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Income inequality of Swiss primary school teachers in the late 19th century

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Abstract: We examine the distribution of income across Swiss primary school teachers at the end of the 19th century. To assess the income differences we use a detailed data set on income of 14000 Swiss primary school teachers in 1881 and 1894/95. In addition, we have annually aggregated test scores from pedagogical examinations at recruitment, to test for the impact of inequality on conscripts' performance. Our results show that between-group inequality amounts to about 30 per cent of total income inequality, and that teachers' income inequality does not play a role in explaining differences in the performance of conscripts in the pedagogical examinations.

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Table 1: Descriptive Statistics – Teachers’ Characteristics

	Sex		Training	Payment in Kind	Civil Status		
	Female	Male			Single	Married	Widowed
1881	28%	72%	84%	60%	46%	50%	3%
1894/95	31%	69%	92%	57%	45%	51%	3%

Number of observations 1881: 7954, 1894/95: 9024 (without clerics)

Table 2: Regional Distribution of Teachers, 1881 and 1894/95

Region	1881	1894/95
Central Switzerland	5%	5%
High Alps	16%	16%
North East	13%	13%
North West	20%	21%
West	21%	22%
Berne	24%	23%

Central Switzerland: Lucerne, Uri, Schwyz, Obwalden, Nidwalden, Zug; High Alps: Graubünden, Ticino, Valais; North East: Glarus, Schaffhausen, Appenzell A. R., Appenzell I. R., St. Gallen, Thurgau; North West: Zurich, Solothurn, Basel Land, Basel Stadt, Aargau; West: Fribourg, Vaud, Neuchâtel, Geneva (the regional groups follow *H. Ritzmann-Blickenstorfer*, *Historical Statistics of Switzerland*, Zurich 1996, p. 65.)

Table 3: Average Marks in the Pedagogical Examinations, 1875-1885 and 1890-1900

1875-1885				
Region	Reading	Essay	Maths	History
Central Switzerland	2.21	2.69	2.42	3.01
High Alps	2.23	2.73	2.46	3.25
North East	2.03	2.51	2.24	2.85
North West	1.89	2.23	2.06	2.56
West	2.00	2.37	2.20	2.72
Berne	2.11	2.53	2.46	3.09
1890-1900				
Region	Reading	Essay	Maths	History
Central Switzerland	2.01	2.54	2.34	2.72
High Alps	1.85	2.43	2.34	2.73
North East	1.73	2.23	2.06	2.54
North West	1.63	2.08	2.00	2.39
West	1.67	2.13	1.98	2.34
Berne	1.85	2.33	2.20	2.62

Central Switzerland: Lucerne, Uri, Schwyz, Obwalden, Nidwalden, Zug; High Alps: Graubünden, Ticino, Valais; North East: Glarus, Schaffhausen, Appenzell A. R., Appenzell I. R., St. Gallen, Thurgau; North West: Zurich, Solothurn, Basel Land, Basel Stadt, Aargau; West: Fribourg, Vaud, Neuchâtel, Geneva (the regional groups follow *H. Ritzmann-Blickenstorfer*, *Historical Statistics of Switzerland*, Zurich 1996, p. 65.)

Table 4: Income Distribution Characteristics, 1881 and 1894/95

	N	25%-Quantile (Fr.)	Median (Fr.)	75%-Quantile (Fr.)	Mean (Fr.)	Coeff. of Variation
1881						
Total	7954	800	1100	1495	1190	0.49
Female	2193	574	840	1100	891	0.47
Male	5761	970	1200	1580	1304	0.45
1894/95						
Total	9024	930	1300	1635	1367	0.52
Female	2786	750	950	1300	1036	0.48
Male	6238	1130	1400	1766	1515	0.48

Table 5: Annual Incomes, Middle Class

Male			Female		
Teachers			Teachers		
	N	Fr.		N	Fr.
1881	5761	1304	1881	2193	891
1894/95	6238	1515	1894/95	2786	1036
Clerks			Clerks		
	N	Fr.		N	Fr.
1890	(estimate)	2160	1895	12	780
			1900	16	1068
			Salesclerks		
				N	Fr.
			1902	76	1171
			1905	267	1080
Teachers (21-23 Years)			Teachers (20-23 Years)		
	N	Fr.		N	Fr.
1881	785	1030	1881	742	821
1894/95	487	1166	1894/95	687	841
Engineers, Starting Salary			Young Clerks (20-24 Years)		
	N	Fr.		N	Fr.
1895/1900	("several")	1440	1895	12	900
1899/1900	5	1800	1900	16	1008
1908	22	2124			
Railway Employees, Starting Salary					
	N	Fr.			
Accountant, 1880		1238			
Accountant, 1894		1214			
Station Master, 1880		1249			
Station Master, 1894		1401			
Teachers (> 40 Years)			Teachers (25-30 Years)		
	N	Fr.		N	Fr.
1881	1989	1433	1881	538	944
1894/95	2142	1710	1894/95	607	981
Experienced Engineers			Salesclerks (25-30 Years)		
	N	Fr.		N	Fr.
1895/1900	("several")	4800	1902/05	(estimate)	1224
1899/1900	1	9900			
1908	45	4272			

Sources: Clerks, Salesclerks: *M. König/H. Siegrist/R. Veterli*, Warten und Aufrücken. Die Angestellten in der Schweiz 1870-1950, Zürich 1985, Tables 13, 21-24 und 32; Engineers: *König et al.*, Warten, Tables 26-29; Railway Employees: *V. E. Scherer*, Die Lohnverhältnisse des Personals der schweizerischen Eisenbahnen, in: Zeitschrift für schweizerische Statistik und Volkswirtschaft 37, 1902, S. 244-261, p. 251. The age of the teachers in each block is selected to fit the age of the group to be compared with.

Table 6: Gini Coefficient (Income and Wealth), Canton Zurich 1886

	District Zurich	District Dielsdorf
Agriculture	0.40	0.37
Industry	0.41	0.18
Trade	0.57	0.30
Transportation	0.36	0.19
Administration, Education, Arts	0.48	0.34
Personal Services	0.13	0.08
Unknown	0.72	0.56
Total	0.55	0.37

Source: *H. Greulich (Ed.), Das statistische Seminar in Zürich. Bericht über den Jahreskurs 1886/1887*, Bern 1891. The numbers are based on income and wealth distributions resulting from a statistical course provided by the statistical office of the canton Zurich in 1886/1887. In this course, data from tax declaration were used to teach participants the construction and use of statistical tables.

Table 7: Decomposition of Inequality by Subgroups

1881				
Decomposition	I_{total}	$I_{between}$	I_{within}	$R_{between}$
(1)	0.119	0.005	0.114	0.039
(2)	0.119	0.018	0.101	0.148
(3)	0.119	0.018	0.101	0.150
(4)	0.119	0.027	0.092	0.226
(5)	0.119	0.030	0.089	0.251
(6)	0.119	0.046	0.072	0.391
1894/95				
Decomposition	I_{total}	$I_{between}$	I_{within}	$R_{between}$
(1)	0.133	0.005	0.129	0.034
(2)	0.133	0.019	0.114	0.144
(3)	0.133	0.019	0.114	0.144
(4)	0.133	0.029	0.104	0.221
(5)	0.133	0.032	0.101	0.238
(6)	0.133	0.046	0.087	0.344

Notes: the decomposition is based on the generalized entropy measure with $\theta = 2$. Subgroups: (1) Payment in Kind; (2) Payment in Kind, Sex; (3) Payment in Kind, Sex, Training; (4) Payment in Kind, Sex, Training, Length of Service; (5) Payment in Kind, Sex, Training; (4) Payment in Kind, Sex, Training, Length of Service, Civil Status; (6) Payment in Kind, Sex, Training; (4) Payment in Kind, Sex, Training, Length of Service, Civil Status, Share of Catholics.

Table 8: Relationship between Gini Coefficient and Average Cantonal Marks, 1881 and 1894/95

	Reading			Essay		
	Parameter	t-Statistic	p-Value	Parameter	t-Statistic	p-Value
Constant	1.761	11.136	0.000	2.242	13.249	0.000
D ₁₈₉₄	-0.280	-1.215	0.231	-0.300	-1.216	0.231
Gini	0.179	0.192	0.848	-0.476	-0.479	0.634
D ₁₈₉₄ × Gini	0.034	0.023	0.981	0.563	0.361	0.720
Catholics	0.491	4.873	0.000	0.590	5.471	0.000
R ² _{adj}	0.443			0.429		
N	48			48		

	Math			History		
	Parameter	t-Statistic	p-Value	Parameter	t-Statistic	p-Value
Constant	1.947	13.178	0.000	2.578	15.614	0.000
D ₁₈₉₄	-0.081	-0.378	0.708	-0.304	-1.264	0.213
Gini	0.349	0.403	0.689	0.076	0.078	0.938
D ₁₈₉₄ × Gini	-0.325	-0.239	0.812	-0.077	-0.050	0.960
Catholics	0.486	5.166	0.000	0.496	4.718	0.000
R ² _{adj}	0.381			0.451		
N	48			48		