, a very large gap between junior schools and regular primary schools can be generally discerned. Junior-school teachers earned on average 44 percent of a regular primary school teacher. Our data also indicate that the practice of remuneration created a divide between teachers in permanent and ambulatory schools – albeit not large. Within school types, inequality among teachers was limited – as evident by comparing the 25th and 75th percentiles. Still, within the group of teachers in regular schools, women earned c. 19 percent less than men, a sizeable gap. This might be due to further differences concerning e.g. seniority, experience, education, and other individual and regional features. Therefore, further analysis is recommended to examine the gender wage gap controlling for a broader set of individual and regional features (Burnette and Stanfors 2020).

Table 2. Average teacher’s wage and associated features.

Panel (A): school type	Female				Male			
	SEK	p. 25	p. 75	Obs.	SEK	p. 25	p. 75	Obs.
Junior	310	281	325	2,505	288	250	300	180
Junior (ambulatory)	282	250	300	1,172	279	250	300	209
Minor	324	300	350	401	351	300	400	137
Minor (ambulatory)	314	300	350	219	323	300	350	98
Regular	593	300	740	976	730	675	800	3,402
Regular (ambulatory)	480	255	700	96	681	600	775	732

Panel (B): job type	Female				Male			
	SEK	p. 25	p. 75	Obs.	SEK	p. 25	p. 75	Obs.
Artisan (Slöjd)	154	40	175	260	167	72	170	258
Physical-education teacher					240	100	300	5
Assistant teacher	389	300	480	136	321	250	400	27
Regular teacher	369	281	350	4,973	698	600	775	4,468

Panel (C): city size	Female				Male			
	SEK	p. 25	p. 75	Obs.	SEK	p. 25	p. 75	Obs.
Rural (no city)	328	250	338	4,957	641	600	775	4,532
Small (below 5,000)	443	300	600	115	624	300	833	58
Medium (5,000 – 10,000)	468	350	529	98	909	775	1,081	43
Large (10,000+)	1,029	625	1,300	199	1,557	1,231	1,900	125

Notes: the number of observations (obs.) reports the number of teachers in each category displayed.

The second difference is across teaching roles (Panel B).¹⁴ It is important to note that most of the teachers in our sample were regular teachers, even though they taught in different schools. This suggests, again, that the main source of variation came from the school type. Yet, when crossing information from both variables, one finds that regular (permanent, qualified) teachers in regular non-ambulatory schools earned approximately the same wage independently of whether they were men or women. In fact, women earned a little more (2.3 percent) among regular teachers, and substantially more (27.7 percent) among assistants. The same result can be found for junior schools

¹⁴ This is particularly true when we compare assistant and regular teachers, as they were supposed to work the same number of hours / months per year approximately, compared to sloyd and physical-education teachers.

where, among regular teachers, women earned 310 SEK on average, against 290 SEK for men (6.9 percent more).

Panel C describes differences in wages between urban and rural areas. Most differences are found between the large cities (10,000+ inhabitants) and the rest, whereas very small differences are found between rural areas and small as well as medium cities. The within-inequality component (differences within each category of city size) does not change across the four categories either, at least when comparing the 25th and 75th wage percentiles. Indeed, the ratio between the two percentiles remains similar across different city sizes, ranging from 43 to 50 percent. It is important to note that the cost of living does not seem to explain (at least not to a large extent) the differences between the cities and the countryside – particularly as far as small and medium-size cities are concerned.

It is worth noting that the preliminary analysis presented in Table 2 is purely descriptive and based on face-value data. Further multivariate analysis of correlates of teacher wages is needed – which we perform below in the paper – to fully understand how individual and regional factors affected wages and the wage gender gap.

Apart from the monetary wage, teachers also received in-kind benefits. These could have a significant practical (and monetary) value. The value of receiving good housing, fodder that enabled a teacher to keep a cow, firewood (keep in mind the northern location of Sweden), and a land plot or even some fields, should not be underestimated. Contemporary commentators could argue that animals were necessary for a rural teacher's livelihood, and teachers at the time fought to keep their benefits in-kind, instead of seeing them transformed into monetary payments.¹⁵ Similarly to in-kind payments, previous studies have indicated that regular Swedish teachers often had the opportunity to add a secondary occupation to their wage. An investigation from 1896 even pointed out that, in total, 31 percent of regular-primary-school teachers in rural areas worked as sextons or organists (Westberg 2019). Appendix B discusses in-kind payments and teacher earnings from other occupations more in detail.

To sum up, descriptive evidence suggests that gender inequality might have been negligible among primary-school teachers, at least within the same job and school types. However, there clearly was occupational segregation, as women predominantly worked in junior schools, which required no training certificate and paid lower wages compared to regular schools – where men were the majority of teachers. Yet, even the job type (e.g. regular vs assistant teachers) was not strongly linked to wage inequality. Instead, the school type seems to be, by far, the most important features explaining individual variations in teacher wages in 1890s Sweden. In the following section, we delve more into the issue of gender (in)equality and, later, explain why the analysis of teachers' wage premia compared to other occupations is important in relation to feminization and the expansion of primary education.

5.2 Gender inequality and the wages of Swedish primary-school teachers

To isolate the relationship between monetary wages and gender inequality, we rely on the OLS regression presented in the previous section. Results are presented in Table 3, column 1. Contrary to what the descriptive evidence discussed earlier seemed to indicate, there is a gender gap even when controlling for the school type and the job type. The coefficient suggests that men in primary-school teaching were paid, on average, 53 SEK more than women, when all the other (observable) conditions were equal. In relative terms (standardized beta coefficients), the dummy capturing

¹⁵ The value of owning a cow is examined in Humphries (1990). Regarding the debate on, and experiences of, the value of these in-kind items in Sweden, see Westberg (2017: 160-72).

gender is among the most prominent factors explaining wage inequality – only the dummies identifying sloyd teachers, regular schools, and cow fodder being provided as an in-kind payment have substantially larger standardized coefficients. Compared to the average wage within the population of primary-school teachers in Sweden at the time (c. 500 SEK), this is a gap of c. 10 percent. Albeit perhaps not very large compared to other coefficients in the same analysis, this points out the existence of a gender-related pay gap that did not depend on the level of employment or age, school type, the rural-urban divide, regional inequality or in-kind and other payments. However, since we do not have further individual information concerning other types of differences across genders and thus the above coefficient may be considered an upper-bound estimate, the actual gender gap may be assessed as relatively small. This is in line with recent results provided by Burnette and Stanfors (2020), who find no statistically-significant gender gap within the group of 1900 Swedish compositors in the typesetting industry, once the effect of individual and other features is considered.

Among the other coefficients, school types, job types and the level of urbanization (city size) play the lion's share as explanatory factors of the structure of teacher wages – confirming the descriptive analysis.

In the second model (column 2), the analysis is augmented by considering county-level factors that are likely to have affected individual wages to some extent. Gross Enrolment Rates are negatively associated with individual monetary wages: increasing the GER by one percentage point is associated with a reduction in the average wage equal to a little less than one SEK. Though counterintuitive at first, the result is consistent with the process of primary-schooling expansion at the time, mainly driven by junior schools and female teachers, thus relying on relatively low wages.

Instead, the amount of government expenditure on education normalised to school-age children is positively associated with teacher wages – unsurprisingly, given the government subsidy mechanisms explained in section 2. Basically, school boards offered a wage that enabled them to receive government subsidies and thus, actually, reduce their local expenditure on education. The county-level per-capita GDP is also positively associated with teacher wages, as improving it by a little more than 10 SEK would translate into a wage premium equal to almost one SEK. The variable capturing the share of public over total employment is not statistically different from zero, while population density displays a negative sign. Though counterintuitive when taken alone, this result must be seen in the context of controlling for rural vs urban environments. Within the same type of setting (e.g. areas characterised by large cities) a larger density might capture a larger pool of labour supply, thus being associated with lower wages. This coefficient is very small, as a whole standard-deviation increase (21 people per sq. km) would reduce the average wage by c. six SEK.

Finally, in model 3, we investigate how the wage varied in association with the different counties of Sweden – dropping the county-level variables and introducing county dummies. Since we control for individual factors associated with teachers' roles and occupations, and gender, as well as local features like urbanization and the diffusion of in-kind payments, the coefficient of the county-variables should be interpreted as mainly affected by their relative economic prosperity as well as average local policy concerning wages to attract certain types of teachers – compared to the benchmark county of the constant term, which is Västerbotten. Indeed, the largest coefficient is that of Stockholm City (372 SEK), while most other counties have a coefficient ranging from c. 30 to 80 SEK. Counties with a slightly larger coefficients are Uppsala, Örebro, Östergötland, Värmland, Älvsborg, Gävleborg, Södermanland, and Göteborg.

In sum, our analysis highlights two features of the variation of wages across Swedish counties in c. 1890. First, it suggests that once all other measured factors are considered, most of the variation in

teacher wages may be linked to individual conditions of employment, age, and gender (see the adjusted R squared of all three models). Secondly, Stockholm City may be seen as an exception to this main result – as wages in Stockholm City exhibit a large premium. Thus, when examining white-collar wages in Sweden by relying on data from Stockholm City, particular care should be taken. Within the scope of this paper, we can note that variations in wages across Swedish counties in the late 19th century cannot be explained to a large extent by differences in the cost of living – since prices were quickly converging across areas (Bengtsson and Jörberg 1975). Yet, possible reasons for the premium on wages in Stockholm City might include the fact that only a very small share of teachers received a land plot or had alternative occupations (sextons or organ players), i.e. one or two percent, against double-digit figures (often reaching 40 percent for land) in other Swedish counties.

Table 3. Regressing the monetary wages on individual and regional features.

VARIABLES	(1) Monetary wage (SEK)	(2) Monetary wage (SEK)	(3) Monetary wage (SEK)
Gender	-53.2342*** (4.553)	-46.7040*** (4.227)	-61.5066*** (4.509)
Stockholm City			371.6621*** (36.341)
GER (county)		-0.8865*** (0.306)	
Gov't exp. per child (county)		5.5591*** (1.892)	
GDP per capita (county)		0.0890*** (0.027)	
Public employment % tot. (county)		1.7697 (2.334)	
Population density (county)		-0.2905*** (0.090)	
Constant	329.2551*** (5.956)	362.2108*** (28.604)	292.9147*** (8.810)
Individual-level controls	Y	Y	Y
County dummies	N	N	Y
Observations	10,127	10,006	10,127
Adjusted R-squared	0.806	0.799	0.821

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Sources: see text. Notes: the coefficients of the individual controls and of county dummies are not shown for the sake of brevity and focus, but relevant results are discussed in the text. Appendix C shows the full table, together with an alternative specification where the dependent variable is the log of wages. Results are consistent with those shown here.

5.3 Teachers vs other occupations: wage premia and the feminization of Swedish primary schools

This section aims at investigating our second hypothesis, i.e. that teacher wage premia compared to alternative occupations in the labour market may explain the feminization of the teaching profession and sustained human-capital accumulation across Swedish counties by the late 19th century (Cappelli and Quiroga 2021; Evertsson 2023). To address this, we have explored county-level data: our individual data was aggregated by computing county-level mean values.

In a wider context of 19th century wages, teachers had specific working conditions that needs to be kept in mind. Teachers' annual minimum wage was based on eight months of work (which may include either five or six-day weeks), considerably below the 250 or 300 days of work that has been used to calculate the annual wages of workers and labourers (Gary 2018: 52; Bengtsson and Prado 2020: 97). To combat tendencies to concentrate schooling to fewer and longer school days, regulations stated a maximum of six-hour school days in primary schools, and five-hour school days in junior schools. While teaching requires work both prior to and after the conclusion of the school day,¹⁶ we can safely assume that their working days were shorter than those of workers in the manufacturing industry – who worked 10 hours per day in the early 20th century (Bengtsson and Molinder 2017). Assuming an eight-month working period (35 weeks) over the year, and an average six-day week, the number of days worked by teachers would equal 210 working days. Factoring in the fact that the length of the workday was most likely less than eight hours, instead of ten as in manufacturing, this would result in 168 manufacturing-equivalent days worked over one year.

For the sake of an exhaustive comparison, we include an estimate of the monetary value of in-kind payments in addition to the monetary wage of teachers. The monetary values of in-kind payments are provided only for c. half observations in our sample. Despite this, we could obtain county-level and national mean estimates of monetary values for cow fodder, housing (the two most valuable items), firewood, and the plot of land. When adding values to the monetary wage, we weighted the value of each in-kind payment by the share of teachers receiving it (N ranging from 180 to 3403 obs.). We must exclude wages tied to alternative occupations because data on earnings from such occupations are not provided.

We compare regular-school and junior-school teacher wages to both agricultural and manufacturing wages (see sources and discussion in Appendix D), for men and women separately (Table 4). A male agricultural labourer working 250 days per year would earn a value of 391 SEK on average, whereas teachers in regular schools would earn three times as much – almost 1,200 SEK including estimates for the value of in-kind payments. Yet, male agricultural wages were still quite better than the earning of a men working as a teacher in a junior school, as the latter would only receive a wage equal to only 91 percent of the alternative one in agriculture. The same holds true for manufacturing wages: the ratio between the earning of a regular-school teacher and a wage in manufacturing would be 2.51, while the same ratio concerning junior-school teachers would be 0.76. Therefore, men did not have strong incentives to move from agriculture or manufacturing to teaching in junior and minor schools on average, while they could hope to receive better wages when working in regular primary schools.

Importantly for our argument, the pattern is the same concerning women – but only in the case of female teachers in regular schools. An average female agricultural labourer could expect to earn 218 SEK over a 250-day work year, while a regular-school female teacher would earn 911 SEK including in-kind payments, i.e. four times as much. Yet, crucially, the value of female-teacher wages in junior schools, which stood at an average equal to 457 SEK inclusive of in-kind payments, is twice as large than the wage paid to women in agriculture – contrary to what we observe for men.

Again, this premium also holds for manufacturing jobs and wages, on average. This specific premium for women working in junior (and minor) schools, which did not require a formal teacher training

¹⁶ During the late 19th century teachers' tasks could include janitorial services (Westberg 2017: 108–12).

certificate, may contribute to explaining why the feminization of Sweden’s primary schools happened mainly through junior and minor schools. While women were paid less than their male colleagues in regular primary schools, junior and minor primary schools offered comparatively good wages in rural settings with relatively attractive working conditions based on eight months of work for five of six days a week.

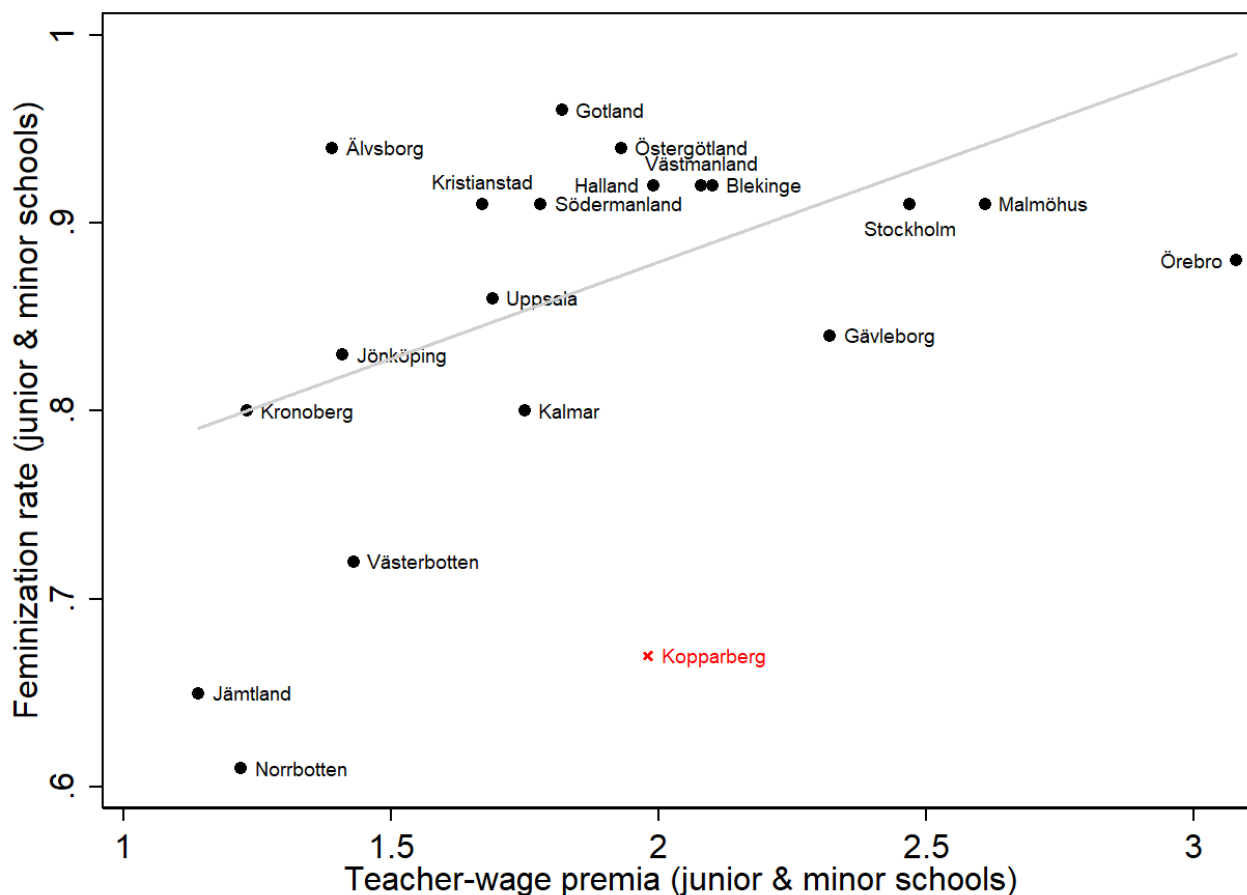
Table 4. Ratio of various wages to agricultural yearly wages, men (M) and women (F), 1880s.

	Regular-school teacher		Junior-school teacher	
	M	F	M	F
Compared to agricultural wages	3.02	4.18	0.91	2.10
Compared to manufacturing wages	2.51	3.22	0.76	1.62

Sources: see text. Notes: Swedish average wages are unweighted means of county-level data. Data for regular- and junior-school teachers (all jobs) are county-level means based on individual data. The monetary value of in-kind payments has been added to the wage of teachers for the sake of this comparison. Data for agricultural labourers were reported as annual wages, while manufacturing annual wages are converted from hourly rates (Collin, Lundh and Prado 2019) assuming a ten-hour workday and a 250-day work year. Female manufacturing wages are estimated as 60 percent of those of men, based on existing evidence provided by the HILD dataset.

Finally, we calculate the teacher-wage premia (concerning female teachers in junior schools) compared to female agricultural labourers across Swedish counties. We do not label this ratio a standard “skill premium,” because government regulations and wage minima might have affected the labour market of teachers, even though this is not likely to have happened to a major extent. We compare the premia with the rate of feminization in junior schools by county to explore the hypothesis that teacher-wage premia for women are correlated with their preference for employment in schools – which aligned with school boards aiming to reduce the cost of teaching and running primary schools. The results are presented in Figure 2. The feminization rate is capped at 100 percent, so the values around the threshold are not very informative. Additionally, the scatter plots are based on a very limited number of observations, so this evidence can only be suggestive. Despite this, for values of feminization below 100 percent, a clear positive relationship with the teacher-wage premia can be observed (excluding Kopparberg, which is an outlier). Although some other factors likely confounded this relationship, this evidence is consistent with recent findings on specific areas of Sweden (Evertsson 2023) indicating that school districts employed female teachers to keep costs down, as well as suggestive evidence from the provinces of Italy and Spain in c. the same period (Cappelli and Quiroga 2021), and evidence by Stanfors et al. (2014) that workers’ outside opportunities are important to account for the feminization of specific occupations, like Swedish cigar makers in c. 1900. Consequently, our results may in part explain both that schools in these regions could hire comparatively cheap teachers, and that women wanted those positions. These results also have implications for our interpretation of the early stages of the “quiet revolution” (Goldin 2006) in Sweden. They show that this process, among teachers, was intimately linked to occupational segregation. The early expansion of female white-collar work, which even opened up this field for the lower social classes in society, was enabled by a segregation of female teachers into the less remunerated positions at junior and minor schools.

Figure 2. Female-teacher premia (against agricultural wages) and the feminization rate (junior and minor primary schools).



Sources: see text.

6. Conclusions

This paper contributes to the literature on gender wage gaps and occupational segregation by focusing on one of the main female white-collar professions in the late 19th century: primary school teachers. Exploring a new dataset covering all primary-school teachers in Sweden, this paper adds evidence on wage inequality within a country and within a single profession to existing research, which has predominantly mapped the wages of the working classes and unskilled labour. We rely on this new set of micro data to contribute to the literature on gender wage inequality and occupational segregation in the past, as well as providing evidence as to why teaching in primary schooling was increasingly dependent on women in late-19th-century Sweden.

We find that the gender wage gap was relatively modest among Swedish teachers – female teacher wages were on average 10 percent lower than those of men, within the same job type and school types, as well as controlling for a variety of other features. Considering the differences in context and historical period, the result is in line with recent claims that, when white-collar jobs are considered (where premia based on strength are not to be expected) the gender wage gap is smaller than previously estimated, independently of whether one looks at Northern vs Southern Europe (Drelichman and González Agudo 2020; Palma, Reis, and Rodrigues 2023).

Despite this, occupational segregation was strong. Women worked much more often in junior and minor schools, which were predominantly rural, and paid lower wages than regular schools. Men, instead, were predominantly employed in regular primary schools. We show that, based on available conditions, women had an incentive to work in any kind of primary schools, even junior and minor ones, as the wages they would receive were better than alternatives in agriculture and, as far as we can tell, manufacturing. The same was not true for men, who would improve their living standards only by abandoning agriculture and (especially) manufacturing for working as teachers in *regular* schools. The incentive of women to become teachers thus aligned with that of school boards which, by the end of the 19th century, sought to expand schooling in rural areas by relying on low-cost schools and teachers.

The gender wage gap and occupational segregation of this key female white-collar occupation thus shed new light on the feminization of primary schooling in the complex setting late- 19th-century Sweden. The comparatively low wages of female teachers appear as the result of an occupational structure created by the central government to promote school enrolments and supported by school legislation and the allocation of government grants. Local school boards saw the potential of junior schools and minor primary schools, and their mainly female teaching staff, to keep school spending down. Instead of promoting firm survival, as was the case in Swedish tobacco industry (Stanfors et al. 2014), the feminization of teaching instead reduced local school spending. Unlike teaching in the US, which has been described as the main profession for educated women (Carter 1986), the occupational structure of the teacher profession in Sweden provided opportunities for women that lacked post-primary education. Since the capacity of teacher training in Sweden was very limited, as noted in section 2, and junior schools and minor primary schools did not require a teaching certificate, the increasing number of positions in such schools were open for women that had merely enjoyed a primary education. In that sense, the “quiet revolution” within the teaching profession in Sweden was intimately linked to occupational segregation, where the latter was the price that women had to pay to gain access to this white-collar profession.

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Appendix A – wage minima and the distribution of wages

Heaping on certain wage values can be clearly discerned in the distribution of wages (Table 1 in the paper), particularly on 250 SEK (986 observations), 300 SEK (2,099 observations), 600 SEK (796 observations), and 700 (1,568 observations). This pattern is consistent with the central government subsidy system and provisions for wage minima – which were based on the categories of primary school teachers (Table 1, Section 2).

The minimum wage to get a central-government subsidy for junior-school teachers was 200 SEK, but school districts received an increase in subsidy if wages were risen up to 300 SEK. The minimum pay level for primary school teachers was 600 SEK, but they could receive a central government subsidy of 100 SEK after five years of service.

As evident from Table A1, the minimum wages and government subsidies influenced the structure of teacher wages in Sweden. More than 50 percent of the wages collected through our source match minimum wages or wages that were paid in order to maximise government subsidies.

Table A1. Heaping on teachers' monetary wages.

Monetary wage (SEK)	Frequency	Percentage
200	163	1.61
250	893	8.82
300	1,875	18.51
600	919	9.07
700	1,552	15.32
	5,402	53.33

Sources: see text.

Appendix B – in-kind wages and other earnings

Our individual-level data reveal some of the features of teacher in-kind earnings in late-19th-century Sweden. The in-kind items mentioned in the minimum-wage regulations of primary school teachers were indeed often provided. Housing and firewood were provided to 83 and 77 percent of Swedish teachers, respectively. A plot of land was not as common, but 33 percent of the teachers in our dataset received some kind of land for their use. The distribution of these in-kind items did not simply follow the minimum wage regulations. 84 percent of all teachers in regular non-ambulatory schools received cow fodder and firewood, and 88 percent of them received housing. 55 percent of regular-school teachers received a plot of land, while virtually none of them received food. Such shares changed quite substantially for junior-school teachers, whose minimum wage regulation did not include such items: while 75 percent of them received firewood and 83 percent got housing, only 14 percent could rely on a plot of land, and virtually no cow fodder nor food were provided, according to our data. Interestingly, this evidence suggests that, when including in-kind items, the real-wage gap between primary school teachers and junior-school teachers was consequently larger than what the monetary wage alone indicates.¹⁷

A significant gender gap seems to have existed concerning in-kind payments: around 90 percent of male teachers working in regular schools received cow fodder, housing and firewood, and 64 percent could rely on a land plot. Female teachers did not enjoy these benefits to the same extent. Only 60 percent of the female teachers received cow fodder, and housing (74), firewood (68), and a land plot (25) were also less frequent among the female staff – even if they were working in the same type of schools. Interestingly, such differences were basically non-existent in the case of junior schools. If anything, female junior teachers seem to have received housing and firewood in more instances than men.

Our data allows further exploration of this issue. While it certainly was quite common that this group of rural primary-school teachers had a second job – 20 and 25 percent of regular-school teachers in our dataset had an additional occupation as organists and sextons, respectively – it was less common for specific groups. Only a small share of female teachers in regular schools is associated with being a sexton or organist (one and 1.5 percent, respectively). Again, these differences are important to take account, if we are to correctly understand the gender gap between junior and primary school teachers, and between male and female teachers.

¹⁷ The monetary value of in-kind benefits was seldom reported in the statistics. We can observe that to the average monetary wage in the whole sample of primary-school teachers was 503 SEK. According to our data, the average value of cow fodder was 85 SEK (based on 3,759 observations), that of housing 208 SEK (648), the value of firewood 75 SEK (656), and that of the land plot 41 SEK (8). Teachers working in large cities and regular vs other schools enjoyed in-kind payments of the highest estimated monetary value.

Appendix C – Full regression results

Table C1. Full regression results

VARIABLES	(1) Monetary wage (SEK)	(2) Monetary wage (SEK)	(3) Monetary wage (SEK)	(4) Monetary wage (ln)
Artisan (Sloyd)	-380.2987*** (20.374)	-377.2474*** (20.383)	-372.4196*** (20.432)	-1.5255*** (0.072)
Assistant	-213.5566*** (22.129)	-201.3509*** (21.121)	-189.9340*** (21.376)	-0.2986*** (0.073)
Physical education	-324.5154*** (71.086)	-323.4338*** (70.736)	-334.0544*** (72.683)	-0.7950** (0.319)
Gender	-53.2342*** (4.553)	-46.7040*** (4.227)	-61.5066*** (4.509)	-0.1148*** (0.014)
Age salary	105.3528*** (5.636)	96.3615*** (5.307)	96.4540*** (5.314)	0.1152*** (0.009)
Junior (ambulatory)	-14.0830*** (2.605)	-11.6148*** (2.644)	-15.2332*** (2.689)	-0.0424*** (0.008)
Minor	21.7360*** (3.971)	15.4260*** (4.064)	8.5942** (4.312)	0.0316** (0.013)
Minor (ambulatory)	6.0042 (4.083)	-2.4680 (4.641)	1.5620 (4.814)	0.0230 (0.014)
Regular	207.8073*** (18.523)	206.6057*** (18.517)	194.1887*** (18.519)	0.3159*** (0.056)
Regular (ambulatory)	168.9091*** (18.558)	176.9395*** (18.670)	161.2541*** (18.687)	0.2555*** (0.059)
Cow fodder provided	163.0848*** (18.129)	164.0479*** (18.177)	162.7101*** (18.167)	0.3865*** (0.053)
Housing provided	61.0973*** (6.734)	54.8814*** (6.711)	51.5130*** (6.600)	0.1414*** (0.017)
Firewood provided	-40.7222*** (6.590)	-42.4037*** (6.584)	-35.9436*** (6.680)	-0.0455*** (0.013)
Plot of land provided	-11.2636*** (3.454)	-3.3633 (3.380)	-2.0317 (3.448)	0.0312*** (0.007)
Sexton salary	-17.5782*** (6.240)	-13.0253** (6.286)	-14.6268** (6.381)	0.0019 (0.015)
Organ-player salary	12.2446* (6.536)	7.5380 (6.608)	6.1627 (6.733)	0.0218 (0.015)
Food provided	-122.5229*** (14.293)	-123.7275*** (14.313)	-125.0953*** (15.183)	-0.5096*** (0.060)
Small city	68.6327*** (11.990)	69.1482*** (11.959)	76.8171*** (11.679)	0.2049*** (0.031)
Medium city	143.5541*** (14.775)	146.1990*** (14.778)	147.6100*** (14.449)	0.3816*** (0.040)
Large city	568.3486*** (22.906)	446.7507*** (24.350)	478.0307*** (23.321)	0.7290*** (0.038)
Blekinge			36.1717*** (10.189)	0.1302*** (0.026)
Älvsborg			62.6320*** (7.439)	0.1404*** (0.023)
Gävleborg			79.3703*** (10.697)	0.2071*** (0.030)
Gotland			27.2106** (10.675)	0.1088*** (0.032)
Göteborg och Bohus			51.7818*** (8.175)	0.0973*** (0.028)

Halland		39.7522***		0.1158***
		(7.594)		(0.021)
Jämtland		46.3510***		0.1326***
		(7.956)		(0.023)
Jönköping		13.9771*		0.0031
		(8.398)		(0.026)
Kalmar		40.3096***		0.1404***
		(7.746)		(0.022)
Kopparberg		30.6989***		0.0610**
		(8.305)		(0.025)
Kristianstad		20.3798***		0.0470**
		(7.348)		(0.021)
Kronoberg		34.0614***		0.0878***
		(8.124)		(0.024)
Malmöhus		29.6091***		0.1058***
		(7.698)		(0.022)
Norrbottn		56.2116***		0.1426***
		(10.480)		(0.027)
Skaraborg		38.7894***		0.0943***
		(7.706)		(0.024)
Stockholm		88.0103***		0.1029***
		(10.548)		(0.028)
Stockholm City		371.6621***		0.1850***
		(36.341)		(0.047)
Södermanland		64.4100***		0.1011***
		(9.414)		(0.033)
Uppsala		71.6492***		0.1212***
		(13.547)		(0.036)
Värmland		73.7206***		0.2088***
		(7.930)		(0.023)
Västernorrland		62.8603***		0.1823***
		(8.678)		(0.024)
Västmanland		61.2413***		0.1479***
		(8.411)		(0.024)
Örebro		64.8982***		0.1528***
		(9.496)		(0.027)
Östergötland		69.7933***		0.1126***
		(8.801)		(0.029)
GER (county)		-0.8865***		
		(0.306)		
Gov't exp. per child (county)		5.5591***		
		(1.892)		
GDP per capita (county)		0.0890***		
		(0.027)		
Public empl. % tot. (county)		1.7697		
		(2.334)		
Population density (county)		-0.2905***		
		(0.090)		
Constant	329.2551***	362.2108***	292.9147***	5.6003***
	(5.956)	(28.604)	(8.810)	(0.027)
Observations	10,127	10,006	10,127	10,127
Adjusted R-squared	0.806	0.799	0.821	0.750

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix D – alternative wages to teacher earnings: agriculture and manufacturing

Our teacher monetary wages are compared with two types of alternative wages. First, we address nominal agricultural wages from the HILD dataset. We focus on the total wage (a large part of it provided in-kind) of agricultural labourers whose household lived at the landowner premises. At the national level, the average wage for male labourers was 391 SEK and 218 SEK for female labourers.

Such data closely resemble the value obtained by multiplying day rates for the 250 days per year suggested by Allen. Assuming 250 workdays during the year, equally distributed between summer and winter, we obtain an average agricultural yearly wage equal to 360 SEK for men and 206 SEK for women. Since the data report both summer and winter average day rates, we obtained the average value through a mean with the following back-of-the-envelope calculation, where aw stands for average wage: $aw = w_s * 125 + w_w * 125$.

Secondly, we focus on manufacturing male wages in Swedish counties (Hamark and Collin 2019; Collin, Lundh, and Prado 2019). We convert hourly rates reported in the Historical Labour Database (HILD) into daily rates (assuming 10 hours per day) and then in yearly wages (250 days). Data refer to 1879, the closest year to ours (1890). Male manufacturing wages in 1879 were already higher than agricultural labourer wages in 1890, the average manufacturing wage being 471 SEK.

As we explain in the main text, the average wage paid to women across sectors was 60 percent, so we assume female wages in manufacturing to be 60 percent of the figure reported for men.