# Colonial Administrators and Public Educational Investments in French West Africa

Christine Cai

Sciences Po

July 20, 2015

Christine Cai (Sciences Po)

M2 EPP - Master's Thesis Defense

## Introduction

#### Motivation:

- > 24 of today's 30 poorest countries are located in Africa.
- To what extent can history, and in particular, colonial rule and institutions explain Africa's heterogeneous but overall poor economic performance?

#### • Research question of this paper:

What is the influence of colonial administrators on public investments in education during the colonial period in French West Africa?

# Introduction (cont'd)

#### • Literature review and contributions:

- Extend the analysis of Huillery (2009).
- Newly collected matched district-administrator database.
- Bring methods focused on individual fixed effects (FE) into the literature in economic history and development economics.
  - ★ Spell method (Graham, Li, and Qiu, 2012)
    - $\rightarrow$  whole sample
  - \* AKM method (Abowd et al., 1999; Yao and Zhang, 2015)
    - $\rightarrow$  "connected sample"
  - \* Three-way FE method (Bertrand and Schoar, 2003)
    - $\rightarrow$  "mobile sample"

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# Introduction (cont'd)

#### • Preview of the results:

- Administrator FE explain at most 22% of the variation in educational investments, and less than 2% once district FE are included in the analysis.
- Importance of district FE.
- Some evidence (though not causal) that the administrator effects are driven by a good matching between administrators and their districts.
- Heterogeneous administrator FE.
- $\Rightarrow$  Hypothesis of a path dependence in the investment strategy.

#### Historical Background

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#### • Geography and brief history:

- French West Africa's colonial period: 1895-1960.
- The federation of French West Africa divided into 8 colonies. themselves split into districts: 120 districts in 1925. Map
- Administrative organisation: officially centralized but
  - Administrators = "the real chiefs of the French empire"
  - Heterogeneity in the body of colonial administrators.

## Historical Background

#### • Geography and brief history:

- French West Africa's colonial period: 1895-1960.
- The federation of French West Africa divided into 8 colonies, themselves split into districts: 120 districts in 1925. Map
- Administrative organisation: officially centralized but effectively decentralized.
  - Administrators = "the real chiefs of the French empire" (Delavignette, 1939), "omnipresent and omnipotent" (El Mechat, 2009), due to physical distance and communication difficulties ⇒ variation in colonial policies across districts.
  - Heterogeneity in the body of colonial administrators.

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## Data: Outcome and Control variables

- Datasets from Huillery (2009, 2011, and 2014) and the *Annuaires du Gouvernement général de l'A.O.F.*.
- Outcome variable: district-level investments in education, as proxied by the number of teachers per 100,000 inhabitants.
- Control variables: Summary Statistics
- District-level data over the 1910-1928 period.
- Unit of observation = year-district-administrator combination.
- Keep track of districts by using those of 1925 as a reference.

# District-Administrator Matched Data (1/4)

- Data from the official journals: 1906-1929 period for all colonies, except Mauritania and Niger.
- Summary statistics (without extrapolations): Full Table

Statistics	Initial Sample	Reference Sample
Observations	3,678	3,154
Administrators	749	683
of which temporary	267	248
Districts	127	92
Avg length of stay	11.5	11
w/o temp. admin.	14.9	14.8
Avg length of spells	12.2	12.5
w/o temp. admin.	16.7	17.0

# District-Administrator Matched Data (2/4)

#### • Entries and attrition:

Figure 2: Share of administrators' entries and exits, by year.



• Average presence in the sample: 6 years. • Table

## District-Administrator Matched Data (3/4)

#### • Random assignment: • Table: by month • Table: immediate switches

- Most switches happen upon administrators' returns from their leaves or the arrivals of new administrators.
- Returns (13.5%) were relatively more frequent in Senegal, Dahomey, and Ivory Coast, but less frequent in Sudan.
- Switches between the "most prestigious" colonies and the "less prestigious" ones are not frequent. Table
- $\Rightarrow$  The allocation of administrators across colonies is not completely random.

# District-Administrator Matched Data (4/4)

#### • Sample selection:

Table 7: Sample comparisons.										
	Initial	Reference	Mobile	p-values						
	(1)	(2)	(3)	(1)-(2)	(1)-(3)	(2)-(3)				
Avg nb of spells by admin.	5.0	4.6	3.2	0.00	0.00	0.00				
	(3.64)	(3.19)	(1.33)							
Avg nb of colonies by admin.	1.4	1.3	1.5	0.14	0.29	0.05				
	(0.71)	(0.65)	(0.65)							
Avg nb of districts by admin.	2.3	2.3	2.6	0.45	0.16	0.04				
	(1.97)	(1.77)	(0.86)							
Avg admin.'s presence (in years)	5.9	5.6	5.8	0.46	0.91	0.75				
	(6.12)	(6.00)	(3.65)							
Avg share of movers per district	0.78	0.78	1.00	1.00	0.00	0.00				
	(0.19)	(0.17)	(0.00)							
Avg nb of admin. by districts	16.1	19.3	4.0	0.00	0.00	0.00				
	(7.39)	(4.27)	(2.03)							
Avg length of spells (in months)	16.7	16.8	19.3	0.80	0.00	0.00				
	(9.77)	(9.83)	(10.86)							
1910-1914 period	10.6	10.7	15.8	0.90	0.00	0.00				
	(9.39)	(9.39)	(9.64)							
1915-1919 period	13.0	14.0	20.5	0.99	0.00	0.00				
	(12.84)	(13.60)	(13.73)							
1920-1928 period	13.13	13.08	19.45	0.92	0.00	0.00				
	(10.28)	(10.04)	(8.08)							
Nb of observations	4,443	3,789	516	-	-	-				
Nb of admin.	878	788	129	-	-	-				
Nb of districts	127	92	83	-	-	-				

Notes: the last three columns display the p-values for the test the null hypothesis that the differences are significantly different from zero. In the first three columns, the parentheses contain standard deviations,

Here, I did not exclude the extrapolations in the initial and reference samples, which explains why the numbers

differ from Table 3.

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July 20, 2015 10 / 21

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## Empirical Strategy: Fixed-Effects Methods (1/3)

• LSDV methods to estimate the following 3-way FE model:

$$y_{adt} = X_{at}\beta + W_{dt}\gamma + \alpha_a + \delta_d + \tau_t + \epsilon_{adt}$$

- $y_{adt}$  : number of teachers per 100,000 inhabitants.
- ► X<sub>at</sub> : time-variant administrator-specific characteristics.
- ► *W<sub>dt</sub>* : time-variant district-specific characteristics.
- $\alpha_a$  : administrator FE.
- $\delta_d$  : district FE.
- $\tau_t$  : year FE.
- $\epsilon_{adt}$  : error term, assumed to be strictly exogenous, i.e.,

$$E[\epsilon_{adt}|X_{at}, W_{dt}, \alpha_a, \delta_d, \tau_t] = 0$$

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# Empirical Strategy: Fixed-Effects Methods (2/3)

- Main advantage of the 3-way FE model:
  - It reduces considerably the threat of omitted-variable bias.
- Potential drawback:
  - Impossible to estimate the effect of variables that have little within-group variation.
- Hence, estimate a 2-way FE model, replacing the district FE by time-constant observable district-level variables (*Q<sub>d</sub>*):

$$y_{adt} = X_{at}\beta + W_{dt}\gamma + Q_d\rho + \alpha_a + \tau_t + \nu_{adt}$$

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- Potential drawback of the 2-way FE model:
  - Cannot control for all the time-constant district characteristics.
  - Greater threat of omitted-variable bias.
- If perfect random allocation of administrators across districts  $\Rightarrow$  2-way FE  $\simeq$  3-way FE.
- Despite the weaknesses of each model:
  - $\blacktriangleright$  3-way FE model  $\rightarrow$  lower bound of the administrator FE.
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- 3-way FE: imprecise estimation of the district FE if districts do not have enough administrators who join or leave. Table
- Both: imprecise estimation of the administrator FE if relatively few periods per administrator.
- Impossible to estimate the FE for the administrators who have been observed only once, because of perfect collinearity.
- Thus, restrict the sample to the "movers" ⇒ separate identification of the administrator and district FE.
- However, (i) it may affect the generalizability of the results, and (ii) we can identify only the differences in these fixed effects, not their magnitudes.

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### Empirical Strategy: Test Strategies

• *R*-squared of the 3-way FE model:

$$R^{2} = \frac{cov(y_{adt}, \hat{y}_{adt})}{var(y_{adt})} = \frac{cov(y_{adt}, X_{at}\hat{\beta} + W_{dt}\hat{\gamma} + \hat{\alpha}_{a} + \hat{\delta}_{d} + \hat{\tau}_{t} + \hat{\epsilon}_{adt})}{var(y_{adt})}$$

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$$+ \frac{cov(y_{adt}, \hat{\tau}_{t})}{var(y_{adt})} + \frac{cov(y_{adt}, \hat{\epsilon}_{adt})}{var(y_{adt})}$$

• 
$$F$$
 test  $\rightarrow$   $H_0$  :  $\sum \alpha_a = 0$ 

 Set the mean of α<sub>a</sub> to 0 and test the null hypothesis that the normalized administrator FE are jointly and significantly different from 0 (i.e., they are not different from the average effect).

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## Empirical Results: Baseline Results (1/2)

Estimation technique $\rightarrow$	3-way FE method 2-way FE method					d		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>p</i> -value for $\sum lpha_a = 0$	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.925	0.925	0.927	0.927	0.656	0.666	0.663	0.675
Share of $R^2$ due to $\hat{\alpha}_a$	0.019	0.017	0.007	0.006	0.216	0.174	0.190	0.141
Share of $R^2$ due to $\hat{\delta}_d$	0.901	0.899	0.868	0.866	-	-	-	-
$\operatorname{Corr}(\hat{\delta}_d,  \hat{\alpha}_a)$	-0.19*	-0.20*	-0.21*	-0.21*	-	-	-	-
Admin. time-variant var.	No	Yes	No	Yes	No	Yes	No	Yes
District time-variant var.	No	No	Yes	Yes	No	No	Yes	Yes
District time-constant var.	No	No	No	No	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	No	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Admin. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	516	516	516	516	516	516	516	516
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Table 8: LSDV Regression Results: 3-way FE vs. 2-way FE methods.

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# Empirical Results: Baseline Results (2/2)

- *F* tests for the joint significance of the time-demeaned administrator FE in the 3-way FE regressions: very high *p*-values (greater than 0.8).
- The administrators of a given district are, on average, not different from the typical administrator of that district regarding the decisions related to public investments in education.
- Could suggest a path dependence in the investment strategy.
- Distribution of the normalized administrator FE. Figure

### Empirical Results: Heterogeneous Admin. Effects

- Decompose the administrator FE by (collectively exhaustive and mutually exclusive) subgroups of FE:
  - Administrators' rank:

 $\alpha_{a} \equiv \alpha_{chief} + \alpha_{admin} + \alpha_{assistant} + \alpha_{military} + \alpha_{CS} + \alpha_{IA}$ 

Administrators' cohort:

$$\alpha_{a} \equiv \alpha_{earliest} + \alpha_{early} + \alpha_{middle} + \alpha_{late}$$

Administrators' returns:

$$\alpha_a \equiv \alpha_{returned} + \alpha_{noreturn}$$

Colonial school's alumni:

$$\alpha_a \equiv \alpha_{ENFOM} + \alpha_{notENFOM}$$

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Estimation technique $\rightarrow$		3-way FE method				2-way FE method			
	Ν	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Administrators' rank:		. ,			. /	. /			
- Chief Administrator	17	0.114	0.120	0.163	0.166	0.320	0.396	0.310	0.360
- Administrator	88	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.007
- Assistant Administrator	17	0.297	0.404	0.477	0.503	0.024	0.123	0.030	0.099
- Military Men	5	0.008	0.004	0.012	0.017	0.108	0.034	0.033	0.020
B. Administrators' cohort:									
- Earliest (1906-1909)	71	0.002	0.001	0.032	0.036	0.000	0.001	0.001	0.148
- Early (1910-1914)	41	0.127	0.068	0.400	0.380	0.000	0.005	0.000	0.071
- Middle (1915-1919)	13	0.420	0.385	0.125	0.117	0.040	0.005	0.010	0.002
- Late (1920-1928)	2	0.156	0.124	0.211	0.215	0.271	0.009	0.418	0.729
C. Administrators' returns:									
- With returns	51	0.004	0.006	0.021	0.028	0.000	0.000	0.000	0.002
- No returns	76	0.000	0.004	0.019	0.022	0.002	0.194	0.063	0.335
D. ENFOM alumni:									
- ENFOM alumni	19	0.074	0.162	0.137	0.183	0.001	0.000	0.010	0.008
- Not ENFOM alumni	108	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Admin. time-variant var.		No	Yes	No	Yes	No	Yes	No	Yes
District time-variant var.		No	No	Yes	Yes	No	No	Yes	Yes
District time-constant var.		No	No	No	No	Yes	Yes	Yes	Yes
District FE		Yes	Yes	Yes	Yes	No	No	No	No
Year FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Administrator FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations		516	516	516	516	516	516	516	516

Table 9: Empirical Results:	Heterogeneous	Administrator	Effects
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- Randomness of attrition: correlation between the dummy 1{a leaves the sample in year t} and the residuals → statistically insignificant ⇒ attrition is orthogonal to the erratum.
- Normalization by the population of 1925: results with similar patterns as the baseline ones. Table
- Without districts with many returns (5 or more): Table
  - Greater contribution of the admin. FE (8% to 11.5%).
  - ▶ Higher *R*<sup>2</sup> in the 2-way FE estimations.
  - Districts with many returns partly drove the results, but cannot fully account for the non-random allocation.
- Other subsamples: Table: Comparison Table: Results Figures: Distributions
  - Results not significantly altered, except a higher contribution of the admin. FE for the S2 subsamples (0.216 vs 0.143).

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# **Concluding Remarks**

- Examine the role of colonial district administrators on educational investments in French West Africa.
- Findings:
  - Administrator FE have little explanatory power for the variance in public educational investments → contribute up to 22% in the variation, but at most 2% once district FE are included.
     ⇒ The matches between administrators and districts matter more than the intrinsic administrators' time-constant characteristics, such as their education level.
  - Heterogeneous effects support the idea of a path dependence in the policy strategy in investments in human capital.
- Potential limitations: measurement error & sample selection
   → generalizability of the results.

#### THANK YOU FOR YOUR ATTENTION!

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- Findings:
  - Administrator FE have little explanatory power for the variance in public educational investments → contribute up to 22% in the variation, but at most 2% once district FE are included.
     ⇒ The matches between administrators and districts matter more than the intrinsic administrators' time-constant characteristics, such as their education level.
  - Heterogeneous effects support the idea of a path dependence in the policy strategy in investments in human capital.
- Potential limitations: measurement error & sample selection
   → generalizability of the results.

THANK YOU FOR YOUR ATTENTION!

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Note: Senegal is colored in brown, Mauritania in yellow, French Guinea in dark blue, French Sudan in fuschia, Ivory Coast in green, Upper Volta in red, and Niger in cyan. Source: Huillery (2006)



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July 20, 2015 21 / 21

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Appendix

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Variables	mean	std. dev.	min.	max.
Districts' characteristics:				
Number of teachers per 100,000 inhabitants	4.6	10.5	0	157.5
Colony order	3.4	1.6	1	6
District order	0.7	0.3	0.3	1
District population	255854	439036	4444	1824954
Rainfalls (mm)	1262.4	673.6	225	3248
Altitude (feet)	895.9	615.3	0	3044
Latitude	11.2	3	4.8	16.8
Longitude	-7.3	4.7	-17	2.6
Year of the last military intervention before				
final submission	1900	14	1858	1930
Access to the sea $(=1)$	0.1	0.4	0	1
Distance of the main city to the coast (km)	497.9	351.4	0	1,300
Presence of an important river $(=1)$	0.7	0.4	0	1
Year of colonial conquest's start	1880	11.5	1854	1894
Local resistance length (years)	19.5	10.6	0	42
European trade counter $(=1)$	0	0.2	0	1
Centralized political power (=1)	0.5	0.5	0	1
Acephalous society before the colonial conquest $(=1)$	0.1	0.3	0	1
Administrators' characteristics:				
Administrators' experience (months)	37.6	29.2	0	157
Rank type	4.8	0.7	1	6
Number of spells	6.5	3.2	1	22
Former pupil of the colonial school (=1)	0.2	0.4	0	1
Administrators' length in the sample (months)	156.4	68.6	4	297
Observations		516	3	

Table 2: Outcome and control variables: summary statistics.

Christine Cai (Sciences Po)

July 20, 2015 21 / 21

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	Init	tial Sar	nple	Reference Sample			
Length	freq.	%	mean	freq.	%	mean	
[0,4]	168	22.4	2.0	157	23.0	1.9	
(4,12]	264	35.2	8.4	238	34.8	8.4	
(12,24]	254	33.9	16.8	230	33.7	17.0	
(24, 36]	39	5.2	28.5	39	5.7	28.1	
(36, 53]	24	3.2	50.4	19	2.8	49.5	
Total	749	100	11.5	683	100	11.0	
of which temporary	267	35.6	4.9	234	34.2	4.8	

#### Table 3: Average length of administrators' stays and average spells. Panel A. Average length of stay of administrators (in months)

Panel B. Average length of spells (in months)

	Initial Sample			Refer	ence S	ample
Length	freq.	%	mean	freq.	%	mean
[0,4]	544	28.5	2.0	459	27.5	2.0
(4, 12]	598	31.3	8.2	522	31.2	8.3
(12, 24]	528	27.7	18.0	471	28.2	18.1
(24, 36]	185	9.7	28.6	166	9.9	28.6
(36, 69]	54	2.8	45.5	54	3.2	45.4
Total	1,909	100	12.2	1,672	100	12.5
of which temporary	618	32.4	2.6	523	31.3	2.6

Notes: The reference sample contains the districts as of 1925. When districts merged before 1925, I kept the district with the largest population as a reference.

#### Return

July 20, 2015 21 / 21

Table B4. Length of administrators' presence in the initial sample.

Length	%	cum.	
Less than 1 year	27.3	27.3	
1-2 years	13.1	40.4	
2-3 years	8.3	48.7	
3-5 years	9.6	58.3	
5-10 years	18.4	76.7	
10-15 years	11.2	87.9	
15-20 years	9.6	97.5	
20-25 years	2.5	100.0	
Average (in years)	5.9		



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	Long	$Spells^a$	All S	pells
	freq.	%	freq.	%.
January	96	11.9	225	11.5
February	74	9.2	147	7.5
March	81	10.0	170	8.7
April	65	8.0	178	9.1
May	61	7.5	190	9.7
June	71	8.8	189	9.7
July	67	8.3	169	8.7
August	57	7.1	151	7.7
September	54	6.7	128	6.6
October	59	7.3	117	6.0
November	58	7.2	137	7.0
December	58	7.2	142	7.3
Total	801	100	1,943	100

Table B1. Distribution of switches, by month

<sup>a</sup>Sample with long spells only, i.e. those that last for at least one year. Note also that both samples do not include extrapolations.

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	$\underline{\operatorname{Returns}^{a}}$		Many	$\operatorname{Returns}^{b}$
	freq.	%	freq.	%
Ivory Coast	60	14.7	18	30.0
Dahomey	54	15.7	32	59.3
French Guinea	63	12.0	31	49.2
Haut-Senegal-Niger	57	13.2	18	32.1
Upper Volta	12	12.0	3	25.0
Senegal	57	16.4	29	50.9
French Sudan	14	7.7	4	26.7

#### Table 4: Share of returns across colonies.

<sup>a</sup>The observations in a given colony with at least 1 return of an administrator to a district of which he was previously in charge.

 $^{b}$ The observations in a given colony with at least 5 returns of administrators that have previously been assigned to a district of that colony.

To $\rightarrow$	Ivory Coast	Dahomey	Guinea	Upper Volta	Senegal	Sudan	Leave
From $\downarrow$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Ivory Coast	0.41	0.05	0.16	0.06	0.08	0.16	0.09
Dahomey	0.08	0.43	0.14	0.09	0.09	0.09	0.08
French Guinea	0.13	0.10	0.39	0.07	0.11	0.13	0.07
Upper Volta	0.11	0.09	0.14	0.16	0.03	0.36	0.11
Senegal	0.08	0.09	0.16	0.05	0.35	0.21	0.06
French Sudan	0.11	0.04	0.13	0.18	0.12	0.33	0.08

Table 6: Share (%) of administrators' next move across colonies.

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To $\rightarrow$	Ivory Coast	Dahomey	Fr. Guinea	Upper Volta	Senegal	Fr. Sudan
From $\downarrow$	(1)	(2)	(3)	(4)	(5)	(6)
Ivory Coast	-	8.1%	12.9%	11.0%	6.2%	17.2%
	(209)	(17)	(27)	(23)	(13)	(36)
Dahomey	13.4%	-	17.3~%	8.7%	12.6%	18.1%
·	(17)	(127)	(22)	(11)	(16)	(23)
French Guinea	13.2%	10.8%	-	11.8%	13.2%	19.1%
	(27)	(22)	(204)	(24)	(27)	(39)
Upper Volta	16.8%	8.0%	17.5%	-	6.6%	34.3%
	(23)	(11)	(24)	(137)	(9)	(47)
Senegal	9.7%	11.9%	20.1%	6.7%	-	23.9%
	(13)	(16)	(27)	(9)	(134)	(32)
French Sudan	13.3%	8.5%	14.4%	17.4%	11.9%	_
	(36)	(23)	(39)	(47)	(32)	(270)

Table 5: Share (%) and number of administrators' switches across colonies.

Notes: Parentheses contain the corresponding number of administrators. Column 1 row 2 should be read as follows: among all the administrators that were observed in Dahomey during the 1906-1929 period, 13.4% were also observed in Ivory Coast.

#### Return

Christine Cai (Sciences Po)

M2 EPP - Master's Thesis Defense

July 20, 2015 21 / 21





3

#### Colonial Administrators and Public Educational Investments Appendix

Table B5. Robustness Checks Results: Normalized Outcome variable.										
Estimation technique $\rightarrow$	3-w	ay FE n	nethod	l	2-1	2-way FE method				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		
<i>p</i> -value for $\sum \alpha_a = 0$	0.000	0.000	-	-	0.000	0.000	-	-		
R-squared	0.941	0.945	-	-	0.756	0.774	-	-		
Share of $R^2$ due to $\hat{\alpha}_a$	0.018	0.018	-	-	0.180	0.170	-	-		
Share of $R^2$ due to $\hat{\delta}_d$	0.914	0.927	-	-	-	-	-	-		
$\operatorname{Corr}(\hat{\delta}_d,  \hat{\alpha}_a)$	-0.16*	-0.17*	-	-	-	-	-	-		
Admin. time-variant var.	No	Yes	No	Yes	No	Yes	No	Yes		
District time-variant var.	No	No	Yes	Yes	No	No	Yes	Yes		
District time-constant var.	No	No	No	No	Yes	Yes	Yes	Yes		
District FE	Yes	Yes	Yes	Yes	No	No	No	No		
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Admin. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Number of observations	582	582	-	_	582	582	-	_		

Table B5. Robustness	Checks Results:	Normalized (	Outcome	Variable.
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Notes: The dependent variable is the number of teachers per district normalized by the population as in 1925. The results shown are p-values, except for the row  $\operatorname{Corr}(\hat{\delta}_d, \hat{\alpha}_a)$ , which corresponds to the correlation between the estimated administrator FE and district FE; the presence of a star indicates that the correlation is

statistically significant at the 1% level. Heteroskedasticity is accounted with robust standard errors. Columns (3)-(4) and (7)-(8) do not display any results because there are too many parameters to estimate and when performing the joint significance test on administrator FE, Stata automatically dropped several constraints.

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Estimation technique $\rightarrow$	3-way FE method 2-way FE method						2 metho	od	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
<i>p</i> -value for $\sum \alpha_a = 0$	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
R-squared	0.862	0.863	0.870	0.871	0.796	0.798	0.802	0.803	
Share of $R^2$ due to $\hat{\alpha}_a$	0.115	0.113	0.080	0.094	0.233	0.229	0.170	0.167	
Share of $R^2$ due to $\hat{\delta}_d$	0.682	0.678	0.580	0.578	-	-	-	-	
$\operatorname{Corr}(\hat{\delta}_d,  \hat{\alpha}_a)$	-0.41*	-0.42*	-0.31*	-0.36*	-	-	-	-	
Admin. time-variant var.	No	Yes	No	Yes	No	Yes	No	Yes	
District time-variant var.	No	No	Yes	Yes	No	No	Yes	Yes	
District time-constant var.	No	No	No	No	Yes	Yes	Yes	Yes	
District FE	Yes	Yes	Yes	Yes	No	No	No	No	
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Admin. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Number of observations	423	423	423	423	423	423	423	423	

	Table	10:	Robustness	Checks	Results:	Without	The	Districts	With	Manv	Returns
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Notes: Heteroskedasticity is accounted with robust standard errors. The dependent variable is the number of teachers per 100,000 inhabitants per district. The results shown are *p*-values, except for the row  $\text{Corr}(\delta_d, \hat{\alpha}_a)$ , which corresponds to the correlation between the estimated administrator FE and district FE; the presence of a star indicates that the correlation is statistically significant at the 1% level.

#### Return

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Sample	Nb of obs.	Nb of admin.	Nb. of districts	% "long admin."					
S1pop	516	128	83	63.6					
S2pop	514	132	84	68.9					
S3pop	511	128	83	64.2					
S4pop	457	119	80	63.7					
S1dis	516	129	83	63.6					
S2dis	513	132	84	69.0					
S3dis	513	129	83	64.1					
S4dis	461	119	80	63.8					

#### Table B6. Simple Comparison Across Samples

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Table Di	Table D1. Robusticos Checks Results. Different Subsamples.							
$\text{Subsample} \rightarrow$	S1pop	S2pop	S3pop	S4pop	S1dis	S2dis	S3dis	S4dis
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. 3-way FE methods								
<i>p</i> -value for $\sum \alpha_a = 0$	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.927	0.930	0.927	0.969	0.926	0.931	0.927	0.968
Share of $R^2$ due to $\hat{\alpha}_a$	0.006	0.022	0.006	0.002	0.000	0.021	0.004	0.001
Share of $R^2$ due to $\hat{\delta}_d$	0.866	0.868	0.865	0.898	0.870	0.871	0.867	0.898
$\operatorname{Corr}(\hat{\delta}_d,\hat{lpha}_a)$	-0.21*	-0.12*	-0.23*	-0.38*	-0.25*	-0.12*	-0.22*	-0.36*
B. 2-way FE methods								
<i>p</i> -value for $\sum lpha_a = 0$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
R-squared	0.674	0.708	0.690	0.673	0.674	0.708	0.690	0.673
Share of $R^2$ due to $\hat{\alpha}_a$	0.143	0.216	0.171	0.122	0.144	0.216	0.171	0.122
Number of observations	516	514	511	457	516	513	513	461

Table B7. Robustness Checks Results: Different Subsamples.

Notes: The dependent variable is the number of teachers per 100,000 inhabitants per district. The administrator and district time-variant control variables are included in all specifications. The two-way FE estimations include the district time-constant covariates as well. The row  $Corr(\hat{d}_a, \hat{\alpha}_a)$  shows the correlation between the estimated administrator FE and district FE; the presence of a star indicates that the correlation is statistically significant at the 1% level. Heteroskedasticity is accounted for with robust standard errors.

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M2 EPP - Master's Thesis Defense

July 20, 2015 21 / 21

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Nb of	districts	admin. are assigned to:
#	freq.	%
2	78	60.94
3	29	22.66
4	17	13.28
5	2	1.56
6	2	1.56
Total	128	100.00
N	b of obs	. per administrator:
#	freq.	%
2	32	25.00
3	29	22.66
4	25	19.53
5	18	14.06
6	12	9.38
7	6	4.69
8	2	1.56
9	1	0.78
10	2	1.56
16	1	0.78
Total	128	100.00





Appendix



Figure A2. Number of ENFOM alumni,<sup>a</sup> by year (1895-1963)

<sup>a</sup>This chart shows the annual number of the alumni of the colonial school ENFOM who were reported to be district administrators in French West Africa (see Appendix C).

21 / 21

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	Number of returns $\rightarrow$	0	1	2	3	4	<b>5</b>	6	7	8	
	Ivory Coast	3	2	6	4	4	2	0	0	1	
	Dahomey	0	4	1	4	1	1	3	1	1	
	French Guinea	7	6	<b>5</b>	4	1	<b>2</b>	<b>2</b>	0	0	
	Haut-Senegal-Niger	6	6	5	8	1	0	1	0	1	
	Upper Volta	3	<b>2</b>	0	1	0	0	0	0	0	
	Senegal	3	<b>2</b>	5	<b>4</b>	1	3	0	<b>2</b>	0	
	French Sudan	2	1	<b>2</b>	0	1	1	0	0	0	

Table B2. Number of administrators' returns to districts, by colony.

Note: column 8 row 1 should read "in Ivory Coast, only 1 district counts 8 administrators' returns.

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Variable coded	ed Rank type Rank		Variable coded
		1st class	18
6	Chief Administrator	2nd class	17
	Administrateur en Chef des Colonies	3rd class	16
		1st class	15
5	Administrator	2nd class	14
	Administrateur des Colonies	3rd class	13
		1st class	12
4	Assistant Administrator	2nd class	11
	Administrateur-Adjoint des Colonies	3rd class	10
		Lieutenant-Colonel	9
		Battalion Chief	8
3	Military	Captain	7
	Militaire	Lieutenant	6
		Sublicutenant	5
2	Civil Services		4
	Personnel des Services Civils		
		1st class	3
1	Indigenous Affairs	2nd class	2
	Personnel des Affaires Indigènes	3rd class	1
Note:	the top corresponds to the highest rank while	e the bottom is the lowest	rank.

#### Table B3 Banks of administrators

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M2 EPP - Master's Thesis Defense

July 20, 2015 21 / 21

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	Non-extrapolated	Extrapolated	Missing	Total
Ivory Coast	52	107	29	188
	(27.8%)	(56.9%)	(15.4%)	(100%)
Dahomey	19	12	34	65
	(29.2%)	(18.5%)	(52.3%)	(100%)
French Guinea	71	124	18	213
	(33.3%)	(58.2%)	(8.5%)	(100%)
Upper Volta	59	78	11	148
	(39.9%)	(52.7%)	(7.4%)	(100%)
Senegal	28	50	15	93
	(30.1%)	(53.8%)	(16.1%)	(100%)
All colonies	299	488	138	925
	(32.3%)	(52.8%)	(14.9%)	(100%)

#### Table D1. Extrapolations for the outcome variable, by colony.

July 20, 2015 21 / 21

2

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