Online Appendix to Closing the Gap? The Effect of Private Philanthropy on the Provision of African-American Schooling in the U.S. South

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This appendix delves into two areas that were omitted from the main paper for brevity. Section A describes the data assembly, transcription, and auditing process and presents descriptive statistics and figures relating to county-level black and white school resources over the years 1910-1940. Section B extends our main findings on the impact of Rosenwald contributions on black and white school spending by illustrating how those impacts differed across proxies of black disenfranchisement and the strength of pre-existing black education sectors.

A Trends in Segregated School Resources, 1910-1940

This study makes use of data on Southern public school districts between 1910 and 1940 in five states (Alabama, Georgia, Louisiana, North Carolina and South Carolina), including statistics on schools, teachers, students, and expenditures. These states were selected for their consistency in reporting the variables of interest and the intensity of Rosenwald activity therein. While several researchers have used portions of these data for specific projects, to our knowledge, our assembled dataset is unprecedented in its size, scope, and depth. We expect these data to serve as a valuable foundation for future research. This section describes the data in more detail and illustrates trends in white and African-American schooling resources in the early 20th century.

Our primary sources of education input data are annual reports from state Superintendent Offices, Departments of Education, or equivalent governmental units. Measures of schooling resources reported separately for white and African-American schools typically include:

1. Enrollment, average daily attendance
2. Number of teachers
3. Expenditures
4. Teacher salaries
5. Number of schools
6. Average term lengths
7. Local tax revenues

We outsourced transcription of available statistics for these five states and assembled county-by-race panels for the three decades encompassing Rosenwald Fund activity, 1910-1940. Data availability is remarkably consistent across

states and years, with one important exception. North Carolina reported total spending but not spending by race, a feature that is important for the present study. For this reason, our analysis examines fiscal crowd-out and diversion (available for four states) as well as crowd-out in kind (e.g., in the number of teachers) and changes in other measures of schooling resources and capacity (term length, number of schools, enrollment) available in North Carolina as well.

We conduct an informed 0.5% audit of each transcribed variable. Specifically, for each school statistic and each state, we regress transcribed data against county fixed effects and a quadratic function of time, generating predicted values and residuals. We flag cells in the top 99.5% of residuals, in absolute value. This resulted in 814 flagged cells, for 16 variables and just over 11,000 county-by-race rows of raw data. Then, our research assistant verified the accuracy of each flagged cell by consulting the original scanned reports and fixed any discovered errors. The realized error rate from these flags was 14.9 percent. We believe this to be an encouraging signal of the underlying fidelity of these data, considering that our audit focused on the top 0.5% of outliers within counties' time series.

Other researchers have used portions of these data or statewide aggregations of historic education data to characterize pre-War school resources. We construct summary statistics comparable to those that have been reported in earlier work. For instance, observe that Card and Krueger (1992*b*) assemble data on pupil-teacher ratios, annual teacher pay, and term length for black and white schools from eighteen state-level reports, including the five states in our sample. Statistics in our data closely track theirs. For example, Card and Krueger (1992*b*) document a convergence in white-black term length ratio of 1.31 (1915) to 1.10 (1940) in eighteen segregated states, weighted by enrollment. We find a convergence of 1.40 to 1.09 over the same period in our five Southern states, also weighted by enrollment. In related work, Card and Krueger (1992*a*) document statewide aggregates of pupil-teacher ratios and term lengths using the U.S. Department of Education series *Biennial Survey of Education*. The earliest cohort they consider attended school between 1926 and 1947. We use our transcribed data on enrollment, teachers, and term lengths to construct statewide average values of pupil-teacher ratios and term lengths over the years 1926-1940. Summary statistics are similar to those reported by Card and Krueger (1992*a*). For Alabama, Georgia, Louisiana, and the Carolinas, Card and Krueger (1992*a*) report pupil-teacher ratios in the range of 33.7 - 35.9 and term lengths in the range of 154 - 161 (see their Table 1 on p. 12, first and fourth columns). For these same states and a somewhat earlier window of time, we find pupil-teacher ratios of 32.2 - 37.7 and term lengths of 148.9 - 158.3. In addition, Donohue, Heckman and Todd (2002) utilize the same series of Georgia Department of Education statistics that we use here, and their panel of county statistics spans 1911 to 1960. Our transcribed data from 1910 - 1940 match theirs exactly.[1]

Table A1 contains a summary of data available for these five states. Particular variables were sporadically missing from state reports, unsurprising given the 31-year window over which we collected data. Importantly, variables that are key to this analysis (enrollment and attendance, number of teachers, expenditures, number of schools, and term length) were found throughout almost all of the 1921-1933 period that the Rosenwald Fund was actively building schools.

Figure 1 in the main text illustrates trends in Rosenwald schools and public schooling resources over the pre-integration 1910-1940 period, and Appendix Figures A1 - A5 illustrate trends for each state. To our knowledge, these

[1] We thank the authors for providing a copy of their data.

figures are the first of their kind for this phase of public education in the United States as county-level data have not previously been assembled in an analytical form for multiple states or decades. The upper-left panel of each figure plots the frequency of new Rosenwald schools by year in all fifteen states where the Fund was active. The remaining panels illustrate means and confidence intervals for county-level enrollment, teachers, school buildings, term lengths, teacher salaries, and total expenditures. Black students – both enrolled and attending – per school-aged child were growing and black school-aged children per black teacher (i.e., the potential teaching burden of each black teacher) declined over this period (see Figure 1 in the main text). The same was true for white schools, but to a lesser degree, and we see meaningful convergence in these measures of black and white schooling. The gap in term lengths narrowed slightly, but unevenly across states. By contrast, we see no convergence in teacher salaries or expenditures per student. In fact, the black-white gap in real spending per enrollee steadily widened between 1910 and 1940. The number of white schools per 1,000 school-aged whites fell substantially prior to 1940. School consolidation was a major development in this phase of U.S. public education. Small, wood-framed community schoolhouses were supplanted by large, multi-story buildings with facilities and teachers for different grade levels. Many of the annual reports we obtained for this study devoted entire narrative sections to the progress of (largely white) school consolidation. As white schools were consolidating throughout the region, black schools were steadily growing in number.

These descriptive figures are not surprising, given our analysis of the effect of Rosenwald monies on schooling resources. Rosenwald schools were widespread in each of these states, cumulatively accounting for 24 percent of teachers by 1933, on average. Nevertheless, Rosenwald-induced gains in spending and teaching were short-lived and accompanied by similar or larger gains among white schools.

B Additional Results on Crowd Out and Diversion

Our main estimating equation for the impact of Rosenwald contributions on school spending is given by:

$$\Delta Y_{ct}^{k} = \alpha^{k} \Delta R_{ct} + \sum_{s=1}^{5} \alpha_{-s}^{k} \Delta R_{c,t-s} + \Delta \mathbf{X}_{ct} \beta^{k} + \theta_{c}^{k} + \theta_{t}^{k} + \varepsilon_{ct}^{k}, \tag{2}$$

where ΔY_{ct}^{k} is the change in primary and secondary school spending for African-American or white schools ($k = a, w$) in county c and year t. ΔR_{ct} represents the change in private Rosenwald contributions between years t and $t-1$ (i.e., the sum of new or additional contributions from Rosenwald and private citizens), $\Delta \mathbf{X}_{ct}$ contains lagged changes in black or white enrollment, lagged changes in school districts' property tax revenues as reported in the schools data, as well as changes in interpolated population and agriculture data from decennial Censuses (total population, percent black, crop value per capita, and percent of land devoted to agriculture). The parameter θ_{c}^{k} is a county fixed effect and θ_{t}^{k} is a year fixed effect. Robust standard errors are clustered to account for serially correlated errors within counties.

Findings in the main body of the paper suggest that each dollar of private Rosenwald-facilitated contributions yielded \$2.21 in new black and white school spending, a strong flypaper effect that even exceeds the Rosenwald Fund's matching requirements. In the main body of this study we postulate that funds earmarked for Rosenwald projects were diverted and matched to benefit white schools because white citizens and white-controlled governments valued the standing of white schools *relative* to that of black schools.

To test this idea we disaggregate our main results on crowd-out in black expenditures and diversion to white expenditures along three dimensions: the percent of the population who were black in 1860, the percent of blacks who were literate in 1920, and the percent of under-17 blacks who were enrolled in 1915. The 1860 black population share, by county, is a measure of the strength of the slave economy in the 19th century and the historical level of disenfranchisement of blacks within a county. Black literacy rates as measured by the 1920 Census are a measure of contemporaneous political enfranchisement, since each of these states administered literacy tests to prospective voters. Finally, the share of black minors who were enrolled in school in 1915 is a measure of the density of black schooling immediately prior to the Rosenwald campaigns.

We bifurcate the sample within states into counties with above-median and below-median 1860 black population shares, 1920 literacy rates, or 1915 enrollment shares, and re-estimate Equation 2. Estimates of crowd-out and diversion in total spending for each subsample are reported in Table A3. We find that the gap between black and white spending gains attributable to Rosenwald involvement was largest (1) where race relations were poorest, as measured by 1860 population shares, (2) where blacks were more politically disenfranchised in the early 20^{th} century according to literacy, and (3) where a larger share of blacks were already enrolled in school. Again, this latter finding may reflect a heightened sensitivity to the relative position of blacks in locations where the density of black schooling was already relatively high.

References

Card, David, and Alan B. Krueger. 1992*a*. "Does School Quality Matter? Returns to Education and the Characteristics of Public Schools in the United States." *The Journal of Political Economy*, 100(1): 1–40.

Card, David, and Alan B. Krueger. 1992*b*. "School Quality and Black-White Relative Earnings: A Direct Assessment." *The Quarterly Journal of Economics*, 107(1): 151–200.

Donohue, John J., James J. Heckman, and Petra E. Todd. 2002. "The Schooling of Southern Blacks: The Roles of Legal Activism and Private Philanthropy, 1910-1960." *Quarterly Journal of Economics*, 117(1): 225–268.

Tables and Figures

TABLE A1: Summary of Data Availability in State Education Reports, 1910-1940

	Alabama	Georgia[1]	Louisiana[2]
Enrollment, average daily attendance	all years	all years	missing 1910, 1912
Number of teachers	all years except 1921	all years	all years
Expenditures by race	missing 1911-20	missing 1936, 1938	missing 1910-1925
Total expenditures	all years	all years	all years
Teacher salaries	all years	all years	missing 1923, 1926, 1927
Number of school buildings	missing 1929-31	all years	missing 1928, 1932-1933, 1936-1938
Term length	all years	all years	missing 1910-1914, 1926
Local tax revenue	all years	all years	all years
Number of counties	67	64	60

	North Carolina	South Carolina
Enrollment, average daily attendance	missing 1920	all years
Number of teachers	all years	all years
Expenditures by race	not available	all years
Total expenditures	all years	all years
Teacher salaries	all years	all years
Number of school buildings	missing 1920-22	all years
Term length	missing 1920	all years
Local tax revenue	all years	all years
Number of counties	100	46

Notes: [1]Georgia issued report for every year from 1910-1922. Thereafter, reports were issued for even-numbered years only. No Georgia data are available for odd-numbered years between 1922 and 1940. [2]No Louisiana data are available for 1922. The state did not issue a report in that year.

TABLE A2: Descriptive Statistics by State

	(1)	(2)	(3)	(4)	(5)	(6)
	ALL	AL	GA	LA	NC	SC
Public School Data (1910-1940)						
African-American school expenditures (000s)	26.06	32.53	11.38	42.11		36.08
	(71.12)	(95.40)	(35.57)	(114.43)		(37.53)
White school expenditures (000s)	205.24	264.66	96.98	334.27		266.00
	(393.39)	(486.46)	(276.77)	(552.93)		(262.84)
African-American teachers	53.29	54.23	39.04	41.82	53.05	98.74
	(57.40)	(75.72)	(38.44)	(54.48)	(50.31)	(54.35)
White teachers	138.07	162.10	90.52	131.73	153.09	181.33
	(151.06)	(186.41)	(126.32)	(175.94)	(120.35)	(136.65)
African-American schools	29.81	32.46	23.36	21.03	24.87	59.07
	(24.85)	(22.77)	(19.46)	(16.93)	(19.69)	(31.91)
White schools	42.48	59.92	32.13	31.00	43.27	51.23
	(31.48)	(29.32)	(32.17)	(22.30)	(30.75)	(28.77)
African-American term length	116.15	105.40	120.49	112.88	130.19	97.04
	(31.00)	(29.62)	(26.04)	(33.85)	(27.24)	(30.15)
White term length	145.24	139.40	139.10	167.24	141.01	151.91
	(26.41)	(22.88)	(30.28)	(14.89)	(24.12)	(24.07)
African-American enrollment (000s)	2.63	2.79	2.01	2.10	2.47	5.44
	(2.87)	(3.81)	(2.20)	(2.45)	(2.39)	(2.89)
White enrollment (000s)	4.66	5.81	3.39	4.01	5.56	5.66
	(5.22)	(6.23)	(5.03)	(5.47)	(4.31)	(4.42)
African-American teacher salary	292.59	205.90	226.37	296.25	418.55	268.32
	(207.84)	(149.36)	(214.69)	(206.30)	(206.96)	(120.76)
White teacher salary	698.29	665.41	585.40	811.43	702.48	838.24
	(313.68)	(220.43)	(300.17)	(427.11)	(293.07)	(243.24)
Local tax revenues (000s)	124.46	112.66	59.17	176.73	141.51	157.00
	(306.63)	(334.37)	(263.73)	(480.93)	(202.21)	(160.84)
Rosenwald Data (1921-1933†)						
Value of private Rosenwald contributions	833.93	677.75	339.61	886.42	1037.84	2126.72
	(2342.08)	(2286.06)	(1459.79)	(2165.82)	(2321.99)	(3949.92)
Number of new Rosenwald-funded teachers	1.06	0.53	0.41	1.08	1.58	2.76
	(2.71)	(1.38)	(1.43)	(2.60)	(3.43)	(4.32)
Number of new Rosenwald schools	0.39	0.23	0.14	0.44	0.56	0.93
	(0.93)	(0.53)	(0.43)	(1.02)	(1.19)	(1.34)
Census Data (1910-1940)						
Total population (000s)	30.52	37.21	22.40	32.85	30.23	42.75
	(36.88)	(44.24)	(31.16)	(54.63)	(23.76)	(25.02)
Per capita crop value	107.88	100.58	118.01	89.61	101.50	129.95
	(55.35)	(36.60)	(56.52)	(42.85)	(59.35)	(69.20)
Percent of land devoted to agriculture	60.22	60.99	67.60	36.82	63.46	62.56
	(20.32)	(15.87)	(15.45)	(18.49)	(21.33)	(15.00)
Percent black population	38.96	36.80	41.11	42.94	29.54	52.03
	(21.34)	(24.19)	(21.76)	(17.90)	(18.14)	(16.04)
n (1910-1940 county-years)	12,121	2,077	3,999	1,820	2,945	1,240

Notes: The table lists county-level mean statistics covering 1910-1940 with standard deviations in parentheses. †Summary statistics for Rosenwald data are limited to the years 1921-1933, when the Rosenwald school building campaign was active throughout these states. *Source:* The Fisk University Rosenwald Fund Database, authors' calculations, 1910-1940 U.S. Census returns, and numerous annual reports of states' Department of Education or equivalent office.

TABLE A3: Equation 2 Results: Impact of Private Rosenwald Contributions on Total Spending in African-American and White Public Schools By 1860 Black Population Shares, 1920 Black Literacy Rates and 1915 Black Enrollment Shares

	(1)	(2)	(3)	(4)
School Population	African-American	White	African-American	White
	Below-median counties	Below-median counties	Above-median counties	Above-median counties
Effect of R_{ct} on Total Spending,	1.059^{***}	1.350^{**}	0.647^{**}	1.657^{**}
by 1860 Black Population Shares	(0.181)	(0.631)	(0.282)	(0.725)
(median $= 0.375 - 0.618$)	[0.704, 1.414]	[0.113, 2.587]	[0.094, 1.200]	[0.236, 3.078]
Effect of R_{ct} on Total Spending,	1.020^{***}	1.662^{***}	0.484	0.499
by 1920 Black Literacy Rates	(0.126)	(0.497)	(0.403)	(1.149)
(median $= 0.527 - 0.670$)	[0.773, 1.267]	[0.688, 2.636]	[-0.306, 1.274]	[-1.753, 2.751]
Effect of R_{ct} on Total Spending,	0.747^{***}	0.434	1.051^{***}	2.638^{***}
by 1915 Black Enrollment Shares	(0.096)	(0.583)	(0.387)	(0.921)
(median $= 0.283 - 0.532$)	[0.559, 0.935]	[-0.709, 1.577]	[0.292, 1.810]	[0.833, 4.443]

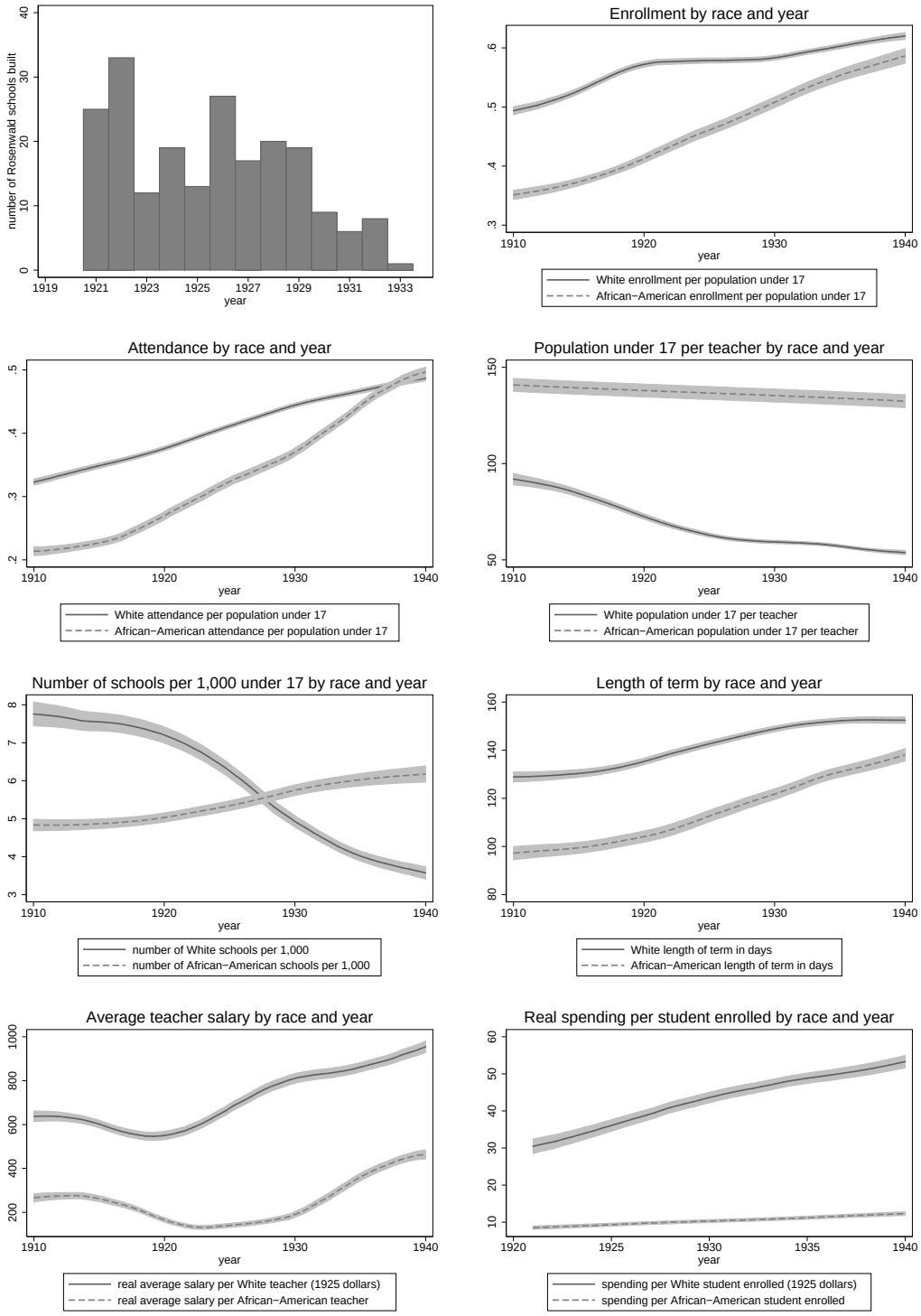
Notes: The table lists results from estimates of Equation 2, regressing changes in total spending for black and white public schools on current and lagged private contributions to Rosenwald schools. The estimating equation is

$\Delta Y_{ct}^{k} = \alpha^{k} \Delta R_{ct} + \sum_{s=1}^{5} \alpha_{-s}^{k} \Delta R_{c,t-s} + \Delta \mathbf{X}_{ct} \beta^{k} + \theta_{c}^{k} + \theta_{t}^{k} + \varepsilon_{ct}^{k}$

where Y_{ct}^{k} is change in primary and secondary school spending, by race. ΔR_{ct} represents the change in private Rosenwald contributions between years t and $t-1$. ΔX_{ct} contains lagged changes in black or white enrollment, lagged changes in school districtsŠ property tax revenues as reported in the schools data, as well as changes in interpolated population and agriculture data from decennial Censuses (total population, percent black, crop value per capita, and percent of land devoted to agriculture). θ_{c}^{k} is a county fixed effect and θ_{t}^{k} is a year fixed effect. The sample is bifurcated according to 1860 black population shares (a proxy for historical disenfranchisement), 1920 black literacy rates (proxying for contemporaneous political disenfranchisement), or 1915 black enrollment shares (measuring the density of black schooling prior to the Rosenwald campaign). Unlisted control variables include county fixed effects, year fixed effects, changes in enrollment (by race and lagged one year), and changes in Census variables (interpolated between decennial years: total population, black population share, crop value per capita, and percent of land devoted to agriculture). Spending regressions also control for changes in revenues from local taxes (lagged one year). Regressions are weighted by total, county-wide Rosenwald contributions from 1921-1933 and estimated with heteroscedasticity-robust standard errors clustered within counties. Standard errors are in parentheses below each expenditure coefficient and 95% confidence intervals are in brackets.

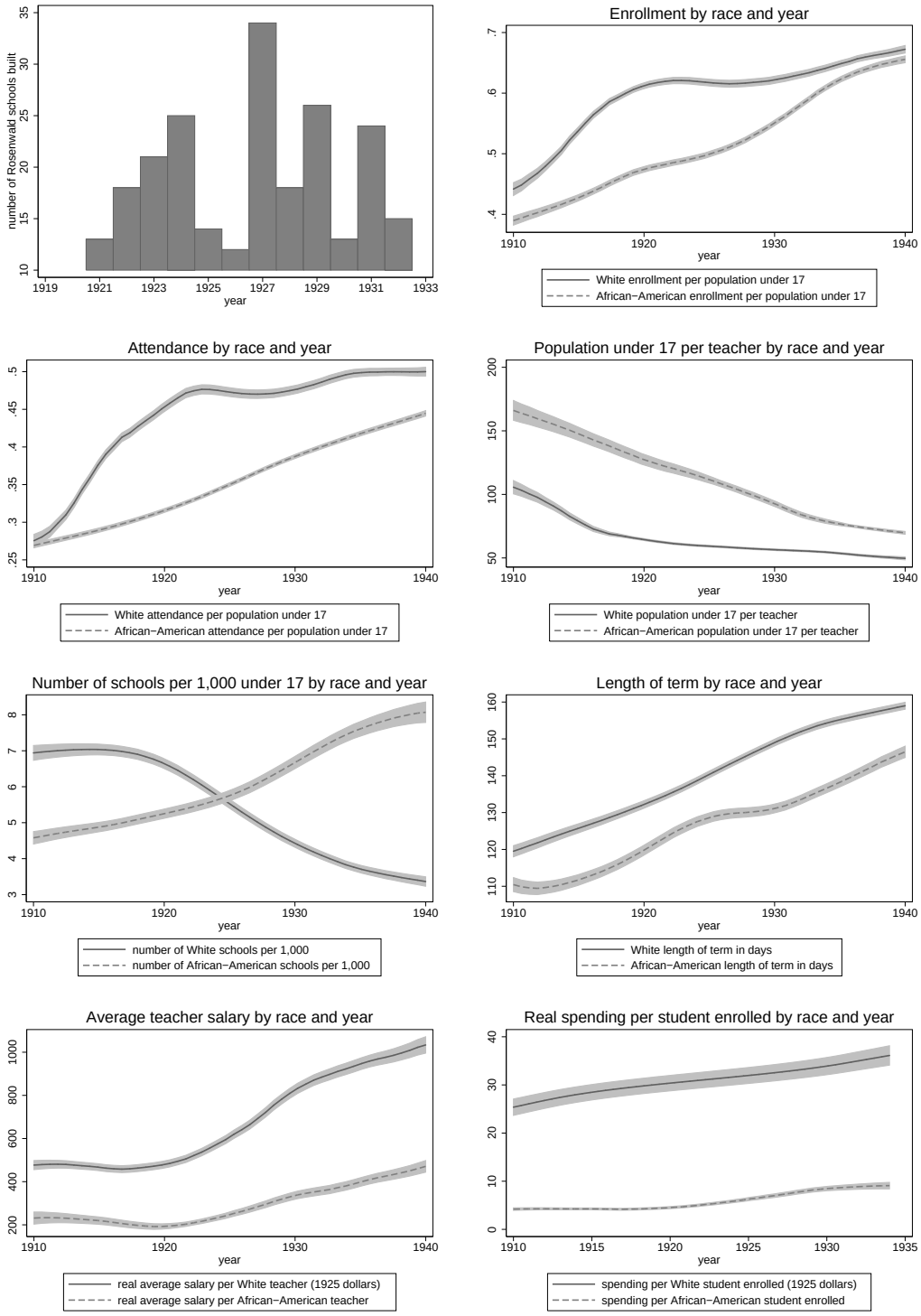
*** indicates statistical significance at 99% confidence (with respect to zero), ** at 95%, and * at 90%.

FIGURE A1: Rosenwald Schools and Education Statistics in Alabama, 1910-1940



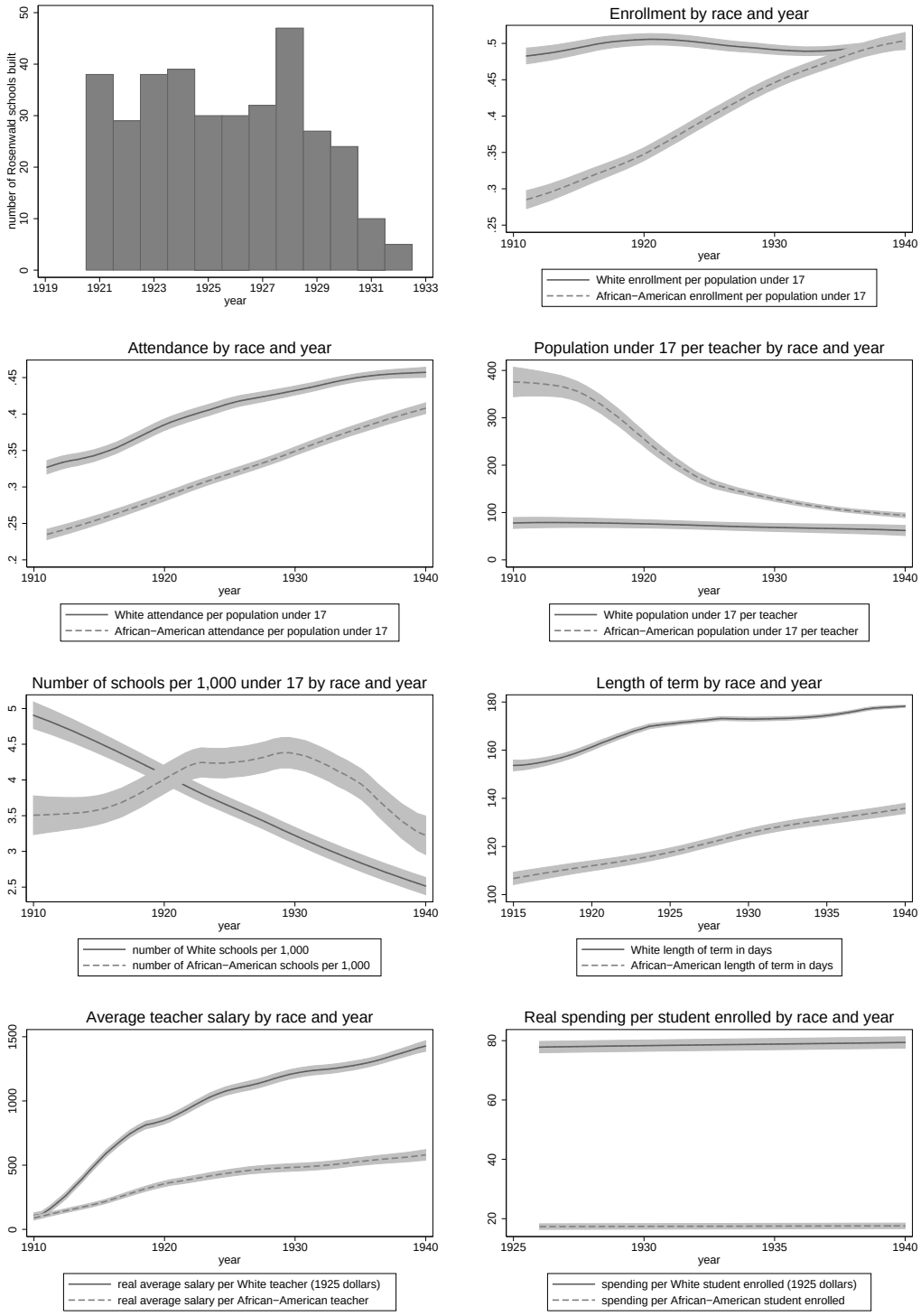
Source: Authors' calculations, numerous annual reports of states' Department of Education or equivalent office, and, for the upper-left figure, the Fisk University Rosenwald Fund Database. The last seven figures illustrate third-degree local polynomials of county-level statistics by year and race, with data weighted by the county-level population of white or black individuals under the age of 17.

FIGURE A2: Rosenwald Schools and Education Statistics in Georgia, 1910-1940



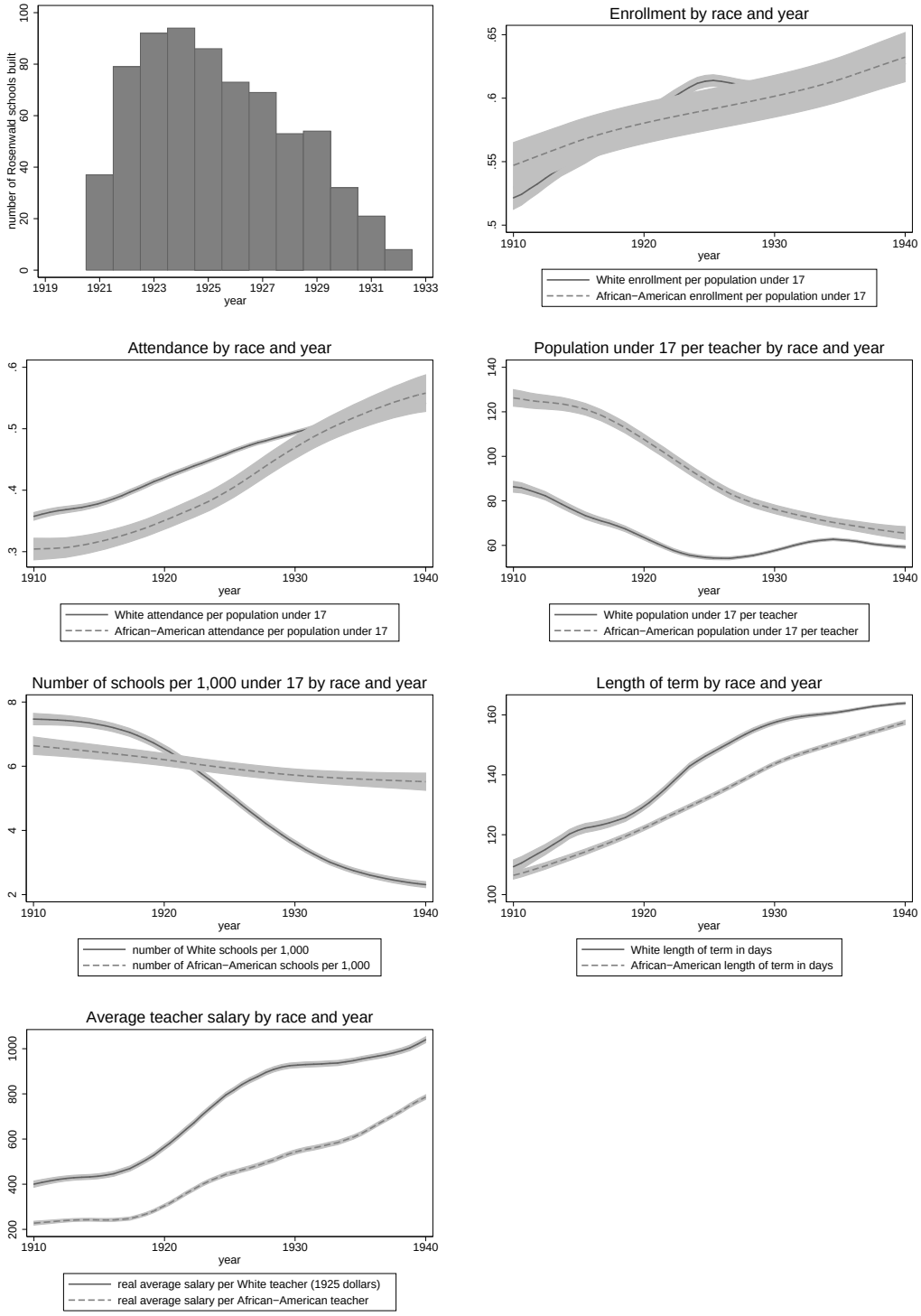
Source: Authors' calculations, numerous annual reports of states' Department of Education or equivalent office, and, for the upper-left figure, the Fisk University Rosenwald Fund Database. The last seven figures illustrate third-degree local polynomials of county-level statistics by year and race, with data weighted by the county-level population of white or black individuals under the age of 17.

FIGURE A3: Rosenwald Schools and Education Statistics in Louisiana, 1910-1940



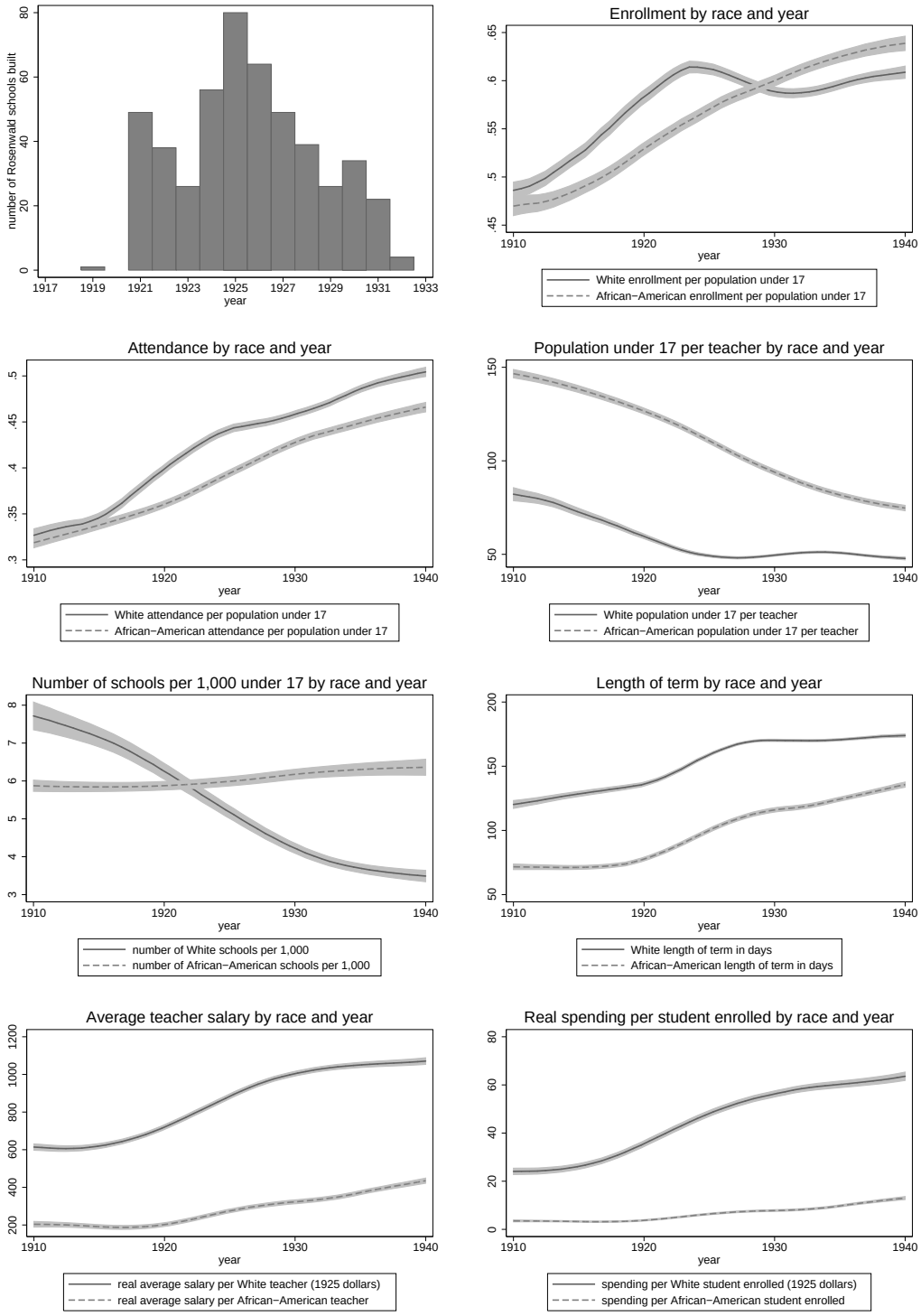
Source: Authors' calculations, numerous annual reports of states' Department of Education or equivalent office, and, for the upper-left figure, the Fisk University Rosenwald Fund Database. The last seven figures illustrate third-degree local polynomials of county-level statistics by year and race, with data weighted by the county-level population of white or black individuals under the age of 17.

FIGURE A4: Rosenwald Schools and Education Statistics in North Carolina, 1910-1940



Source: Authors' calculations, numerous annual reports of states' Department of Education or equivalent office, and, for the upper-left figure, the Fisk University Rosenwald Fund Database. The last seven figures illustrate third-degree local polynomials of county-level statistics by year and race, with data weighted by the county-level population of white or black individuals under the age of 17.

FIGURE A5: Rosenwald Schools and Education Statistics in South Carolina, 1910-1940



Source: Authors' calculations, numerous annual reports of states' Department of Education or equivalent office, and, for the upper-left figure, the Fisk University Rosenwald Fund Database. The last seven figures illustrate third-degree local polynomials of county-level statistics by year and race, with data weighted by the county-level population of white or black individuals under the age of 17.