Institutional Impact of Colonizers on Economic Performance of Post-colonial Countries in Africa

December 19, 2019

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Contents

Theoretical discussion

- Main focus of development economics: what causes economic prosperity?
  $\rightarrow$ Answer institutionalist school: the way institutions are set up.
- The way colonizers set up colonies determines long-term economic performance [1]
- General consensus: British institutions better for country after independence than French [2]
  $\rightarrow$ Does the data show this?

[1] Acemoglu, Daron and Robinson, James A., Why Nations Fail (2012)

[2] Lee, Alexander and Schultz, Kenneth A., Comparing British and French Colonial Legacies: A Discontinuity Analysis of Cameroon (2011).

Main Hypotheses

- H_0: No difference in economic performance between French and British former colonies in Africa.
- H_1: British former colonies in Africa perform better economically than French former colonies in Africa.

Two measures of economic performance:

- Financial stability.
- GDP growth.

Analyzed data sets

- Crisis data African countries (Reinhart and Rogoff)
  $\rightarrow$ Financial stability.
- Nominal GDP data and GDP growth data (Worldbank)
  $\rightarrow$ GDP growth.

Crisis data African countries

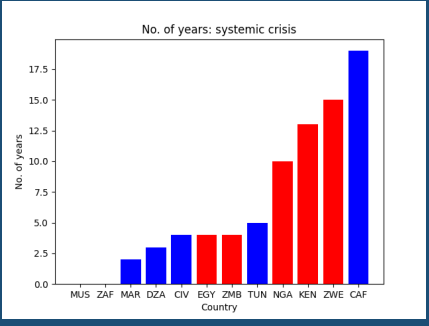
- Focuses on types of crisises between 1860 to 2014
  - Systemic Crisis
  - Banking Crisis
  - Inflation Crises
  - Currency Crises
  - etc.
- 13 former European African colonies
  - 5 French
  - 7 British
  - 1 Portuguese

Nominal GDP data and GDP growth data

- Time-series focused on nominal GDP and GDP growth between 1960-2014
- Contains all countries in the world including our 13 former European African colonies

Part 1: Financial Stability

Test 1: Mann-Whitney U test[3]



[3] Mann, H. B.; Whitney, D. R. On a Test of Whether one of Two Random Variables is Stochastically Larger than the Other. Ann. Math. Statist. 18 (1947), no. 1, 50–60.

Test 1: Mann-Whitney U test (contd.)

- H_0 : A *given crisis* distribution is the same for former British and French colonies
- H_1 : A *given crisis* distribution is less for former British colonies than for former French colonies[4]

We test these hypotheses under a *significance level* (α) of 5% or 0.05.

[4] Note that in our case a lesser distribution would equal a stabler economy

Test 1: Mann-Whitney U test results

Type of crisis	U test statistic	p-value
Systemic Crisis	17	0.5
Currency Crises	32.5	0.9942
Inflation Crises	29	0.9756
Banking Crisis	20	0.6875

We cannot reject H_0 for any type of crisis as we do not have enough evidence ($p \leq 0.05$) to accept H_1 for any type of crisis.

Test 1: Mann-Whitney U test (extra)

- H_0 : A *given crisis* distribution is the same for former British and French colonies
- H_1 : A *given crisis* distribution is greater for former British colonies than for former French colonies[5]

We again test these hypotheses under a *significance level* (α) of 5% or 0.05

[5] Note that in our case a greater distribution would equal a less stable economy

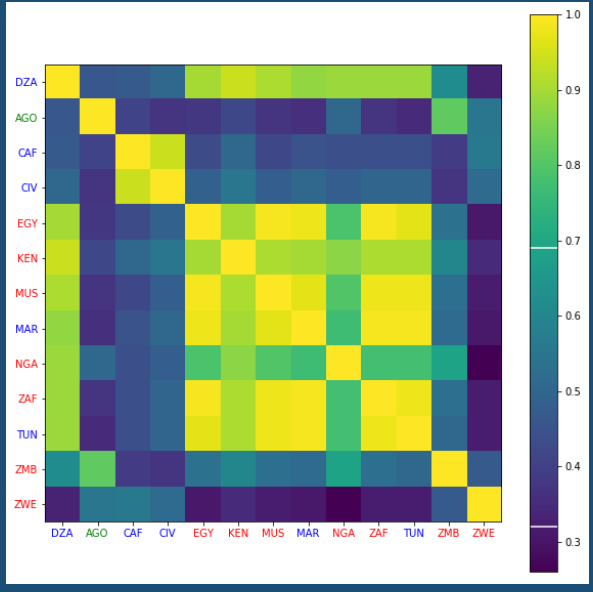
Test 1: Mann-Whitney U test results (extra)

Type of crisis	U test statistic	p-value
Systemic Crisis	17	0.5651
Currency Crises	32.5	0.0092
Inflation Crises	29	0.0355
Banking Crisis	20	0.3722

We have enough evidence for H_1 for currency crises and inflation crises as $p \leq \alpha$, thus we reject H_0 for currency crises and inflation crises.

Test 2: Clustering

- Exploratory data analysis
- K-means clustering
- Non-deterministic
- Rank of clusters


DZA
AGO
CAF
CIV
EGY
KEN
MUS
MAR
NGA
ZAF
TUN
ZMB
ZWE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3

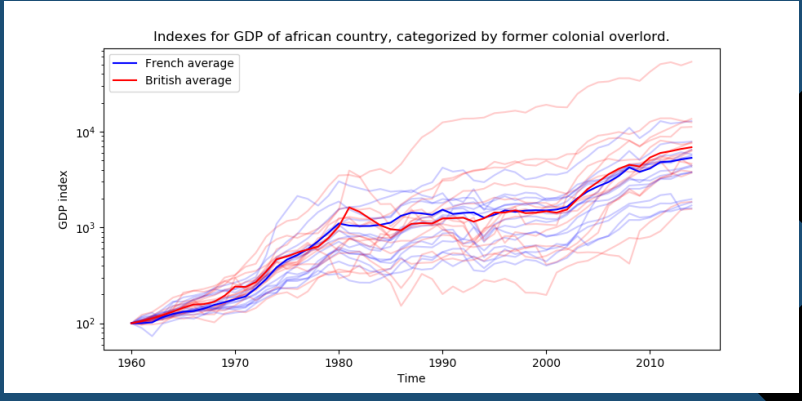
Financial stability: conclusion

- Former British colonies are not financially more stable than French colonies.
- The reverse is the case, for some crises former French colonies are financially more stable than former British colonies.

H_1 of main hypotheses not proven: no proof of better performance former British colonies.

Part 2: GDP growth

Which subset of countries have the highest growth?

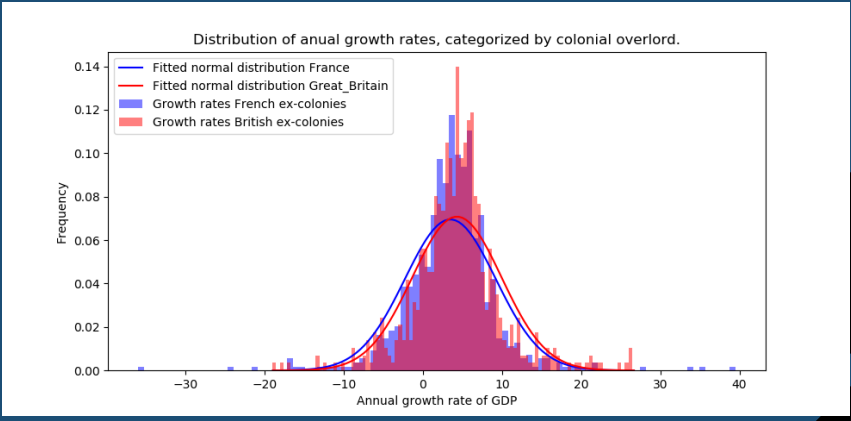


Test 1: t-test on GDP growth[6]

- H_0: The distribution in growth rates between former British and French colonies is the same.
- H_1: The average growth rates for former British colonies is higher than those of former French colonies.

[6] Wasserman, L., All of Statistics (2010)

Test 1: t-test on GDP growth, histogram



Assume normality based on Central Limit Theorem.

Test 1: t-test on GDP growth results

Statistics for the period 1961-2014:

Measurement	French	British	All
Average growth rate	3.39	4.36	3.78
Standard Deviation	6.14	5.71	5.67
n countries	13	13	26
n growth rates	702	702	1404

one-sided t-statistic = -3.03, one-sided p-value = 0.00125

For $p \leq 0.05$, the average growth rate of British ex-colonies is higher than in French ex-colonies, and thus to reject H_0.

Test 2: Multivariate regression model (OLS)[7]

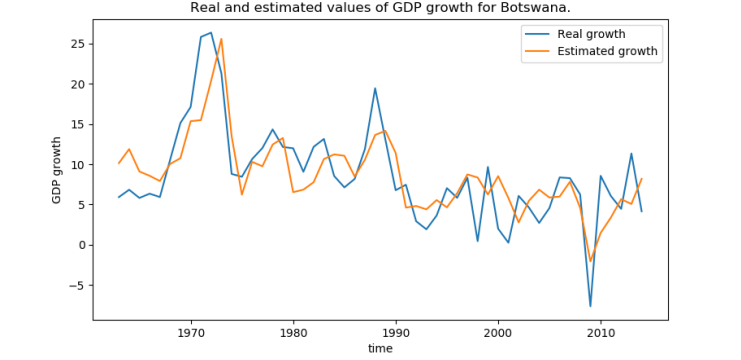
Test if growth former motherland still influences growth after independence.

$$\hat{y}_t = \alpha + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \beta_3 y_{World} + \beta_4 y_{France} + \beta_5 y_{GreatBritain}$$

Note that this is **not** a predictive model, but an explanatory model which shows the influence of the given variables.

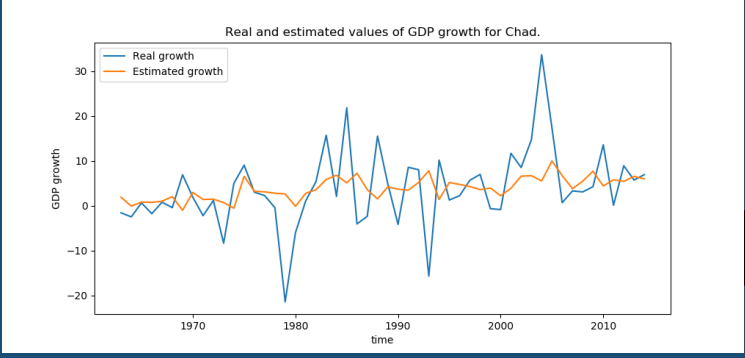
[7] Stock, James H., Watson, Mark W., Introduction to Econometrics (2015)

Test 2: Botswana (adj. $R^2 = 0.54$)



$$\hat{y}_t = \underset{(0.464)}{-1.32} + \underset{(0.009)}{0.37}\, y_{t-1} + \underset{(0.058)}{0.26}\, y_{t-2} + \underset{(0.49)}{0.47} y_{World} + \underset{(0.615)}{0.28}\, y_{France} + \underset{(0.028)}{0.85}\, y_{GreatBritain}$$

Test 2: Chad (adj. $R^2 = -0.02$)



$$\hat{y}_t = \underset{(0.084)}{5.32} + \underset{(0.292)}{0.16}\, y_{t-1} + \underset{(0.920)}{0.02}\, y_{t-2} + \underset{(0.967)}{-0.06} y_{World} + \underset{(0.445)}{-0.90} y_{France} + \underset{(0.791)}{0.21}\, y_{GreatBritain}$$

Test 2: significance in models

$$\hat{y}_t = \alpha + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \beta_3 y_{World} + \beta_4 y_{France} + \beta_5 y_{GreatBritain}$$

For $n_{France} = n_{GreatBritain} = 13$:

Measurement	French	British
Average R^2	0.14	0.25
Average adjusted R^2	0.05	0.17
sign. pvalue for FRA*	0	0
sign. pvalue for GBR*	1	1
sign. pvalue for WLD*	1	3

*Number of countries with $p < 0.05$ for given category

Test 2: check for imperfect multicollinearity

Exclude world:

$$\hat{y}_t = \alpha + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \beta_3 y_{FRA} + \beta_4 y_{GBR}$$

Measurement	French	British
Average R^2	0.11	0.22
Average adjusted R^2	0.04	0.15
sign. pvalue for FRA	2	0
sign. pvalue for GBR	0	1

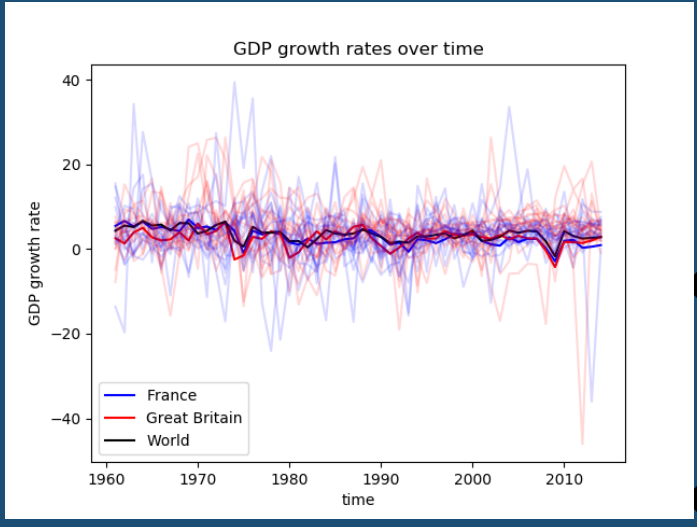
Exclude France and Great Britain:

$$\hat{y}_t = \alpha + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \beta_3 y_{WLD}$$

Measurement	French	British
Average R^2	0.11	0.22
Average adjusted R^2	0.05	0.17
sign. pvalue for WLD	3	5

Conclusion: I.M. makes it difficult to accurately measure effect growth GBR and FRA.

Test 2: reason imperfect multicollinearity



GDP growth: conclusion

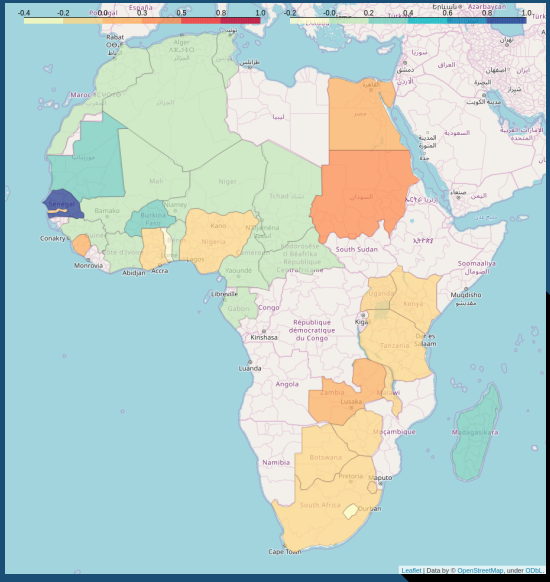
- GDP growth in former British colonies higher.
  $\rightarrow$ Confirms H_1.
- GDP growth not dependent on former colonizer in most cases
  $\rightarrow$ Does not rule out institutional component.

H_1 of main hypotheses proven: former British colonies have higher GDP growth.

Suggestions for further research: correlation growth in region

- Does economic prosperity and growth carry over the border?

- Correlation between Senegal and the rest of Africa.



- Correlation between The Central African Republic and the rest of Africa.

- Correlation between World economy and Africa.

Suggestions for further research

- More crises in former British colonies because financial sector is better developed?
- Are former British colonies better equipped for international trade?
- Combine our current sets of data with political data to see how much of an influence political events have on the economy.