DSIFinal Project

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Introduction

821 million people across the world suffered from hunger in 2018 according to the United Nations. Policymakers and global leaders are committed to ending hunger, and have codified this effort through the Millenium Challenge Goals, the Sustainable Development Goals, and the UN's Zero Hunger Challenge. These policymakers and global leaders face many challenges however, and this analysis provides an analysis of food availability in West Africa. We seek to understand how capital flows in the agricultural sector influence the availability of food in West African countries.
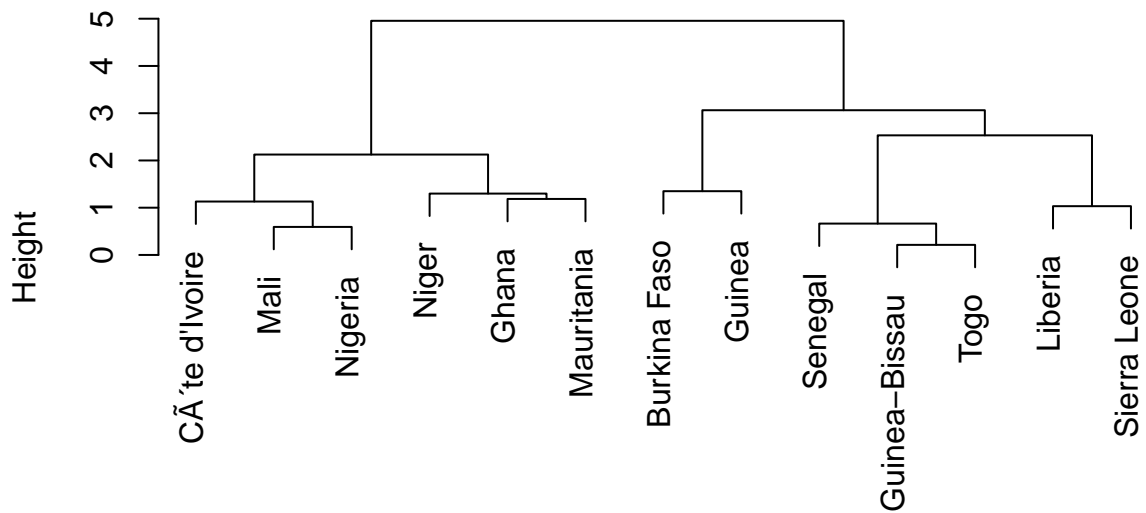
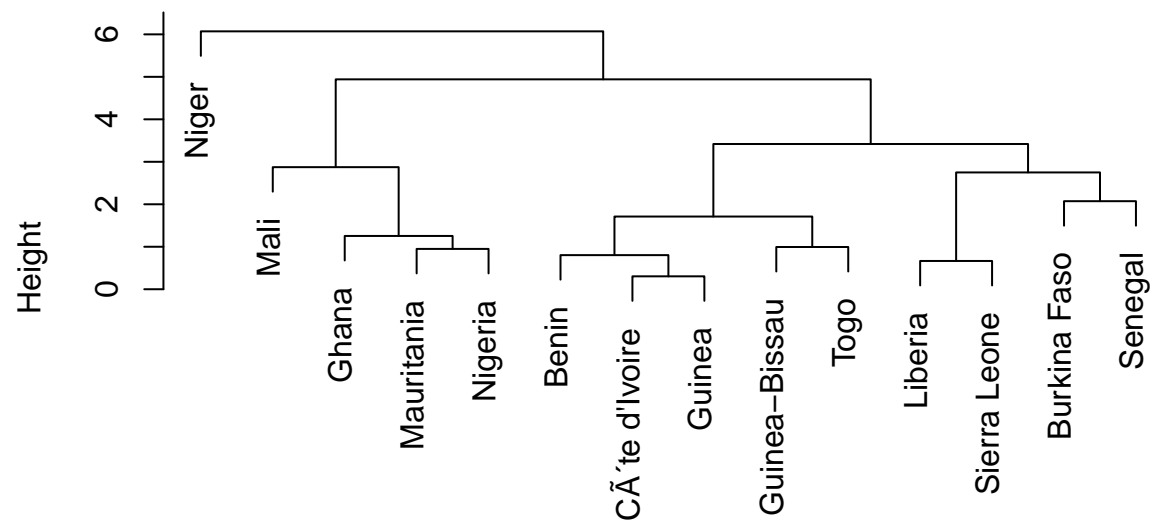Our analysis finds that PUTFINDINGSHERE.

Clusters in 2000

Height
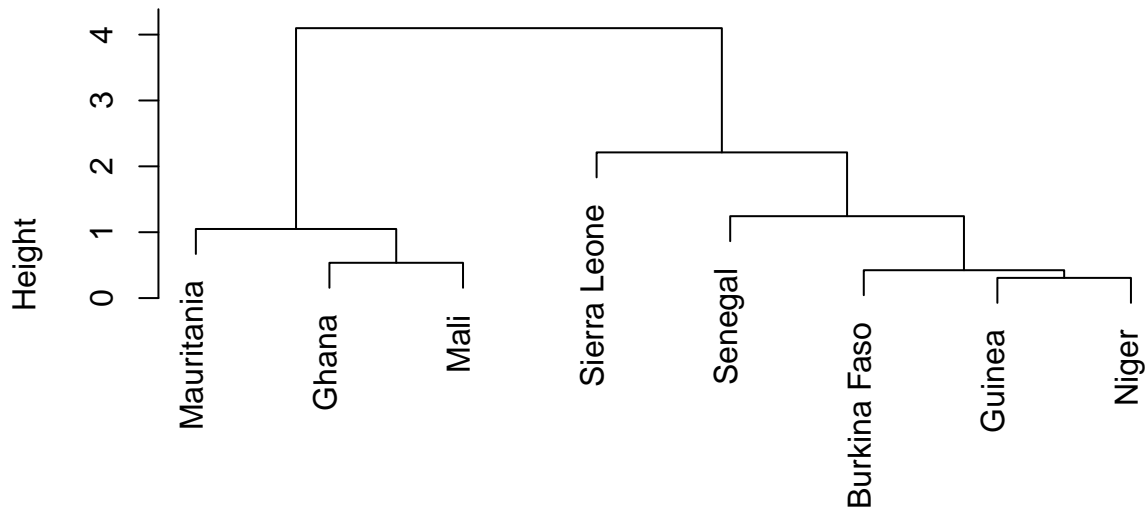
clust2000
hclust (*, "complete")

Clusters in 2005

Height

clust2005
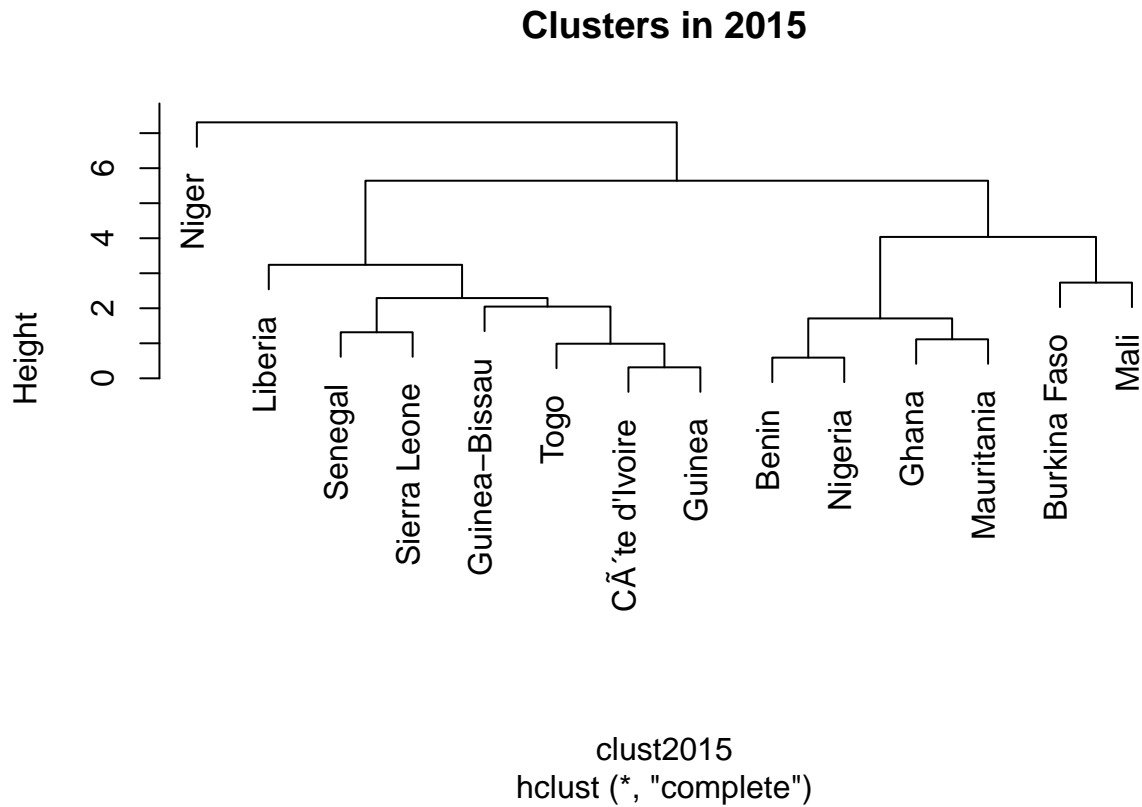hclust (*, "complete")

Clusters in 2010

clust2010
hclust (*, "complete")

Clusters in 2015

clust2015
hclust (*, "complete")

Cluster Analysis

To more closely examine the trends uncovered by the linear regression model, we decided to complete a cluster analysis to examine how the different states have shifted in relation to each other. This analysis could potentially reveal additional information on how capital flows have impacted similar states. We focused on bilateral and multilateral development flows, as they contained the most complete data and clustering is ineffective with significant amounts of missing data. Due to the relatively small sample size, we utilized a hierarchical agglomerative method clustering process as it can identify nuance in small-n datasets which are harder to trace through k-means clustering.

This process examined the shifts in clusters at four time markers: 2000, 2005, 2010, and 2015. These time periods were selected as they contain most of the data, avoid incomplete data, and prevent an oversaturation of the dendrogram. The results are summarized in dendrograms created through `hclust`, with the closeness between clusters summarized through the `height` variable on the Y-axis.

Overall, we see countries moving further apart from each other as the millennium progressed. This is represented by the maximum height value moving from 4.0979373 in 2000 to 7.3082381 in 2015, a change of -3.2103008. We can also examine Baker's Gamma correlation coefficient to determine the level of similarity between two dendrograms. Due to the varying size of the dendrograms, it is only possible to compare figure 3 and figure 4. Between these we find a Baker's Gamma correlation of 0.6811645. This correlation coefficient indicates a strong similarity between the two models, though they are not exactly the same. While this correlation coefficient doesn't account for height, we also see a change in similarity between the two years of -1.2373249 as Niger continues to pull away from additional countries. Thus, while we see most countries experiencing similar effects of multinational and bilateral development aid