Online Appendix

This document contains supplementary material to the paper "The headmaster ritual: The importance of management for school outcomes" by Anders Böhlmark, Erik Grönqvist and Jonas Vlachos.

Table A.1. Descriptive statistics of school manager observables

| | Principal level sample | | | |
| | Switchers | | Non-switchers | |
	Mean	St.dev.	Mean	St.dev.
Male	.579	.494	.447	.497
Year of birth	1951	6.951	1952	9.406
Seniority	**8.409**	**2.624**	**3.659**	**2.685**
Tenure	4.110	2.157	3.336	2.637
Cognitive ability	65.676	22.456	62.781	23.793
Leadership ability	64.374	28.527	62.865	28.119
High school GPA	68.147	25.744	66.619	25.253
Pedagogical education	.750	.433	.8259	.379
Bachelor's/Master's degree	.391	.488	.334	.472
Subject teacher	.153	.360	.177	.382
Years of post-secondary edu	1.93	.61	1.87	.69
Former army officer	.024	.152	.027	.163
Wage	7.898	.526	7.677	.830

Note: The "Principal level sample" refers to the set of principals who are observed in the matched sample, and where "Switchers" are observed in multiple schools with at least a two-year stay in at least two schools. t-ratio tests are used to test the null of equal means in the Switcher and Non-switchers distributions. Numbers in bold typeface indicate that this hypothesis is rejected at the 10 percent level.

Table A.2. Size distribution of school manager fixed effects: Non-clustered standard errors

	Adjusted standard deviation (clustered)	Adjusted standard deviation (not clustered)
Test scores	.119	.083
Final grades	.052	.041
Students passed	.021	.013
Grade inflation	.118	.073
Wage dispersion	.008	.008
Female teachers	.038	.031
Non certified teachers	.041	.032
Teacher retention	.051	.045
Long term sick absence	.021	.020

Note: The school manager fixed effects are retrieved from the regression model described in Section 3.1.. Data cover the years 1996-2008, except test scores which are only available from 2003 and sick-leave absence which is not available for 2008.

Table A.3. Size distribution of school manager fixed effects when excluding time-varying controls

	Median	Adjusted standard deviation	Unadjusted standard deviation
Test scores	-.0061	.160	.234
Final grades	-.0024	.075	.121
Students passed	-.0009	.027	.042
Grade inflation	.0121	.128	.172
Wage dispersion	.0018	.009	.015
Female teachers	.0002	.037	.043
Non certified teachers	.0005	.041	.049
Teacher retention	-.0028	.052	.102
Long term sick absence	.0035	.021	.037

Note: The school manager fixed effects are retrieved from fixed effects panel regressions. For each dependent variable (reported in columns) the regressions include school, year, principal and assistant principal fixed effects, but without school level controls. Column 2 reports the standard deviation of the fixed effects adjusted for estimation error, whereas column 3 reports the unadjusted standard error for the fixed effects.

Table A.4. Size distribution of school manager fixed effects adding a school specific linear trend

	Median	Adjusted standard deviation	Unadjusted standard deviation
Test scores	.0152	.093	.289
Final grades	.0014	.085	.129
Students passed	-.0001	.030	.046
Grade inflation	.0090	.074	.143
Wage dispersion	.0020	.005	.016
Female teachers	-.0015	.033	.040
Non certified teachers	.0012	.027	.045
Teacher retention	-.0046	.106	.133
Long term sick absence	-.0011	.023	.044

Note: The school manager fixed effects are retrieved from fixed effects panel regressions. For each dependent variable (reported in columns) the regressions include school, year, principal and assistant principal fixed effects, and school level controls and in addition a school specific linear trend. Column 2 reports the standard deviation of the fixed effects adjusted for estimation error, whereas column 3 report the unadjusted standard error for the fixed effects.

Table A.5. Size distribution of school manager fixed effects including county-by-year fixed effects

	P-value (on F-test)	Median	Adjusted standard deviation	Unadjusted standard deviation
Final grades	<0.0001	-.0018	.043	.127
Students passed	<0.0001	-.0017	.020	.045
Wage dispersion	<0.0001	.0011	.007	.017
Female teachers	<0.0001	.0018	.035	.046
Non certified teachers	<0.0001	-.0001	.040	.053
Teacher retention	<0.0001	.0002	.080	.119
Long term sick absence	<0.0001	.0043	.024	.044

Note: The fixed effects are retrieved from the baseline regression model (described in Section 3.1) with added county by year FE. We have only performed this sensitivity analysis for the outcomes that we observe for the full period 1996-2008. Column 1 reports the P-values of F-tests for joint significance of the school manager fixed effects. Column 2 reports the median fixed effect for each outcome variable. Column 3 reports the standard deviation of the fixed effects adjusted for estimation error, whereas column 4 reports the unadjusted standard error for the fixed effects. Data cover the years 1996-2008. Standard errors are corrected for clusters on school level.

Table A.6. Effects of school manager tenure

	(1) Test scores	(2) Final grades	(3) Students passed	(4) Grade inflation	(5) Wage dispersion	(6) Female teachers	(7) Non-cert teachers	(8) Teacher retention	(9) Long-term sick absence
1st year	0.007	0.004	0.001	0.003	0.001	-0.002	0.003	-0.006	0.002
	(0.012)	(0.006)	(0.002)	(0.005)	(0.001)	(0.001)	(0.002)+	(0.004)	(0.002)
2nd year	0.024	0.005	0.000	0.000	-0.000	-0.002	0.002	-0.010	0.000
	(0.014)+	(0.005)	(0.002)	(0.006)	(0.001)	(0.001)+	(0.002)	(0.005)*	(0.002)
Obs	2474	8847	8847	7902	8847	8847	8847	8847	8089
Adj R2	0.77	0.77	0.87	0.60	0.44	0.81	0.80	0.28	0.50

Note: Reported in the table are the results from fixed effects panel regressions. For each dependent variable (reported in columns) the regressions include school, year, principal and assistant principal fixed effects, as well as school level controls. In addition indicators for the school managers first and second at a school are included. Robust standard errors correcting for clusters on the school level are reported in parenthesis. +/*/** significant at 10/5/1 percent level

Table A.7. Placebo estimates of school manager fixed effects when randomly allocating principal spells to schools (100 repetitions)

	Mean of Unadjusted standard deviation	Std. dev. of Unadjusted standard deviation	Mean (std. dev.) of p-value of joint significance of the manager fixed effects	Mean of adjusted standard deviation	Calculated sampling bias (Unadjusted-Adjusted std. dev. of main est. of Tab.4)
Test scores	.127	.006	.46 (.32)	.000	.092
Final grades	.063	.004	.87 (.26)	.000	.053
Students passed	.021	.001	.97 (.11)	.000	.017
Grade inflation	.072	.002	.90 (.16)	.000	.032
Wage dispersion	.009	.000	.89 (.23)	.000	.007
Female teachers	.019	.000	.92 (.13)	.000	.006
Non certified teachers	.022	.001	.87 (.16)	.000	.008
Teacher retention	.064	.002	.79 (.23)	.000	.051
Long term sick absence	.021	.001	.94 (.11)	.000	.016

Note: Reported in the table are the results from fixed effects panel regressions where principal spells are randomly allocated to schools. This is repeated 100 times. Column 1, reports the mean of the unadjusted standard deviations of the resulting principal fixed effects and column 2 the standard deviation of the unadjusted standard deviation. Column 3 reports the mean (standard deviation) of F-tests of joint significance of the principal fixed effects. Column 4 reports the mean of the adjusted standard deviation of the placebo school manager fixed effects when randomly allocating principal spells to schools. Column 5 shows the calculated sampling bias in main estimates based on the difference between unadjusted and adjusted principal effects in Table 4. The statistics reported in the first row are based on data from 2003-2008 and the other statistics are based on data from 1996-2007 since data on sick absence are not yet available for 2008. Standard errors are corrected for clusters on school level.